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The Political Economy of Capabilities Accumulation: the Past and Future of Policies for Industrial Development

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The Political Economy of Capabilities Accumulation: the Past and Future of Policies for Industrial Development

Preface

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Preface to M. Cimoli, G. Dosi and J. E. Stiglitz (eds.), *The Political Economy of Capabilities Accumulation: the Past and Future of Policies for Industrial Development*, Oxford University Press, forthcoming. (Table of Contents at the end)

There has been 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. It was the time of the (in)famous 'Washington Consensus' on development – dominant among international policy makers in the last part of the 20th century – with its market fundamentalism, made of an invariant recipe good for all macro diseases (less government, fiscal sweat and tears, privatizations, etc.) in turn grounded into a very naïve and blackboxed microeconomics ('… the market will take care of itself … hence do not mess around with micro behaviors …'). At last, the realization of the impressive failures of the recipe (see, revealingly, World Bank (2005) and (2008a)) has finally sobered up a significant share of both economists and policy makers (although with significant exceptions in both camps). Indeed, at the time this book is sent to the publisher, the tsunami hitting the world financial markets is hammering bitter reason even amongst the most stubborn believers in the miraculous properties of 'markets' as they exist only in economic textbooks.

This book, however, is not about beating the dead horse – notwithstanding the many horses still running around – and concerns only tangentially the so-called 'augmented Washington Consensus', that is the revisitation of the former one with a much greater emphasis on ancillary institutions. Rather, this book is about industrial policies seen as intrinsic fundamental ingredients of all development processes: witness to that, every experience of successful industrialization, ranging from Germany and the USA, almost two centuries ago, all the way to Korea, Taiwan, Brazil, China and India nowadays.

The notion of 'industrial policy' is understood here in a quite expansive manner. It comprises policies affecting 'infant industry' support of various kinds, but also trade policies, science and technology policies, public procurement, policies affecting foreign direct investments, intellectual property rights, and the allocation of financial resources. Industrial policies, in this broad sense, come together with processes of 'institutional engineering' shaping the very nature of the economic actors, the market mechanisms and rules under which they operate, and the boundaries between what is governed by market interactions, and what is not.

The accumulation of capabilities in the great industrial transformation

The contributions to this book analyze from different angles the role played by industrial policies, in the foregoing broad sense, and by institution building within that *great transformation* – borrowing Karl Polanyi (1944) expression – leading from traditional, mostly rural, economies to economies driven by industrial activities (and nowadays also advanced services), able to systematically learn how to implement and eventually how to generate new ways of producing and new products under conditions of dynamic increasing returns.

Such a 'great transformation' entails a major process of *accumulation of knowledge and capabilities*, both at the levels of *individuals* and *organizations*. Certainly, part of such capabilities builds on education and formally acquired skills (what in the economists' jargon often goes under the heading of 'human capital'). However, at least equally important, capabilities have to do with the problem-solving knowledge embodied in organizations – concerning e.g. production technologies, marketing, labor relations as well as 'dynamic capabilities' of search and learning.

Many contributions to this volume can be read in this perspective, which links with a growing literature on technology, innovation and development (see, among others, Amsden (2001), Bell and Pavitt (1993), Chang (2002), Chang and Cheema (2002), Cimoli and Dosi (1995), Dosi, Pavitt and Soete (1990), Mytelka (2007), Nelson (1982 and 2004), Reinert (2007)). More precisely, many of the chapters which follow tackle the impact of various forms of policy intervention upon the rates and directions of knowledge accumulation during the catch-up process and the ensuing effects upon the patterns of production and trade.

The inter-technological and intersectoral diversity of opportunities

That sectors and products matter in terms of learning opportunities is increasingly recognized well beyond the 'structuralists', Kaldorian and evolutionary camps where the conjecture was originally put forward (that is from Prebisch (1950), Kaldor (1981), Dosi, Pavitt and Soete (1990), to Hausmann and Klinger (2006), and Hausmann and Rodrick (2006)). The basic intuition is that specific technologies and specific sectors and products matter because they entail different learning opportunities and also different income elasticities of demand. Thus, today's specializations influence tomorrow's productivity growth, chances to innovate and demand potential: we elaborate a bit on the point in the chapter by Cimoli, Dosi, Nelson and Stiglitz and dwell on it in Dosi, Pavitt and Soete (1990). If this is the case, however, 'industrial policies are a predicament' - as Hausmann and Rodrick (2006) put it - because countries inevitably have the choice of steering their future paths of capability accumulation, and together their patterns of production and trade. Even the choice of not having any (implicit or explicit) industrial policy is a choice in itself, i.e. the acceptance of the current international division of intellectual and physical labor, and with that the current distribution of learning opportunities.

Ricardo vs List

On the issue – as we are reminded in the chapter by Reinert below (see also Reinert (2007)) – there is a divide, which can be traced back to the very origin of modern political economy, between a view *prescribing* on normative grounds the acquiescence in the 'revealed comparative advantages' one country inherit from its past, and an alternative view traceable back even beyond Hamilton and List, arguing that the 'productive forces' of a nation can and must be purposefully constructed, and that current comparative advantages are a luxury that only technological and market leaders can afford (indeed a major asset that they can exploit).

It happens that quite a few of the contributors to this volume bear to varying degrees sympathy with this latter view and show – we believe quite convincingly – how a wide array of policies and institutions have been behind the earlier catch-up successes of e.g. Korea and Taiwan and more recently of e.g. China and India.

Knowledge and Business Organizations

We have already mentioned that the accumulation of knowledge and capabilities does entail, but is not exhausted by, the upgrading of the skills of workers and technicians. Needless to say, such educational efforts are of paramount importance. And so is the construction of broader social capabilities in the sense of Sen (1985). However, there is a fundamental *organizational dimension* in such a process, as the whole body of literature from business economics inspired by *capability-based theories of the firm* has begun to reveal (for an overview, Dosi, Marengo and Faillo (2008)). It is not only or not *even primarily* an issue of entrepreneurship. In fact, contrary to common wisdom, lack of the latter might not be a peculiarity of underdevelopment: on the contrary, imaginative entrepreneurial efforts of economic survival under hardship, and even the level of entrepreneurial sophistication of Sicilian Mafia or the Medellin Cartel, witness that 'entrepreneurship' as such might not be a widespread bottleneck for development. Rather, the bottleneck is likely to concern much more some persistent 'inability to seize opportunities', paraphrasing Albert Hirschman, regarding the productive manipulation of knowledge, especially when such manipulation have a complex collective dimension, involving also the intra-organizational coordination of several actors carrying diverse pieces of knowledge and most often

diverse interests (on seemingly ‘entrepreneurship’ and ‘intrapreneurship’ within incumbent firms, see, below the Hobday and Perini chapter).

Indeed, *organization building* is one of the most different tasks facing developmental industrial policies. The idea that a Toyota, a Samsung, a Tata, an Embraer can just naturally spring up out of a multitude of peasants, just due, again, to the ‘magic of the market’, is a fairy tale that few ought to be ready to believe. In fact, the characteristics of the producers in the catching-up process , their organizational sophistication, and also their nationality (whether domestic or foreign) matters a lot in terms of learning patterns (see Amsden’s chapter, below).

Technological learning: a primus inter pares, not a magic bullet

We have been arguing that the changes in the patterns of accumulation and processing of information and knowledge is at the core of development patterns: the ‘unbound Prometheus’ systematically improving technological and organizational knowledge is a crucial *deus ex machina* of early industrialization almost three centuries ago, and also of subsequent episodes of development (Landes (1969) and Cipolla (1965), cf. also Landes (1999), Freeman (1982), Reinert (2007), Rosenberg (1976), Mokyr (1990) and Nelson (2005)). However this is far from being the identification of some ‘magic bullet’. In fact, economic historians investigating the ‘European exceptionalism’ (Landes (1999)) leading to the industrial revolution do point at the advances of technical knowledge as a crucial factor in the industrial take-off. However, the European industrialization precisely illustrates that not even technological advances are such a ‘magic bullet’. Many of the technological advances upon which the industrial revolution drew were originally developed, or at least equally known, in other regions, *in primis* China. ‘European exceptionalism’ was made possible by a conjunction of complementary conditions ranging from the ‘scientific attitude’ of inquiry about nature which fostered knowledge accumulation and its codification and diffusion, all the way to the characteristics of the political structure and the relations between rulers and subjects. In this vein, C. Freeman ((2008), which puts together an ensemble of his classic contributions) suggests that *national systems of innovation and production* develop and advance (or do not) on the grounds of the co-evolutionary dynamics among five sub-domains, and related institutions, governing

(i) the generation of *scientific knowledge* (he is talking primarily of 'frontier' countries);
(ii) the development, improvement, adoption of new artifacts and new techniques of production (that is the domain of *technology*);
(iii) the *economic machine* which organizes the production and distribution of goods, services and incomes, and *together*, *information flows and patterns of incentives* amongst economic agents;
(iv) the *political and legal structure*;

and, finally

(v) the *cultural domain*, shaping values, norms and customs.

Co-evolutionary dynamics

Several scholars are indeed adding substance (implicitly or explicitly) to this 'grand political economy' program: we have already mentioned few contributors to the technology-focused literature, but the 'ground view' takes on board the complementary importance of the political economy of labor relations, income claims, property rights, and indeed, of culture (working our way backward, from Mokyr (2009)), North (2005), and Greif (2006), all the way to Karl Marx and Adam Smith).

This is not the place to discuss in any detail the long history of industrialization in general. Suffice to say that if there is some truth in this co-evolutionary story, such truth does not apply only to the Low Countries four centuries ago or England three centuries back. It does apply equally well to all the much later episodes of industrialization and subsequent self-sustained growth. The point is indirectly revealed by the overall shaky results stemming from the quest for overarching *institutional preconditions* for growth or invariant policy recipes for it[1]. On the contrary, the co-evolutionary account rests on the sorts of *congruence conditions* between *ingredients* (including state variables which influence the subsequent dynamics) and *processes* wherein feature prominently the matchings or mismatchings between capabilities accumulation and the institutions governing the distribution of information and the incentive structures of any one economy. (Incidentally, note that if this view is correct, the outcomes of different *combinatorics* among institutional set-ups and learning dynamics, is not likely to be statistically captured by heroic 'reduced form' estimations in quest for some pre-conditions, or driving factors of differential growth - supposedly shielded from endogeneity - invariant in their effects across countries).

For sake of an illustration, consider the diagnostics of the underlying drivers of different performances of East Asia and Latin America in the '80s and '90s dramatized in Table 1.1 (drawing upon Dosi, Freeman and Fabiani (1994) and Freeman (2008) where one can find more detailed discussions). Notably such diagnostics of the significantly different economic outcomes, highlights primarily *diverging processes* at both microeconomic level (e.g. the different modes and intensity of technological search), and at a more aggregate one (e.g. the patterns of investments in ICT); and, together, *diverging institutional set-ups* (affecting education, income distribution, corporate learning, etc.). As we argue in the chapter that follows by Cimoli, Dosi, Nelson and Stiglitz, policies and various measures of 'institutional engineering' have deeply shaped the patterns of growth throughout contemporary industrial history dynamics. In fact, many of the subsequent chapters add to our understanding of how policies and institution-building have shaped both the accumulation of technological and organizational capabilities and the political economy in which it is embedded.

[1] Sachs and Warner (1997) is a known short example of the *genre*; more specifically on the role of institutions and policies within the 'new political economy' style of interpretation, cf. the somewhat diverging views of Acemoglu, Johnson and Robinson (2001), Easterly and Levin (2003), Rodrick (2008). For a sharp critique of mono-causal explanation of underdevelopment, see Adelman (2001), together with a few other contributions to Meier and Stiglitz (2001).

Table 1.1 At the roots of different East Asian and Latin American Performances: divergences in National Systems of Innovation and Production in the 1980's and 1990's

East Asia	**Latin America**
Expanding education system with high proportion of engineering studies	Deteriorating education system with proportionally lower output of engineers
Rapid growth of scientific and technical activities at enterprise level, especially R&D	Slow growth stagnation or decline of enterprise level R&D and other learning activities
Progressive integration of production design, marketing and research activities within the firm	Weakening of R&D and absence or decline of enterprise marketing (especially on foreign markets)
Development of strong science-technology infrastructure	Weakening of science-technology infrastructure
Strong influence of Japanese models of management and networking organization	Continuing influence of outdated management models
High levels of investment	Generally lower level of investment
Heavy investment in advanced telecommunications	Slow development of modern telecommunication
Strong and fast-growing electronic industries with high exports	Weak electronic industries with low exports
More generally, patterns of specialization favoring goods with high income elasticities	Specialization in low income elasticity goods
Growing participation in international technology networks and agreements	Low level of international networking in technology
Rather sophisticated policy efforts aimed at fostering technological learning and generalizing rent-seeking even under regimes of protection of domestic markets (until the 80s)	From generalized protection with little anti-rent seeking safeguards to 'wild market regimes' with little learning incentives
Relative egalitarian income distribution	Very unequal income distribution- and increasingly so -

Source: elaborations on Dosi, Freeman and Fabiani (1994) and C. Freeman (2008)

Taking a centennial perspective, Reinert identifies a kind of invariance in the inspiring principle for successful catching-up policies, namely a philosophy of *emulation* vis-à-vis world technological leaders, irrespectively of revealed comparative advantages. (More on that in the conclusions to this book). This applies to pre-industrial revolution England; 19th century Germany form the *Zollverein* onward; the United States since their constitution; Japan, starting from the Meji restoration well into the second half of the 20th century; post WWII Korea; and also the policy antecedents of current successes of China and India. On the latter, see the (on the purpose controversial) chapters below by Singh and by Dahlman.

An historical topography of policy experiences is in Di Maio's contribution, while W. Peres traces the somewhat shy comeback of industrial policies – ridden of implementation hurdles – in Latin America after the apotheosis of the 'Washington Consensus' (and the experience of its failed promises).

Some chapters reconstruct the role of both macroeconomic and industrial policies along the history of a country's development: see Castro on Brazil, Kosakoff and Ramos on Argentina and Singh on India.

Other contributions explicitly compare different countries or groups of them in their performances and try to identify the role of policies underlying the different patterns of specialization and growth: see Palma on the comparison East Asia vs. Latin America and Dahlman on a comparative assessment of both policies and outcomes of India and China.

Another group of contributions addresses, so to speak horizontally, specific policy domains. So, Akyuz revisits the importance of trade policies for local industrial development and assesses the consequences of the newly introduced constraints in their use stemming from the WTO regime of international exchanges. But even granted 'infant industry protection' (something that indeed is not granted any longer), what are the organizational *loci* where learning occurs and how does their nature affect knowledge accumulation?

Entrepreneurship, incumbent organizations and development

Hobday and Perini analyze the role of entrepreneurship in the development process, dispelling also the myth of a diffused entrepreneurial potential for *industrial development* hidden in marginality and compressed by bureaucracy and red tape. As we already mentioned, developed capitalist economies have no monopoly for entrepreneurial efforts. A distinguished feature of industrial economies, however, is that a significant share of such efforts is devoted to the manipulation and improvement of products, production technologies and the development and maintenance of organizations able to implement them. This is the type of entrepreneurial and managerial abilities required by the *great transformation*. And indeed, as Amsden's chapter argues, most often the accumulation of technological and managerial capabilities has historically occurred within *domestic* firms rather than within subsidiaries of foreign owned firms. One of the reasons for this phenomenon (which is not going to disappear: see also the remarks in the chapter by Castaldi, Cimoli, Correa, Dosi) is that even when MNCs are an important source of capital investment, they often carry a relatively limited technology transfer, with the most tacit forms of knowledge and a good deal of R&D activities being kept in developed countries (indeed, often near the corporate headquarters). One could say that MNCs tend to bring in higher 'static capabilities' but also often entail greater obstacles for local 'dynamic' learning capabilities.[2]

[2] Are these patterns going to persist also under the current 'globalized regime' of production? In fact the evidence suggests a significant increase in the internationalization of R&D activities (cf. the evidence critically reviewed in Narula and Zanfei (2005)). However such patters involve primarily intra OECD-investments. While the question is certainly open, we tend to believe that the weakness of the incentives, if any, to purposefully transfer major 'dynamic capabilities' of innovative search to newly industrializing countries – including China – is likely to persist also in the future.

Institutions supporting the great transformation

We have repeatedly emphasized knowledge accumulation as central process within any industrialization strategy, occurring to a good extent *but not exclusively* within business firms. As the chapter by Mazzoleni and Nelson shows, the process – when it occurs effectively – is supported and nurtured by the activities of applied research, training, consultancy, adaptation of technologies to local conditions undertaken by universities and public laboratories.

Technological learning, of course, does not happen in the thin air, but rather goes hand in hand with investments in physical equipment and intangibles. And, in turn, that requires the mobilization of financial resources and their transfer to industry. By now the economic profession is well aware of the implications of the fundamental informational asymmetries underlying industry financing, being it via credit or via equity (cf. Stiglitz and Weiss (1981)). This applies in general, and even more to industrializing countries. How did earlier industrializers cope with them, and what may that experience teach to current catching-up countries? The question is addressed in the chapter by Colin Mayer drawing upon the early history of industrialization of England and Germany. In the literature, one often emphasizes the difference between a supposedly market-based (and equity-based) English system and a credit-based German one. The chapter argues that the differences were less pronounced than it appears at a first glance, even if the two systems differed in the ways equities were intermediated. In fact, the crucial point – entailing also a major normative lesson for 'institutional engineering' in developing countries – concerns the development of institutional arrangements fostering relations of trust in equity intermediation (incidentally, note also that, notwithstanding 'globalization', these relations are bound to have an intrinsically 'local', possibly national, or even regional, dimension).

The appropriability of knowledge and the opportunities for imitation

Technological learning throughout the catching-up process, and especially in its early phase, involves a lot of imitation, reverse engineering, marginal modifications of products and processes, and straightforward copying (the point has finally come through also the official discourse of some international organizations: see World Bank (2008) and ECLAC (2008)). It has been so in the past in England vis-à-vis the Netherlands, in the U.S. vis-à-vis England, in Japan vis-à-vis the developed West and it is so nowadays in the case of China.

However, the possibility of successfully undertaking such activities of imitation in the broadest sense depends, first, on the *absorptive capabilities* of the various countries (cf. Cohen and Levinthal (2008) who write about firms, but the notion can be easily extended to countries composing inter-related ensemble of firms and complementary organizations). Absorptive capabilities fundamentally concern the ways in which past achievements in knowledge accumulation influence the future learning potential (and, as such they impinge also on the degrees of path-dependency that the process of capability-building displays).

Second, given whatever absorptive capabilities, the easiness of imitation is modulated by the degrees of *appropriability* of the various technologies – by which we mean a measure of the ability of the originators/owners of the process and product technologies to keep to themselves the relevant underlying knowledge and/or the ensuing claims to the economic benefits coming from the exploitation of such knowledge. It happens that quite often appropriability conditions depend to a large extent on the nature of technological and production knowledge itself (cf. Dosi, Marengo and Pasquali (2006) and the literature cited therein). Imitating a Boeing or an Airbus is likely to be hard in itself irrespectively of the legal conditions of knowledge appropriation, while the latter might affect a lot the possibility of reproducing a new chemical entity. However, appropriability

conditions are also affected by the regimes of *Intellectual Property Rights* (IPR). Clearly, other things being equal, tighter IPR regimes imply harder conditions for imitation. The issue is discussed in the chapter by Cimoli, Coriat and Primi. Historically, imitative activities by catching-up countries have occurred under quite lax conditions regarding the international enforcement of IPR especially with regard to at-the-time developing countries. So, for example, until the mid-nineteenth century the United States were not recognizing patents to non-nationals and the pro-domestic bias continued long after. Germany and Japan originally allowed 'utility patents', covering also minor improvements over state-of-the-art technologies most often protecting local 'creative imitators'. In fields like pharmaceuticals – indeed the technological area where IPR count most – countries like Italy and Switzerland (the headquarters of some major drugs multinationals!) recognized IPR altogether only around three decades ago. Things have dramatically changed since, with the current scene featuring both TRIPS international agreements and an unexpected novel aggressiveness of U.S. and European companies in their IPR protection even against seemingly marginal infringements and even at the cost of world moral outrage, like in the case of anti-retroviral drugs. Does all this change the imitation opportunities of catching-up countries? If so, generally, or only in some technologies? While this book is not focused primarily on this issue[3], the evidence discussed in Cimoli, Coriat and Primi's chapter seems to suggest that a tighter IPR enforcement regime has effects on the imitation/catching-up process that range between the irrelevant and the quite harmful: certainly, the positive sign is hardly to be seen on the screen.

Incentives and rents in the political economy of learning

The reader will have already noticed that the thread of our argument rests more on notions such as knowledge, information, capabilities, learning rather than incentives. This is also what distinguishes this line of interpretation of development processes from another one inspired by the principle of 'getting the incentives right and everything will follow'. The thrust of our argument is that, given whatever incentives, 'learning how to seize technological and organizational opportunities' is a fundamental driver of industrialization. Granted that, however, the two dimensions are far from orthogonal.

As discussed in detail in the chapter by Khan and Blankenburg, the *political economy of (successful) industrialization* entails the compatibility of technological and organizational strategies with the political constraints arising from the distribution of power among social groups (and often also from external influences, including of course foreign economic and political entities). In this respect, the sad paradox of the political economy of development is that those supposedly in charge of leading the development strategies are the very groups which have huge vested interests in it and huge rents from the status quo. Hence the need to engineer what the authors call *systems of institutional compulsion* lending momentum to imitation, productivity growth, production expansion and eventually innovation. In turn, this involves the political ability to directly or indirectly allocate *developmental rents* to the actors of the 'great transformation' (and also withdraw them according to performances). This is in fact what has happened in many Far Eastern countries, but not in most Latin American ones. And the comparison also vividly illustrates the circumstances under which unleashing the rent-seeking *genie* of capitalism has unleashed also the 'Unbound Prometheus' of technological advances as distinguished from those other circumstances whereby it just triggered the search for rents *full stop*.

Stick-and-carrot and rent governance issues emerge also at the more circumscribed domain of market regulation and competition policies, addressed in the chapter by Possas and Borges. The framework is broadly speaking 'Schumpeterian', in that the virtue of competition policies is judged against the yardstick of the performance dynamism that a particular market structure fosters, rather

[3] In fact, another task force of the IPD is currently preparing a report on the subject.

than in terms of the standard textbook triangles of static allocation and welfare measures. At early stages of industrial development, infant industry considerations militate against the viability of competition policies either as a rent-curbing stick or an innovation-enhancing carrot. Thus, other institutional devices should be in place in order to govern 'developmental rents' and spur the 'developmental compulsion' discussed by Kahn and Blankenburg, including performance-related allocation of finance, foreign currency, subsidies, and diverse taxation regimes. The first three decades of Korean industrialization are a good case to the point. And older historical experiences reinforce it: competition policies have typically been introduced in all catching-up countries well after the initial industrialization drive – in the U.S. as well as in Germany, Italy and Japan. However, Possas and Borges argue that above a certain threshold of development competition policies become (or at least ought to become) an important ingredient of industrial policies, often under negligible trade offs between rent-curbing and incentives to innovate, if any.

The consistency conditions among macro policies and industrial policies

Industrial policies, in the broad definition adopted here, are a constant presence in all historically observed successes in industrialization. However, they require *compatible macro policies*, regarding exchange rates, taxation, fiscal policies, public investment, governance of the labor market, income distribution. This is another crucial facet of the political economy of industrialization. It is also a theme recurrent in several chapters, especially those analyzing the experience of single countries or comparing them (see in particular those by Castro, Kosakoff and Ramos, and Palma). There is a more dramatic way to put the same point: there are combinations of macro policies which are bound to suffocate industrial development and sterilize most opportunities of success of more technology- and industry-oriented polices, even when tried. The point is well illustrated by the application of the 'Washington Consensus' policy package in Latin America (with the partial exception of Brazil), with its devastating effects on industrial production capacity and technological capabilities – which often disappeared together with the firms that were carrying them (for some evidence cf. also the chapter by Castaldi et al.).

This is even more striking, when the effects of Latin American macro shocks are compared with the outcomes at industrial level of much less orthodox responses to financial and exchange rate crises such as in Korea and other Far Eastern economies: we discuss them in Stiglitz (2002) and (2006).

Certainly, the sudden liberalization process together with orthodox macro policies in Latin America, had a massive 'weeding out' effect. However, there is no guarantee – either in biology or even less so in economics – that a major *selection shock* allows anyone specie to survive. And in fact what happened in South America (outside Brazil) was that in the aftermath of the shock one found piles of rubbles where before one had a variegate, even if often inefficient, industrial structure, with few survivors - except in some natural-resource based activities (these activities are currently experiencing a boom driven by the spectacular increase in demand of energy and raw material especially by China, but a big question-mark remains concerning their ability to lead the industrialization of whole countries: we shall come back to the issue in the conclusions).

How much are the lessons from the past helpful for the future?

In our view there is little doubt on the historical lessons pointing out the crucial importance of various ensembles of industrial policies and institution-building efforts in nurturing capabilities accumulation and industrial development. Indeed, the chapters which follow add several original insights to such evidence. However, even granted that, the last resort of the skeptic rests in the view that even what applied to the past will not apply to the future: the magic that was not done by the

Washington Consensus policy medicines is going to come around nonetheless as a natural by-product of 'globalization'. In order to address this conjecture, in the chapter by Castaldi et al., we set the current trends against a secular background evidence on the international distribution of innovative activities, the patters of technological diffusion, the structure of international trade flows and income growth. One major message of the analysis is that *divergence and heterogeneity* have been and continue to be the dominant tendencies in the world economy. Second, and relatedly, notwithstanding the hype, there appears to be a lot of globalization of (short term) finance, but relatively little, if any, in terms of technological capabilities. In fact it could well be that under conditions of dynamic increasing returns, more international openness of capital and trade flows might well 'naturally' induce *divergence* across regions and countries. Hence, in our view also the continuing importance of measures of discretionary policy intervention able to trigger and fuel what we have called the 'great industrial transformation'.

Clearly, the international conditions have changed compared to when, say, the United States were moving their first steps toward catching-up, and even compared to when Korea or Taiwan were entering the international scene. The WTO and the TRIPS agreements are putting some novel constraints on what policies can and cannot do with respect to both their domestic industry and to trade flows. First-world companies are as aggressive as ever before in the defense of their proprietary technologies. The very emergence of China as a major industrial player has profoundly changed the patterns of opportunities and constraints facing other actual or would-be industrializers. All true. But the processes of knowledge accumulation and industrial development continue to require relative massive doses of public policies and institution-building molding a national political economy friendly to technological and organizational learning.

Some of the basic building blocks of such policies will be spelled out in the conclusions.

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