CENTRO STUDI SUL FEDERALISMO

research paper

SIMONE VANNUCCINI

THE RATE, DIRECTION AND TIMING OF EUROPEAN INDUSTRIAL POLICY: A FEW PROPOSALS

May 2015

ISSN: 2038-0623

ISBN 9788896871461

ABSTRACT

The paper provides a novel view on the challenges to the design of a European industrial policy. We overview the reasons for the recent renewed interest in Industrial Policy and list a series of known facts concerning development, industrialization processes and industrial dynamics, coming to the partial conclusion that Europe needs a set of initiatives tailored to its specific position in the world economy. The strategies recently developed by the European Commission (Smart Specialization and Industrial Renaissance) identify the contours of a sound public intervention in the real economy and contribute to a deeper understanding of the technological trajectories that can influence Europe-wide patterns of specialization, entrepreneurial discovery and structural change. However, they maintain a rather conservative approach to the desired rate, direction and timing of economic activities. In this respect, this paper sets out a number of proposals to go beyond the simple relaxation of market constraints and bottlenecks and aims to contribute to a policy approach willing to "create markets", to enable discovery and complementary initiatives from the private sector and to lift the economy out of potential traps. Such proposals concern Investment Banks, Public Procurement, European Public Enterprises and a possible European "Patrimony". Finally, we suggest that the key to industrial upgrading in Europe is the public provision of those "specific inputs" that – for reasons of scale and failures in coordination – only the supranational Polity can supply.

Simone Vannuccini PhD student at Friedrich Schiller University Jena

E-mail: **simone.vannuccini@uni-jena.de**

Paper prepared for the Conference "*A New Industrial Policy for the European Union*" (Turin, 8 May 2015) organized by the Centro Studi sul Federalismo (CSF) and the European Policy Centre (EPC).

1. Industrial Policy Matters, Once Again - 2. What We Know about Industrial Policy and What is Relevant for the European Economy - 3. The Current European Strategies - 4. A Few Proposals for a Truly European Industrial Policy - 5. Concluding Remarks - 6. References.

It is hard to deny that every case of economic success in recent economic history is related to forms of policy intervention devoted to the development of industries (Salazar-Xirinachs *et al.*, 2014). Nonetheless, the debate on the relative costs and benefits of Industrial Policy (IP hereinafter) is usually polarized between supporters and detractors, often mirroring the political divide that separates progressive and conservative worldviews. Moreover, while offering a set of tools available to any country irrespective of the position occupied relatively to the world's technological and wealth frontier, IP and its related theoretical advances tend to be a developing countries' (and development economics') affair.

Even if IP has a clear developmental focus, it is hard to disagree with Hausmann and Rodrik (2006) when they claim that policy-makers everywhere are "doomed to choose": industrial policies play an important role both in catching up and leader countries, and the decision is not whether to intervene, but where and how to intervene. This paper takes stock of the most recent debates on IP and provides a framework not only to "re-import" IP discussion to developed countries, but also to extend its reach to the supranational dimension. The analysis results in a number of proposals to design a new industrial policy for the European Union, able to consider the shortcomings of the existing approaches and the reforms required at community level. From another point of view, what the paper suggests is to make the idea of the "entrepreneurial state" (Mazzucato, 2013) and the "innovation state" (Rodrik, 2015) a supranational one, embracing the European Union as a whole.

The first take-home from the analysis is that the European dimension of IP is subject to a specific set of problems which requires a specific set of solutions. The focus on the extent and intensity of the capabilities and know-how necessary to make industrial upgrading work well is an issue somewhat less important than creating the appropriate instruments able to *i)* remove bottlenecks to Europe-wide investments, raising their returns, *ii)* create enabling platforms for cumulative technological advancement and upgrading, *iii)* provide the critical mass of demand to make certain niches of research and production viable, *iv)* fill the gaps and the structural holes in the continental industrial network with direct public intervention – which, according to Mazzucato (2015) has to do with "actively creating markets, instead than just fixing them". In a nutshell, a European IP has to focus not just on the rate of intervention, but also on its direction and timing, taking stock of the dynamics of its industries.

The second take-home from the paper regards the premises and the implications of implementing such proposals. The setup of a consistent European IP is inherently connected in a sort of "dual inducement" with the budgetary and governance dimension of the Union: advancements in the European institutional design affect the scope and the (economic and political) feasibility of the policies under consideration; the implementation – even partial – of some of the suggested industrial policies may represent a push for broader reforms. The existence of such mutual

feedback does not necessarily lead to progress in the integration process nor to superior outcomes, whose selection is mainly a political choice.

The paper proceeds as follows: Section one identifies the structural reasons for the current coming back into fashion of IP. Section two provides the general theoretical rationale for IP and describes the specificity of the European case. Section three reviews the current IP strategies of the European Union. Section four provides a number of proposals to be implemented as building blocks of a new European industrial policy. Section five concludes.

1. Industrial Policy Matters, Once Again

There is growing interest in the study and the practice of IP (Stiglitz *et al*., 2013; Salazar-Xirinachs *et al.*, 2014); this is quite interesting given that "*There was a time when 'industrial policies', for both developed and developing countries, were bad words not to be spoken either in public or in private by respectable people*" (Cimoli *et al.*, 2009, p. 1). Such growing interest is particularly evident in the literature, where qualifying adjectives such as "new", "rejuvenation", "return to fashion" and "rethinking" are constantly matched to industrial policy (Warwick, 2013) to signal a novel wave of attention to the topic[1]. Moreover, recently many high and medium income economies (among them France, Germany, Japan, Korea, The Netherlands, United Kingdom, Turkey, U.S., Brazil, China, India, Argentina, Colombia, Vietnam and Chile) have been engaged in either general, sector-specific or technology-related industry interventions (Warwick, 2013; O'Sullivan *et al.*, 2013). We can identify two main – related – explanations for the return of IP, one based on long-run arguments and the other based on short-run and contemporary drivers.

The first view is rooted in the historical development of IP as experiencing a "rise, fall, and rise again" (Salazar-Xirinachs *et al.*, 2014). Such perspective considers the current interest in IP as a consequence of the (roughly) natural cyclical succession of positions against and in favor of policy intervention. In this respect, the comeback of IP can be seen as a case of "shifting involvements" (Hirschman, 1982). From this perspective, a call for stronger and more pervasive IPs depends on the fact that the expected returns from studying and adopting industrial policies are increasing after a period of disillusion and disenchantment in which market failures became more critical than government failures. However, cyclical shifts in the evaluation of the essentiality of State intervention cannot be the only determinant of IP resurgence. The second explanation departs from a purely long term predictable pattern to highlight those several contingent factors which – at least for Europe – contribute to raising the importance of IP: *first*, the double-dip[2] crisis that European economies are still experiencing (UNIDO, 2014); *second*, the structural transformations

[1] The labeling of Industry and Innovation -related policies is even more diversified; see for example the German New High Tech Strategy *Industry 4.0* (http://www.hightech-strategie.de/de/The-new-High-Tech-Strategy-390.php).

[2] With double-dip here is meant the "W" shape of the EU macroeconomic variables – in particular manufacturing output – trends (UNIDO, 2014), where a new recession followed a small upswing in 2011. Interestingly enough, the "alphabet" of the European crisis, which passed from an expected "V" (a crisis with a fast resumption) via a "U" to the already mentioned "W", is in serious danger of bending towards an "L" shaped recession (Basu, 2014).

of production activities; *third*, the secular trends of economic growth for developed countries; *fourth*, the competition with emerging economics. The four points are analyzed below.

Concerning the first point, the European economy is still deeply rooted in the crisis (Majocchi, 2014). Over the last years, however, the political pressure generated by poor economic forecasts and the figures of mounting unemployment helped the convergence towards positions favorable to a supranational coordinated intervention in support of the real economy. Notwithstanding the debate on the size and scope of austerity measures, the consensus around public intervention is exemplified by the recent launch of the Investment Plan for Europe (Juncker Plan)[3] and the related kick-off of the ESIF fund (Majocchi, 2015). The acknowledgment of the magnitude of the capital structure destroyed by the crisis and the focus on the importance of manufacturing are already at the core of the European Commission's IP strategy (see Section three for a more detailed discussion); in this respect, such a starting point for policy design already represents a step in the direction suggested by this paper.

Regarding the second issue, at least three different but related dynamics, and the need to govern them, make a qualitative leap in the extent and quality of IP necessary: *i)* the robotization and automation of economic tasks (Autor, 2014) that – in a creative destruction fashion – results in efficiency gains, re-shoring and resources reallocation but also produces jobs and wages polarization with some consequent detrimental welfare effects; *ii)* the emergence of factoryless producers (Bernard and Fort, 2013) as a transitory or permanent phenomenon, the international dispersion of production processes in global value chains (GVC), and the change in the shares of value added originating in Europe (Timmer *et al.*, 2014; Amador *et al.*, 2015); *iii)* the increasingly blurred boundaries between manufacturing and services, as Fontagnè *et al.* (2014) highlight when trying to draw the boundaries of what is meant by industry: "*The nature of industry is changing as industry and services are becoming one single entity. The boundaries of companies are changing with the splitting of value chains. The defining characteristic of an "industrial" company is its involvement in product design, intellectual property and economic risk. The defining characteristic of "industry" is mass production, economies of scale, productivity gains and the application of technical progress*" (Fontagnè *et al.*, 2014, p.4). This structural fusion between manufacturing and services has to be seriously taken into account when implementing IP. The same attention needs to be paid to matters concerning the evolution of value chains. As Amador *et al.* (2015) found out, there is a growing relevance of external suppliers in the Euro area – as important as it is for China and more than it is for U.S. or Japan – even if such embeddedness in GVC does not seem to undermine the magnitude of intra-European trade. Rather, it is domestic production that is substituted by international sourcing and linkages, a tendency at the core of the relative European de-industrialization problem that spurred most of the recent initiatives on IP (Dhéret, 2014).

[3] Communication of the European Commission COM(2014) 903 final "An Investment Plan for Europe" of 26.11.2014. The plan is structured around the European Structural Investment Funds (ESIF) and the Programme for Employment and Social Innovation (EaSI) microfinance. The ESIF fund, endowed with €21 billion in guarantees coming from the European Union budget (€16 billion) and the European Investment Bank (€5 billion), is expected to produce a 15x leverage in order to finance projects for €315 billion.

Concerning the third point, the possibility that advanced economies are entering a phase of secular stagnation (Summers, 2013; Gordon, 2012) implies potentially severe consequences on the amount of public intervention needed to maintain the pre-crisis level of occupation, the balance of macroeconomic accounts, and so on. If the level of potential growth (the attainable target for output growth) of the Western economies suffers from a permanent slump and has to be corrected downwards, then the need for a fine-tuned IP able to facilitate and channel investments is even stronger. The combining of the economic and financial crisis with processes of de-industrialization and the possibility of falling onto a path towards secular stagnation creates the risk of that "never come back" situation experienced by Eastern Germany after reunification, which calls for sustained intervention in order to support investments (Kollatz-Ahnen and Bullman, 2014).

Finally, the fourth factor making IP an urgent matter of analysis and action has to do with the competition from emerging economic powers. Despite the dependency of a good share of these economies on the availability of natural resources, many of them successfully applied IPs in recent years – entering advanced markets step by step, first by assembling imported goods and then taking over slices of the value chains, in a fashion similar to that predicted by the international product life cycle theory (Vernon, 1966). The competitive pressure coming from these rising countries acts as an incentive to rationalize and enhance the developed world's strategies in support of industrial development.

To sum up, the literature is right in highlighting the "rise again" of industrial policy – at least as a theoretical priority –, especially as it takes place in the minds of the European policy-makers. The combined effect of the crisis-induced push for reforms, the structural worldwide re-arrangement of production, the secular trends of economic growth for the developed economies, and the global competitive race for success – all happening on top of a period of shifting involvements toward more open views on government intervention – set up the optimal conditions for IP to be at the core of economic policies. However, having a favorable climate for IP does not directly translate into an extended reach of IPs or, more importantly, in implementing the "right" policies. In order to be effective in the European context, IP has to be tailored to the needs of the European economy. The task of the next section is therefore to highlight some general stylized facts of IP and to combine them with other known facts about the dynamics of advanced economies, in order to identify which prescriptions hold for the European case.

2. What We Know about Industrial Policy and What is Relevant for the European Economy

It is good practice to start with a definition of the object of analysis. We consider the most comprehensive definition of IP the one elaborated by Warwick (2013, p. 16) on the basis of an extensive review of the literature: "*Industrial Policy is any type of intervention or government policy that attempts to improve the business environment or to alter the structure of economic activity toward sectors, technologies or tasks that are expected to offer better prospects for economic growth or societal welfare than would occur in the absence of such intervention*". This definition can be maintained as a useful benchmark; however, for the purposes of this paper, our

"working" definition is the one borrowed from Hausmann and Rodrik (2006, p. 24), who see IP as "*the provision of inputs that are specific to subsets of activities*". Two building blocks from this definition are relevant for the construction of a European IP: *i)* with "*provision*" the focus is on the pro-active role played by public institutions, filling the gap when market provision is lacking; *ii) specific inputs* – so specific as to require an external public intervention – are the key for differentiating the European case from interventions in a developing context: the required specific inputs are relevant and purposeful know-how, missing links in the network of interactions between firms and industries, financial resources, and platforms that facilitate matching of latent supply and demand. The proposals in Section four are related to the provision of specific inputs to certain activities and build around this first definitional exercise.

To identify which specific proposals can be designed for the European Union, it is useful to briefly discuss what is already known about industrial policy in order to circumscribe the field of analysis. In fact, another reason not yet mentioned for the comeback of IP has to do with the very evolution of the economic discipline, and namely with the fact that nowadays we know more about the ingredients and effects of IP. In particular, over the decades, the broad confrontation between the supporters of balanced and unbalanced growth strategies (Hirschman 1958; Murphy *et al.*, 1989; Alacevich, 2011) has been enriched by the introduction of new microeconomic building blocks, developed in sub-fields of economic theory such as development economics (Hoff, 2000; Sah and Stiglitz, 1988), structuralist, and Schumpeterian economics/industrial dynamics (Cimoli *et al.*, 2009, Cantner, 2011).

In general, any rationale for IP derives from the evaluation of the weight that society assigns to market failures compared to government failures. Government failures have to do with the peculiar payoff functions of the public agents (susceptible to the electoral cycle and to the maximization of power and influence rather than to economic welfare) – that is, with incentives that could be mismatched with respect to the aim of IP – and with information problems – i.e. the uncertainty faced when trying to "pick winners". Moreover, government intervention is usually blamed for its tendency to produce "crowding-out" of private propensities to invest, which are substituted rather than complemented by the State activities.

Market failures in the context of IP are instead determined by forms of externalities like coordination problems and spillovers (Hausmann and Rodrik, 2006). In coordination failures, agents are unable to fully internalize the effects of others' decision, meaning to evaluate the social returns of an action instead of the private ones; spillovers – whether they are "rent" or "knowledge" spillovers (Verspagen and De Loo, 1999) – are unintended transfers of value (not captured by prices) or know-how (when not protected or easily absorbable). The presence of coordination problems and spillovers negatively affects incentives, and produces inferior outcomes and the probable selection of a low-level equilibrium, often turning into "traps" (Hoff, 2000). The role of IP is precisely to correct such failures, being the "visible hand" capable of lifting the economic system out of bad equilibria and to design institutional mechanisms (via direct intervention or contracts and insurances), helping (or forcing) agents to internalize externalities.

In order to work properly, IP has to rely on information about the functioning of the economic system. Such information cannot be complete – information asymmetries are pervasive and learning, which is nothing but knowledge accumulation, occurs also in public institutions – but can

benefit from pieces of evidence that appear to be persistent between and within economies and over time. Such well-known regularities about a certain phenomenon are usually labeled in the literature "stylized facts" (Kaldor, 1961).

We next discuss some of those facts in the context of IP literature and with respect to studies on industrial dynamics (Dosi, 2007), aiming to select those issues that have to be seriously addressed in designing a European IP. Concerning IP, we mainly refer to Hausmann and Rodrik (2006) and Rodrik (2013 and in UN-DESA, 2007). In general, the following persistent regularities are found: *i)* developing countries produce less diversified and less sophisticated products *ii)* the manufacturing sector is conducive to growth and structural change (growth booms happen when economies shift to manufacturing) *iii)* some specialization patterns are better than others in guaranteeing faster growth and *iv)* there is unconditional convergence (in labor productivity growth and levels) at manufacturing and product level. In short, the main finding is that "what" is produced is fundamental. Growth is achieved by upgrading the set of products produced as well as their quality, particularly in the manufacturing sector. The manufacturing sector, in turn, represents the best platform for industrial take-off and the very locus of learning (Cimoli *et al.*, 2009), where growth-enhancing knowledge is accumulated, recombined, re-used (Bresnahan, 2012). Of particular interest is stylized fact *iv*, which is the key to identify the most relevant and ultimate target for IP. The patterns of convergence in economic performance and productivity in recent years show the presence of "technology clubs" (Castellacci, 2008) as well as persistent divides; the macro evidence speaks generally in favor of the so-called conditional convergence, meaning that the growth rates of countries show similar patterns only when country-specific conditions are controlled for. However, when the focus is shifted from the macro level to finer-grained levels of analysis, it appears clear that non-manufacturing activities drive divergence between countries. Taken alone, manufacturing shows unconditional convergence, suggesting therefore that "*lack of convergence is due not so much to economy-wide misgovernance or endogenous technical change but to specific circumstances that influence the speed of industrial reallocation from nonconvergence to convergence activities. The policies that matter are those that bear directly on this reallocation.*" (Rodrik, 2013, p. 38). Unconditional convergence holds at more disaggregated levels of analysis: at product level, once a country starts to produce a certain good, its productivity in making it converges to the world frontier level. The reallocation of resources towards more advanced production is the key to (unconditional) growth.

Following the line of research just sketched out it becomes once again clear that "what" is produced matters, because producing the "right" goods means to jump on the trajectory of growth and industrialization. The implication for the analysis of development is that the focus has to shift on what makes certain products viable for production – namely on what determines the size of the product space (Hidalgo *et al.*, 2007). Here the definition of IP as *the provision of inputs that are specific to subsets of activities* comes in: the specific inputs are in broad sense the *capabilities* – the know-how – needed to introduce goods in the basket of feasible production. In short, the task of IP is to supply or form the necessary capabilities where lacking by intervening directly or by lifting the market forces out of low-equilibrium traps.

The stylized facts on development and IP highlight the provision of "missing inputs" as the key for diversification, sophistication, growth and convergence. The literature on industrial dynamics (Cantner, 2011) identifies another set of regularities, this time more tailored to developed countries. Without entering into detail (see Dosi, 2007 for a survey), economists are aware of the statistical properties of firms growth, R&D expenditures (Cohen and Klepper, 1992), innovation (Silverberg, 2002), spinoff activities (Klepper, 2009), survival, market competition and selection (Cantner, 2007), agglomeration and collaboration (Cabral *et al.*, 2013), and evolution over time (Klepper, 1996). In a nutshell, the success or failure of businesses and industries is again dependent on "what" they do specifically: different industries have different knowledge bases, a different propensity to innovate, to compete and to cluster geographically, different "elasticities" with respect to consumer final demand, and peculiar structures of connectivity and interdependency with upstream and downstream activities. Such heterogeneity evolves over time along with the life cycle of the different economic products and sectors, meaning that, besides the rate and the direction, also the *timing* of policy intervention matters. Even in these cases, market outcomes depend on the availability and the quality of specific inputs: capabilities to do something and to eliminate the bottlenecks created by coordination failures and spillovers, while learning is continuously taking place (Stiglitz and Greenwald, 2014). Moreover, despite the tendency of the borders between manufacturing and services to become fuzzier (Fontagnè *et al.* 2014), also these known regularities of industrial development emerge from the manufacturing sector. Manufacturing is the locus of learning, where knowledge is formed and developed, where scale and cumulative improvements generate growth.

Comparing the stylized facts concerning IP in developing contexts and industrial dynamics, there is a clear commonality regarding the role played by specific capabilities as ultimate inputs for the supply of a largely diversified set of products and on the importance of manufacture as the sector where most innovative activities, learning and change take place.[4] However, when comparing the European case to other contexts in which IPs are applied it also becomes clear how the set of problems to be addressed is different. The economies of the European Union – and in particular those of the Euro area – have already developed strong manufacturing sectors and are – at least potentially – able to produce most of the products (in fact, within the European Union member countries trade similar products[5]). Despite a tendency towards relative de-industrialization (Dhéret and Morosi, 2014), the basic set of capabilities needed as input for specific production activities are available to all European countries, meaning that differences in diversification are negligible. Being already industrialized and endowed with a skilled labor force, the European economy is not at risk of "premature de-industrialization" (Rodrik, 2015a); moreover, its de-industrialization has to be understood mainly as "(low-skills) employment de-industrialization", while value-added in manufacturing remains high. The differences in productivity can be

[4] This awareness has driven recent initiatives in favor of re-shoring manufacturing activities in advanced countries. See for example the strategy "Made in America" launched in the United States via the National Institute of Standards and Technology (NIST) – http://www.nist.gov/mep/services/america/reshoring.cfm.

[5] Intra-industry trade (driven, for example, by product diversification) seems to be another stylized fact of industrial development. As highlighted by the EU Industrial Structure Report 2011 (http://ec.europa.eu/enterprise/policies/industrial-competitiveness/competitiveness-analysis/eu-industrial-structure/index_en.htm) "*there is a high share of exchange of similar goods between countries with comparable levels of income*".

explained as differences in specialization patterns (the relative weight of different industries in the economy) as well as by institutional and technological factors: even considering the tendency to unconditional convergence at product level, the advanced economies participate in a continuous race to innovate and explore new industries – a force that works in favor of increasing divergence and heterogeneity in performance. Moreover, on the demand side, wealthier (despite the crisis and notwithstanding the increasing inequality) and more sophisticated consumers also affect competition and the selection process of "fitter" firms (Cantner, 2007).

The European economy is affected by coordination failures and spillovers like any other economy. However, while the specific inputs that IP has to usually provide have to do with the formation of those capabilities (undersupplied due to market failures) that allow to increase diversification, in the already diversified European Union the IP has primarily to solve the coordination problems (and to internalize the spillovers) related to specialization and asynchronous industry dynamics. The main reason is due to the fragmented nature of the European market and political constituency (Moro and Vannuccini, 2014) and the potential lack of private demand for new industries as well as for the established ones that engage in innovative change. In short, confronting the possibility to actively intervene in the economy, IP in Europe has to focus not only on the rate but also on the *direction and timing* of investments.

Having highlighted the European-specific rooms open for IP and the differences in the areas of intervention identified by IP stylized facts, we now review the current state of the art of industrial policy at the European level.

3. The Current European Strategies

In recent years, European institutions – and especially the European Commission – have tried to ride the wave of IP comeback, by setting up a broad continental strategy aimed at revamping the commitment by governments and stakeholders to industrial growth. Such strategy – urgently necessary due to the economic crisis and the "gloomy prospects for European manufacturing industries" (Dhéret, 2014) – consists of a large set of interrelated programs and initiatives. In what follows, we will focus on the two main pillars that represent a valuable starting point for the construction of a fully-fledged European IP: Smart Specialization strategy and Industrial Renaissance. Before describing them, however, we shall provide a short overview of the tools currently used by the European Union to address the issue of industrial development.

The most comprehensive overview on Europe and IP is the study provided by the Industry, Research and Energy (ITRE) Committee of the European Parliament, titled "*EU industrial policy: Assessment of recent Developments and Recommendations for Future policies*" (European Parliament, 2015). The document nicely depicts the current attitude of the European institutions towards IP: on the one hand, it underlines the widespread renewed interest in industrial policy; on the other hand, it reveals the deep uncertainty about how IP is defined and characterized, particularly as regards its implementation in Europe. Notwithstanding the still-in-the-making nature of European IP, the study offers a useful systematic analysis: it provides background figures on the (regional and country) distribution of several indicators – among them competitiveness, the dynamics of value added, GDP per capita, and R&D expenditures –

(European Parliament, 2015, p. 12) in order to trace a picture of the current situation of the European economy. In addition to this snapshot – which positions Europe as a whole among the world leaders in industrial development and at the same time uncovers wide disparities within the EU – the study traces the historical evolution of European IP through five phases that mark the transition from a one-sector industrial policy with the European Coal and Steel Community to the Commission's alternate activism in the Seventies, Nineties and now. More interestingly, the report summarizes and describes in detail the programs that can be considered as contributing to a European Industrial policy under the current institutional and budgetary framework. We reproduce them below.

Table 1. European initiatives related to industrial policy

	EU Initiative	**Budget (Euro)**	**Sub-initiative relevant for an EU Industrial Policy**	**Budget (Euro)**	**Theme**
Competitiveness for growth and jobs (€125.6 billion, 13% of the Multiannual Financial Framework budget)	Horizon 2020	77 bln (56%)	KET (Key Enabling Technologies	6.6 bln	Innovation
			SME Instrument	2.8 bln	SMEs/ICT
			Eurostars	287 mln	SMEs Internationalization
			Fast Track to innovation	200 mln	Research and Innovation
			SILC II	20 mln	Tech/non-tech innovation
	Connecting Europe Facility	19,3 bln (15%)	Energy infrastructure	5.1 bln	Energy connections - Single market
			Broadband infrastructure	1 bln	Digital connections - Single market
			Transport infrastructure	13.2 bln	Transport connections
	COSME	2 bln (2%)	Access to finance	163 mln	Loan guarantee facility, equity financial instruments
			Access to market	57 mln	Internationalization
			Framework conditions	34 mln	simplification measures

			Entrepreneurship	9 mln	Entrepreneurship
	EaSI	815 mln (1%)	Progress	497.1 mln	Employment
			EURES	146.7 mln	Employment services
			European Progress Microfinance Facility	1711. mln	Microfinance
Economic social and territorial cohesion (€325.1 billion, 34% of the Multiannual Financial Framework budget)	Cohesion Policy	322 bln (99%)	ERDF	100 bln	Innovation, Res., Digital agenda, SME, low-carbon economy
			ESF	n.a.	Active labor market policies
			Cohesion fund	66.3 bln	Digital infrastructure, energy, transport infrastructure
Sustainable growth and Natural res. (€373.2 billion, 39% of the Multiannual Financial Framework budget)	Community Agriculture Policy (CAP) - Pillar II	84.9 bln (23%)	European Agricultural Fund for Rural Development (EAFRD)	84.9	Diversification and dev. of non-agricultural SMEs in rural area
	European Maritime Affairs and Fisheries	6.6 bln (2%)	European Maritime and Fisheries Fund (EMFF)	6.6 bln	Fishing industry - adaptation to changing conditions

Source: European Parliament (2015), p. 31

As results from Table 1, European policies affecting the industrial sectors are spread over a set of heterogeneous programs and initiatives, spanning from research and innovation to infrastructure and small and medium enterprises (SMEs), and belonging to different Directorates-general (see European Parliament (2015) for details). In short, and quoting the report, "*significant resources are mobilised by policies and programmes contributing to an "EU industrial policy", and the policy coverage is extremely wide. Some of the initiatives with a budget envelope are (in order of importance): Cohesion Policy, Horizon 2020, Connecting Europe Facility and COSME, representing*

slightly less than €200 billion. Two recurring priorities across these programmes are SMEs and innovation. In addition, the EU exercises regulatory power in a number of areas, which contributes to levelling the playing field and facilitating business in Europe: competition, internal market, business environment, intellectual property rights, trade and energy". (European Parliament, 2015, p.7). Despite the wide policy coverage, the collection of initiatives classifiable under the heading "IP" seems to be fragmented and likely to generate policy overlapping and duplication.

Besides identifying the source of financing to support industry-related policies, the other requirement for a European IP is to discriminate between the possible targets for intervention. In this respect, the report provides an exploratory forecasting exercise that lists industries and areas of economic activity where policy intervention could be beneficial; among them are construction, upscaling of cars, steel, big data, 3D printing, clean production, advanced manufacturing, smart grids, energy efficiency, creative industries, logistics, smart cities, and integrated agriculture (European Parliament, 2015, p. 51). These "promising" and emerging fields compose a first outline of possible areas of intervention for a European IP since they are market niches with prospective scope for improvement in economic relevance and pervasiveness (Cantner and Vannuccini, 2012). To complete the picture, the list of such target areas has to be complemented by identifying those industries most conducive to growth and technological upgrading (see the Industrial Renaissance strategy contribution below).

Given the state of the art of European initiatives directly or indirectly related to IP and a first screening of promising areas of intervention, we can now turn to the two main strategies designed to upgrade the European industrial base.

The concept of *Smart Specialization* (Foray, David and Hall, 2011) links regional and innovation policy, and addresses the issue of coordination failure in the specialization patterns already identified in Section two. Moreover, it provides a theoretical framework regarding the interaction between the already mentioned specialization patterns and the dynamics of general and radical technological change – the broader techno-economic paradigm (Perez, 2010). Smart Specialization has been quickly adopted as a central strategic objective by the European Commission (Foray and Rainoldi, 2013). It builds upon (and stresses) at least three main building blocks: *i)* the role played by entrepreneurial ("bottom-up") discovery; *ii)* the horizontal distinction between regional heterogeneity in capabilities and opportunities, and *iii)* the vertical (hierarchical) interdependency of industries and technologies. While the first two dimensions point to the micro world of entrepreneurship, learning, and formation of specific and directed stocks of knowledge[6], the third one recognizes the complexity of technical change and highlights the structural properties of an economic development based on a few "engines of growth", able to introduce waves of co-invention in application sectors.

The main contribution of Smart Specialization to industrial policy at the European level is that not all the productive regions can be "leaders" in innovative activities. R&D specialization has to follow both a process of non-planned discovery of local specific capabilities and a "smart"

[6] The theoretical inspiration for the principle of entrepreneurial discovery comes from development economics, and more precisely from Rodrik and Hausmann's (2003) suggestion that, in order to understand and induce economic development, scholars have to adopt a perspective grounded on "learning what one is good at producing" (p. 605), and thus on a view of development as an endogenous process of *self-discovery*.

allocation of innovative efforts to broaden the set of applications for a core technology. In short and as an example, it will not be beneficial at the aggregate level if all European regions specialize and invest in science-based fundamental nanotechnology or ICT research. The suggested alternative is that each local context – each region – identifies the potential, feasible and rewarding applications of the core principle to its field of expertise (i.e. application of nanotechnologies to agriculture, or of ICT to tourism) and invests accordingly in innovative activities. The role of public policy, in this view, is to ease the process of entrepreneurial discovery as well to develop early warning indicators to understand when and where a Smart Specialization strategy is leading to poor results.

Smart Specialization represents an evolution of the standard thinking on IP because it shifts the analysis and proposals from being purely top-down to being bottom-up, focusing on the role played by learning and uncertainty in industrial development. Moreover, by addressing the failures in coordination related to continental specialization patterns, the Smart Specialization strategy specifically addresses the problem facing the emerging European IP, as highlighted in Section two of this paper. Finally, the awareness of the heterogeneity of technology and of its effect on economic activities is also helpful to design policies fitting more to the stylized fact of advanced industries evolution outlined earlier in our study. The reference to the theory of "General Purpose Technologies" (GPTs hereinafter; Bresnahan, 2010; Cantner and Vannuccini, 2012) is, in this respect, an important one. Smart Specialization clearly identifies "GPT networks" as the main technological avenue to be supported and developed in order to generate sustained growth in the European economy. Such theoretical advancement also has drawbacks. In fact, the microeconomic conditions for the successful establishment of a new GPT require an understanding of the mechanisms leading to persistence and pervasiveness of certain technologies (Cantner and Vannuccini, 2012). On this point further clarity is needed, also from a theoretical point of view: a more informed perspective on GPTs and general technological change may help to refine and adjust the formulation of Smart Specialization and thus the design of a European IP.

In sum, Smart Specialization nicely addresses the technological dimension that a Europe-wide IP has to take into consideration, making it a useful building block for our analysis. Distinguishing between generic technical change and its specific application, and applying this more sophisticated view to regional growth strategies, provide very specific forms of intervention aimed at solving the coordination failures in specialization.

The *Industrial Renaissance*[7] (IR) strategy intervenes instead on the broader narrative of IP and represents the official position of the European Commission, progressively developed over the years through several Communications[8]. At the core of the Communication is once again the awareness that, during the crisis, not enough attention has been paid to the real economy, despite the fact that it represents the engine of European growth. In this respect, IR calls for

[7] COM(2014) 14 final "For a European Industrial Renaissance" of 22.01.2014.

[8] COM(2012) 582 final "A Stronger European Industry for Growth and Economic Recovery" of 10.10.2012; COM(2010) 614 final "An Integrated Industrial Policy for the Globalisation Era Putting Competitiveness and Sustainability at Centre Stage" of 28.10.2010; Commission Communication COM(2014) 25 final of 22.01.2014 "A vision for the internal market for industrial products" of 22.01.2014 (and the related Staff Working Document) as well as others related to the specific fields of intervention.

European re-industrialization by setting a target of 20 percent of European GDP to be created by industrial production in 2020. Acknowledging that the concept of "industry" reaches far beyond the statistics of manufacturing output, and given that a strong industrial base is at the root of a healthy "economic fabric", IR sets the stage for a systematic view on industrial policy, identifying four key priority areas of intervention: *i)* the European single market, *ii)* industrial modernization, *iii)* small and medium enterprises (SME) and entrepreneurship, and *iv)* internationalization.

In particular, concerning point *i* – the European single market – the Commission stresses the completion and integration of networks (tangibles – energy and transport – and intangibles – information and data), the promotion of the internal market for industrial goods and services, and the efforts in favor of improved standardization, regulatory frameworks, and public administration efficiency. With industrial modernization (point *ii*) the innovation policy dimension is taken into account, combining efforts on advanced manufacturing, Key Enabling Technologies (KETs – a concept in fact quite similar to that of GPT), bio-based products, clean vehicles and vessels, sustainable construction and raw materials, smart grids as well as, more broadly, on the "upgrade" of skills required in a knowledge-based economy. Moreover, this branch of the IR strategy addresses the relevant issue of access – in terms of costs and availability and distribution – of inputs, in particular energy sources and raw materials. Also for what regards the pillars of the strategy dedicated to SME, entrepreneurship, internationalization and IPR regimes, IR summarizes the relevant areas of intervention. Interestingly enough, the background Staff Working Document accompanying the IR Communication[9] also identifies with a satisfying degree of detail the industries in which Europe has a comparative advantage which could be the specific target of a continental IP[10] aiming to affect not only the rate, but also the broad direction of industrial upgrading.

To sum up, three main conclusions can be drawn from the analysis of the current approach of the European Union to IP. First, with the Smart Specialization strategy the Union has started to address the right set of problems that European industry faces: continental specialization, learning and discovery, connection between broad technological trajectories and the specific directions of regional development. Second, many of the key initiatives identified by the IR to re-launch European industry are already part of the set of actions the European Union is engaged in (as indicated in Table 1), thus reinforcing the impression that the main purpose of the IR is to reorganize existing tools around a clearer rationale and a consistent narrative. Third, what results from the overview of the existing and proposed initiatives is the fact that the European Commission's preferred approach regarding industrial policy is one mostly focused on removing bottlenecks. Such an objective can be achieved by ameliorating access to financial markets or by increasing the variety of and accessibility to basic resources – in a few words, by lowering the bar of the "threshold industrial activities" for which to take place is beneficial rather than costly. This approach often identifies the right targets but is confined to actions that "fix" the markets rather than "create" them. In the context of a recessionary European economy such fixes may not be

[9] SWD(2014) 14/3 "State of the Industry, Sectoral overview and Implementation of the EU Industrial Policy.
[10] The specific industries studied are Chemical, Automotive, Machinery (mechanical engineering), Forest-based industries, Steel, Non-ferrous metals, Textile, fashion and high-end, Defense, Space, Agri-food industries, Pharmaceuticals, Bio-Based Products, Cement, Ceramics, Glass, Construction, Tourism and – more broadly – the issues related to standards and standardization.

enough, and the fears of crowding-out are offset by the potential benefits of public intervention. Hence, the next Section proposes some ideas to go beyond the current European perspective on IP.

4. A Few Proposals for a Truly European Industrial Policy

Before turning to the proposals for the European IP, a clarification has to be made. A basic distinction between IPs – one around which much of the policy debate revolves – is that confronting horizontal (also defined as functional, or general) and vertical (also labeled sectoral, or selective) policies (Chang, 2011). While horizontal policies are supposed to be more systemic in nature – mirroring the idea of Rosenstein-Rodan and Nurske's balanced growth and Big Push (Alacevich, 2011) –, vertical policies appear to be more discretionary, in the spirit of Hirschman's unbalanced growth and linkages approach (Hirschman, 1958). However, as Chang (2011) suggests, this basic distinction is a false one (or at least one with less precise contours – in the same way as the comparison between the just cited "early development theories" seems today much milder, see Alacevich (2011)), because any policy has a degree of selectivity. Even education and health related policies, usually conceived as general ones, still produce uneven and differential effects. Given the scarcity of resources (mainly financial ones, but also policy attention and foresight is a scarce resource to be allocated to alternative ends), policy-makers are, in any case, "doomed to choose".

In this sense, regarding the European dimension of IP, we are not claiming that a supranational IP has to be necessarily horizontal or vertical. On the contrary, we aim at combining the needed narrative on a coherent and systemic supranational industrial policy – a need already embodied in the renaissance-based language of the European Commission's Communications – with the principles already introduced by the literature on Smart Specialization, namely its focus on the combination of general purpose technological opportunities for industry upgrading, coupled with coordination in specialization at regional level. What we suggest is, in short, a network of interdependent tools, institutions, and actions able to set the European economy on a trajectory of sustainable and sustained growth.

In what follows we list four proposals around which a truly European Industrial Policy can be constructed. All of them take into account the conceptual framework developed early on in the paper, that of providing a solution to the coordination problems specifically affecting European industry.

Proposal #1: A Federal System of Investment Banks

State Investment Banks (SIB) are increasingly taken as an example of successful intervention on the real economy (Mazzucato and Penna, 2015) for they combine the availability of resources, the flexibility to screen and select from a wide range of projects and a certain degree of independence – which translates into a lower risk of ending up in "government failures". The European Union already leads the race for the best practices in the field with the successful example of the European Investment Bank (EIB). However, the EIB is not the only institution of

this kind in the old continent: some member states own a "development bank"[11]. SIBs are already experiencing forms of coordination, in Europe[12] and globally[13]. Once again, the initiative proposed relates to solving a coordination problem: European and national investment banks risk to produce duplication of investments, to undermine specialization, to finance overlapping projects scaled either at local, national or supranational level. Conversely, by setting up a Federal System of Investment Banks – with the EIB as the "umbrella institution" – duplications and redundancies in the financed projects could be reduced to enhance an efficient re-organization of production on a continental scale, and to generate a genuine European multiplier out of Europe-wide investments. By strongly involving the EIB, the investment plan launched by the European Commission[14] already starts to take the issue into account, making a useful step in the direction of a coherent network of investment banks.

Proposal #2: European Public Procurement

Public Procurement (PP) as demand-side policy is already one of the tools in the toolkit of current European initiatives affecting industries and firms. However, besides the mere existence of PP, what matters is its magnitude and direction. Of particular relevance is innovative procurement (Guerzoni and Raiteri, 2014). In fact, if one of the policy goals is to accelerate the transition to (or the entry in) more technology-advanced industrial fields, then the coordination problem occurring in this case is one related to the availability of the necessary demand critical mass (Witt, 1997) and to "dual inducement" (Bresnahan and Trajtenberg, 1995). If private demand is not enough to provide the consumer base on which a new industry can grow and develop – especially during the economic slumps generated by the crisis and despite some limits and barriers (Uyarra, 2014) –, PP can fill the gap in expenditure from the private sector with public resources, hence generating crowding-in instead of the feared crowding-out effect. Moreover, the knowledge spillovers generated by advanced PP (Eliasson, 2010) produce cascades of effects in related and unrelated industries, opening new opportunities and rejuvenating mature technological trajectories. In short, and as highlighted by the literature on GPTs (Cantner and Vannuccini, 2012), PP can solve the coordination problem, lifting the economy to a higher level of expected investments and production. Recent research (Raiteri, 2014) has found using U.S. data that for some technologies to be subject to public procurement leads to an increase in their pervasiveness – thus in their scope and applicability; pervasiveness is measured there using the "generality" of the patents (in terms of citations) of the technologies under PP purchase programs. In short, the extensive use of European PP could work as a "coordination device" to orient technological specialization, and to support the growth of infant industries as well as the evolution of established ones.

[11] The European "National Promotional Banks" are the *Caisse des dépôts et consignations* in France, the *Kreditanstalt für Wiederaufbau* in Germany, the *Cassa Depositi e Prestiti in Italy*, the *Bank Gospodarstwa Krajowego* in Poland, and the *Instituto de Crédito Oficial* in Spain.

[12] See for example the Marguerite Fund for Energy, Climate Change and Infrastructure which is sponsored by the European SIBs (http://www.marguerite.com/).

[13] With the Long Term Investors Club (LTIC), whose members are the State Investment Banks of China, India, Japan, Morocco, Ontario and Quebec (Canada), Turkey, Russia, United Arab Emirates and more (www.ltic.org).

[14] See footnote 2 on the Communication of the European Commission COM(2014) 903 final "An Investment Plan for Europe" of 26.11.2014.

Proposal #3: European Public Enterprises

The idea of starting enterprises owned by European institutions and acting on European-wide scale is not new and builds on experiences and evidence at the national level (Ruta, 1980). As regards Public Procurement, the idea of instituting state-controlled firms is particularly appealing in times of crisis and recession when the risk of crowding-out private initiative is lower given the lack of incentives and the higher risks of market exit. European Public Enterprises could have the pros of *i)* creating employment, *ii)* potentially being organized around more forward looking management, and thus more inclined and ready to invest, and *iii)* being established in high-tech fields, contributing – as PP do – to the overall critical mass of demand for innovative and novel products that may otherwise remain confined to market niches. The role of big demanders (Bresnahan and Trajtenberg, 1995) has often been the key for the opening of wide technological and growth opportunities, and European Public Enterprises may be one of the keys to exploit even wider European opportunities for industrial transformation.

Proposal #4: The European Innovation Patrimony and the European Innovation Dividend

The last proposal relates to the intergenerational dimension of IP and with the long term fruits of its investments. In a nutshell, while the fiscal policy debate revolves around the political feasibility of European public debt (through Eurobonds, Union bonds, Euro-project-bonds and the like), IP has to address the use of the assets corresponding to European investments (including those financed with the supranational debt). Such assets represent a patrimony able to produce returns over time that can be accumulated for future uses. The proposal draws on Iozzo's (2011) re-reading of James Meade ideas on social dividend as well as on the recent revival of the topic in Rodrik (2015b) "Innovation State". The basic idea is that public intervention and the respective public investments aimed at "creating markets" (Mazzucato, 2015) are to be initiated in the framework of the European IP, especially in new technologies and emerging knowledge-intensive industries; the resulting capital formation has to be counted as a public asset out of which economic returns can be earned. Such public assets should constitute the basis of a Community-owned "innovation patrimony" composed of a set of technology-related sovereign funds. The creation of these sovereign funds and the ownership of fruitful technological capital will allow future generations to cope with uncertainty and will also be a virtuous way to deal with future possible lack of solidarity in Europe. In the same way as Norway and other governments have created state funds to postpone the use of revenues obtained from "natural capital" to the next generations, the acquisition of technological capital and the knowledge generated by state intervention could endow sovereign funds with an innovation patrimony. The result will be a European innovation social dividend (Iozzo, 2011) to be widely redistributed.

5. Concluding Remarks

This paper provides a new view on the challenges to the design of a European industrial policy. After an overview of the reasons for the recent return to fashion of IP, we listed a series of known

facts concerning development, industrialization processes and industrial dynamics, and we came to the partial conclusion that Europe needs a set of initiatives tailored to its specific position in the world economy. The strategies recently developed by the European Commission (Smart Specialization and Industrial Renaissance) identify the contours of a sound public intervention in the real economy and contribute to a deeper understanding of the technological trajectories that can influence Europe-wide patterns of specialization, entrepreneurial discovery, and structural change. However, their approach to the desired rate, direction and timing of economic activities is still rather conservative. This paper thus puts forward a number of proposals that go beyond the simple relaxation of market constraints and bottlenecks, with the aim of contributing to a policy approach willing to "create markets", to enable discovery and complementary initiatives from the private sector and to lift the economy out of potential traps. Such proposals concern Investment Banks, Public Procurement, European Public Enterprises and a possible European "Patrimony". Given the awareness of Europe's vast availability of capabilities and know-how, we suggest that the key to industrial upgrading in Europe is in the public provision of those "specific inputs" that – for reasons of scale and failures in coordination – only the supranational Polity can supply. Broad support for such a view relies on the idea that, in a moment of crisis and potential secular stagnation, the fear of crowding-out is negligible compared to the benefits of the crowding-in generated by public intervention. In this claim there is certainly a component of "shifting involvements" that may fade in the future, but the challenges to the European economy are real and have to be addressed.

In conclusion, it is worth remember that all the proposals suggested in the paper implicitly rely on some form of financing and – most importantly – transfer of sovereignty to the European level (Vannuccini, 2013). For example, the idea of the European Innovation State has the word "State" in its name, despite the fact that the European Union is not yet a Federal State. The issue of own resources (the budget) necessary to finance – among the other things – a sound IP is currently one of the core topics in the debate on the future of the Union and the Eurozone[15]; therefore, policy proposals addressing industry and the real economy have to be strongly tied to the political proposals for institutional reforms. In addition to that, also the current monetary policies play a role in determining the rate and direction of a European IP; Quantitative Easing can, for example, induce State initiatives while also increasing the risk of moral hazard between the European Central Bank and the member countries who may feel entitled to lower their commitments.

A new Industrial Policy for the European Union that focuses on the provision of the necessary inputs for advanced industrial developments can be the source of a cascade of spillovers – a knowledge and technology multiplier (Eliasson, 2010) – able to increase society's Welfare. Besides, it may play a more strategic role in the European integration process. If every radical and incremental step in the European construction has corresponded to a shift in the provision of a public good to supranational level (Montani, 2008), then a common IP could be regarded as the European public good addressing the need for progress in the real economy. Again using the

[15] High level group on own resources – First assessment report of 17.12.2014 (http://ec.europa.eu/budget/library/biblio/documents/multiannual_framework/HLGOR_1stassessment2014final_en.pdf).

concepts of unbalanced development theory (Hirschman, 1958), each newly introduced Europe-wide policy has contributed to create disequilibrium in the institutional balance, to be resolved with political advances. Setting up some of the proposals suggested in this paper would certainly help push the European Union towards a new disequilibrium and hence *induce* it on the path to institutional progress – yielding in the end a social dividend reaching far beyond the borders of Industry.

6. References

Alacevich, M. (2011). Early development economics debates revisited. *Journal of the History of Economic Thought*, 33(02), 145-171.

Amador, J., Cappariello, R., & Stehrer, R. (2015). Global value chains: A view from the euro area. *European Central Bank Working Paper Series No. 1761* / March 2015.

Autor, D. (2014). Polanyi's Paradox and the Shape of Employment Growth (No. w20485). *National Bureau of Economic Research*.

Basu, K. (2014), The Fear of "L", *Project Syndicate*, http://www.project-syndicate.org/commentary/kaushik-basu-gets-inside-the-resistance-of-economists-and-policymakers-to-innovative-thinking.

Bernard, A. B., & Fort, T. C. (2013). Factoryless goods producers in the US (No. w19396). *National Bureau of Economic Research*.

Bresnahan, T. F. (2012). Generality, Recombination, and Reuse, in *The Rate and Direction of Inventive Activity Revisited* (pp. 611-656). University of Chicago Press.

Bresnahan, T. F. (2010), General purpose technologies, in: Hall, b., Rosenberg, N. (eds.), *Handbook of the Economics of Innovation* 2, North Holland, 2010, 761–791.

Bresnahan, T., Trajtenberg, M. (1995), General purpose technologies "Engines of growth?", *Journal of Econometrics* 65(1), 83–108.

Cabral, L., Wang, Z., & Xu, D. Y. (2013). Competitors, complementors, parents and places: Explaining regional agglomeration in the US auto industry (No. w18973). *National Bureau of Economic Research*.

Cantner, U. (2007). Firms' differential innovative success and market dynamics. *Jena Economic Research Paper*, (2007-078).

Cantner, U. (2011). Industrial dynamics and evolution–the role of innovation, competences and learning, in *Competition Policy and the Economic Approach: Foundations and Limitations*.

Cantner, U. and Vannuccini, S. (2012). A New View of General Purpose Technologies, *Jena Economic Research Papers* **2012**, 054.

Castellacci, F. (2008). Technology clubs, technology gaps and growth trajectories. *Structural Change and Economic Dynamics*, 19(4), 301-314.

Chang, H. J. (2011). Industrial policy: can we go beyond an unproductive confrontation?, in *Annual World Bank Conference on Development Economics* (pp. 83-109).

Cimoli, M., Dosi, G., & Stiglitz, J. E. (2009). *Industrial policy and development: The political economy of capabilities accumulation*. Oxford University Press.

Cohen, W. M., & Klepper, S. (1992). The anatomy of industry R&D intensity distributions. *The American Economic Review*, 773-799.

Dhéret, C. (2014). *Sharing the same vision – The cornerstone of a new industrial policy for Europe*, EPC Discussion Paper, 20 March 2014.

Dhéret, C. and Morosi, M. (2014). *Towards a New Industrial Policy for Europe*, EPC Issue Paper n.78, November 2014.

Dosi, G. (2007). Statistical Regularities in the Evolution of Industries. A Guide through some Evidence and Challenges for the Theory, in *Perspectives on innovation*, 153-186.

Eliasson, G. (2010). *Advanced public procurement as industrial policy: The Aircraft Industry as a Technical University* (Vol. 34). Springer Science & Business Media.

European Parliament (2015). EU industrial policy: Assessment of recent Developments and Recommendations for Future policies, on behalf of DG for Internal Policies - Policy Department A Economic and Scientific Policy - study for the ITRE Committee.

Fontagné, L., Mohnen, P., & Wolff, G. (2014). No industry, no future?, *French Council of economic Analysis Note*.

Foray, D., David, P. A. & Bronwyn, H. (2011). Smart specialization, *OECD working papers*.

Foray, D., David, P.A., and Hall, B. (2009). Smart Specialisation – the concept, *Knowledge Economists Policy Brief No. 9*.

Foray, D., Goenaga, X. (2013). The goals of Smart Specialisation, *Joint Research Centre – Institute for Prospective Technological Studies*.

Foray, D., Rainoldi, A. (2013). Smart Specialisation programmes and implementation, *Joint Research Centre – Institute for Prospective Technological Studies*.

Gordon, R. J. (2012). Is US economic growth over? Faltering innovation confronts the six headwinds (No. w18315). *National Bureau of Economic Research*.

Guerzoni, M., & Raiteri, E. (2014). Demand-side vs. supply-side technology policies: Hidden treatment and new empirical evidence on the policy mix. *Research Policy*.

Hausmann, R., & Rodrik, D. (2003). Economic development as self-discovery. *Journal of development Economics*, *72*(2), 603-633.

Hausmann, R., & Rodrik, D. (2006). Doomed to choose: Industrial policy as predicament. *John F. Kennedy School of Government Working Paper*.

Hidalgo, C. A., Klinger, B., Barabási, A. L., & Hausmann, R. (2007). The product space conditions the development of nations. *Science*, 317(5837), 482-487.

Hirschman, A. O. (1958). *The strategy of economic development* (Vol. 58). New Haven: Yale University Press.

Hirschman, A. O. (1982). *Shifting involvements: private interest and public action*. Princeton University Press.

Hoff, K. (2000). Beyond Rosenstein-Rodan: the modern theory of coordination problems in development, in *Proceedings of the Annual World Bank Conference on Development Economics* (pp. 145-188).

Iozzo, A. (2011). Meade's Social Dividend: from Debt to Public Patrimony, *The Federalist Debate* XXVI(3).

Kaldor, N. (1961). *Capital accumulation and economic growth* (pp. 177-222). Macmillan.

Kollatz-Ahnen, M. and Bullman, U. (2014). Industrial and investment policy - what a well-structured package can achieve, *FEPS Policy Briefs*.

Klepper, S. (2009). Spinoffs: A review and synthesis. *European Management Review*, 6(3), 159-171.

Majocchi, A. (2015). The Juncker Plan: a Turning Point, but not Enough, *CSF Comments* n. 47, 3 February 2015

Majocchi, A. (2014). L'Europa dello Sviluppo e dell'Occupazione, *CSF Comments* n. 32, 13 May 2014

Mazzucato, M. (2013). *The entrepreneurial state: Debunking public vs. private sector myths*. Anthem Press.

Mazzucato, M. (2015). Building the Entrepreneurial State: A New Framework for Envisioning and Evaluating a Mission-oriented Public Sector. *Levy Economics Institute of Bard College Working Paper*, (824).

Mazzucato, M., & Penna, C. C. (Eds.). (2015). *Mission-Oriented Finance for Innovation: New Ideas for Investment-Led Growth*. Pickering & Chatto Publishers.

Montani, G. (2008). *L'economia politica dell'integrazione europea. Evoluzione di una democrazia sovranazionale*, UTET De Agostini, Novara.

Moro, D. and Vannuccini, S. (2014). *Il Governo di un'Economia Federale Sovranazionale e le sue Istituzioni nell'Esperienza Europea – Antologia di Contributi* (eds), CEDAM, Padova.

Murphy, K. M., Shleifer, A., & Vishny, R. W. (1989). Industrialization and the Big Push. *The Journal of Political Economy*, 97(5), 1003-1026.

O'Sullivan, E., Andreoni, A., López-Gómez, C., & Gregory, M. (2013). What is new in the new industrial policy? A manufacturing systems perspective. *Oxford Review of Economic Policy*, 29(2), 432-462.

Perez, C. (2010). Technological revolutions and techno-economic paradigms. *Cambridge journal of economics*, 34(1), 185-202.

Pianta M. (2014), *An industrial policy for Europe,* Seoul Journal of Economics, 27, 3, 2014.

Raiteri, E. (2014). *The Impact of Innovative Public Procurement on Technological Generality: a Patent Data Analysis*, paper presented at the 15th Conference of the International Schumpeter Society, Jena.

Rodrik, D. (2013). Unconditional Convergence in Manufacturing. *The Quarterly Journal of Economics*, 128(1), 165-204.

Rodrik, D. (2015a). *Premature Deindustrialization* (No. w20935). National Bureau of Economic Research.

Rodrik, D. (2015b). From Welfare State to Innovation State, *Project Syndicate*, http://www.project-syndicate.org/commentary/labor-saving-technology-by-dani-rodrik-2015-01.

Ruta, G. (1980). Impresa pubblica ed integrazione europea, in Lavoro e occupazione nella prospettiva dell'Unione Economica e Monetaria Europea. Movimento Europeo – Consiglio Italiano, Franco Angeli.

Sah, R. K., & Stiglitz, J. E. (1988). Sources of technological divergence between developed and less developed economies, in *Debt, stabilization and development*, edited by Guillermo Calvo, Ronald Findlay, Pentti Kouri and Jorge B. de Macedo, 423-446.

Salazar-Xirinachs, J. M., Nübler, I., & Kozul-Wright, R. (2014). *Transforming Economies: Making industrial policy work for growth, jobs and development*. Geneva, ILO/UNCTAD.

Silverberg, G. (2002). The discrete charm of the bourgeoisie: quantum and continuous perspectives on innovation and growth. *Research Policy*, 31(8), 1275-1289.

Stiglitz, J. E., & Greenwald, B. C. (2014). *Creating a learning society: a new approach to growth, development, and social progress*. Columbia University Press.

Stiglitz, J. E., Lin, J. Y., & Monga, C. (2013). The rejuvenation of industrial policy. *World Bank Policy Research Working Paper*, (6628).

Summers, Lawrence, 2013. "Why Stagnation Might Prove to be the New Normal." *The Financial Times* (15 December 2013).

Timmer, M. P., Erumban, A. A., Los, B., Stehrer, R., & de Vries, G. J. (2014). Slicing up global value chains. *The Journal of Economic Perspectives*, 99-118.

UN-DESA (2007), *Industrial Development for the 21st Century: Sustainable Development Perspectives*. United Nations Publications.

UNIDO (2014), *World Manufacturing Production Reports*, Quarters 3/4- 2014.

Uyarra, E., Edler, J., Garcia-Estevez, J., Georghiou, L., & Yeow, J. (2014). Barriers to innovation through public procurement: A supplier perspective. *Technovation*, *34*(10), 631-645.

Vannuccini, S. (2013). *Expectations About Expectations: Auspicabili Effetti di un Piano Europeo di Sviluppo Sostenibile*, in Bordino G., Un nuovo diritto per la democrazia e lo sviluppo in Europa – l'Iniziativa dei cittadini europei (ICE), il Mulino, Bologna, 2013, 141-149.

Vernon, R. (1966). International investment and international trade in the product cycle. *The quarterly journal of economics*, 190-207.

Verspagen, B., & De Loo, I. (1999). Technology spillovers between sectors. *Technological Forecasting and Social Change*, 60(3), 215-235.

Warwick, K. (2013), "Beyond Industrial Policy: Emerging Issues and New Trends", *OECD Science, Technology and Industry Policy Papers*, No. 2, OECD Publishing. http://dx.doi.org/10.1787/5k4869clw0xp-en

CENTRO STUDI SUL FEDERALISMO
Via Real Collegio 30
10024 Moncalieri (TO)

Tel. +39 011 670 5024
Fax. +39 011 670 5081
www.csfederalismo.it
info@csfederalismo.it