

# **Measures of competitiveness and attractiveness: a critical appraisal focused on Italy. (\*)**

*Una valutazione critica delle misure di competitività e attrattività focalizzata sull'Italia.*

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**Riassunto:** Si è assistito negli anni recenti al proliferare di misure di competitività e attrattività tra paesi e regioni. Vi è spesso difficoltà nell'apprezzare le differenze di metodo tra le varie misure, in particolare la scientificità delle metodologie, la coerenza dei confronti, la solidità e la rilevanza dei risultati. Questo studio è volto a presentare un'analisi critica delle metodologie utilizzate per la costruzione di questi indicatori, valutandone l'affidabilità e verificandone la robustezza tramite applicazioni anche al caso italiano. L'analisi conclude segnalando la limitata base teorica dei principali indici, la ridotta coerenza del sistema di ponderazione adottato, la difficoltà di effettuare confronti significativi. Questi aspetti influenzano la robustezza dei risultati e possono spiegare la continua sottostima delle potenzialità di crescita dell'economia italiana.

**Keywords:** Competitiveness, Attractiveness, Composite Indicators.

## **1. Introduction**

In a global economy, nations and regions compete to attract and to valorise profitably the resources needed to increase their productive strength and raise the standard of living. The concept of international competitiveness drives growth policies everywhere, both in areas with a high level of capital endowments and knowledge and in areas that are lagged behind. The objective is to improve development prospects, by increasing productivity and efficiency in the context of international specialization, under free trade and fair market conditions. The Italian policy direction is not different: the recent programmatic guidelines of industrial and regional policies base the development strategy on public and private investment growth, sustained by the improvement in the "contest" where the firms operate.

The effectiveness of the growth policies critically depends on the predisposition, analysis and diffusion of information related to the competitive capacities of national and local economies: it is the presence of a unique advantage, non transferable, not easily imitable, that represent not only a source of long run profit performances but also a fundamental factor of investment attraction.

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The awareness of the material and immaterial resources and skills, even if not easily measurable, has a twofold impact on policy implementation and effects. On one side, it allows for the exploitation of potentially available capacities and resources in an effective way, reducing transition costs for firms and public administrations to a more efficient productive structure. On the other, it permits to evaluate the strength and the weakness of a specific area with respect to alternative locations, therefore identifying strategic actions in order to reduce gaps and increase attractiveness.

The acquisition and the analysis of these characteristics regarding national and local production systems is not an easy task. It requires not only the building up of a large informative data set, usually regionally disaggregated, that necessarily integrates quantitative and qualitative aspects, but also the development of instruments for the analysis of competitiveness factors carried out by synthetic competitiveness indices for comparisons and benchmarking. These considerations can explain the proliferation of different measures of competitiveness and attractiveness across countries and regions, oriented to evaluate the potential, effective and perceived capacity to attract and take advantage of resources and ability for raising the standard of living.

The number of these indicators, in Italy as well as abroad, is impressive: recently more than 130 studies are being surveyed (Dubini and Grassi, 2004). Several indicators are commented in the media generating substantial difficulties to public opinion in perceiving differences in the methodologies and in appreciating divergences in the results. The final users of these statistical instruments wonder about how soundly they are grounded in theory, how sensibly the variables are defined and how well they are measured and aggregated. Policy makers look for coherence in comparisons, relevance and robustness in the results.

These questions require a circumstantiated evaluation of measurement procedures, for which statisticians, especially those oriented to applied economic analyses, are well equipped. The same issues define the scope of this study. The paper presents a critical analysis of measurement methodologies for the competitiveness and for the attractiveness of countries and regions. Since they are complex and multidimensional phenomena, we aim at evaluating the reliability and verifying the robustness of the results also with some empirical application to the Italian case.

## **2 Different definitions, different methods, vague approaches**

The measure of competitiveness and attractiveness requires an accurate definition of the theoretical notion that is the basis of the empirical construction of specific indicators, but the same concept of national competitiveness has been severely criticized in recent years.

The concept of competitiveness and competitive strategy comes from business school literature. Companies compete for markets and resources, measure competitiveness by looking at relative market shares, innovation or growth and use competitiveness strategy to improve their market performance. National competitiveness is assumed to be similar, but this may make sense only for competitiveness in specific activities and

markets. For instance, Lall (2001) states that “it is meaningful to say that the USA has become ‘less competitive’ in making television sets or textiles for international markets and ‘more competitive’ in making computers. But is it sensible to say that the USA is becoming ‘less or more competitive’ as an economy?”. The point is that the loss of a country’s competitiveness in some industrial sectors does not mean that the entire economy is less competitive. On the contrary, the decline of these industries may be part of a shift into more remunerative activities: in a general equilibrium setting, where factors equalize returns to their use across alternative uses, only their optimal allocation matters.

Also Krugman (1994) is very critical. In his opinion, “competitiveness is a meaningless word when applied to national economies” (see also Lall, 2001). The risk is that defending national competitive interests often becomes a facade in asking for privileges for domestic groups or seeking to support uneconomic activities.

Krugman observes that, when economies trade with each other, they do not compete (as firms do) in a confrontational manner. They engage in a non-zero sum game that benefits all parties. Trade theory shows that countries specializing on the basis of their factor endowments do better than when there is an absence of trade, regardless of whether one is technically more efficient than the other in one, or indeed all, activity. This is the basic theory of comparative advantage that cannot be reduced to a competitiveness battlefield across nations.

However, free market can lead to optimal resource allocation only under strong simplifying assumptions such as (among others) perfect competition, efficient markets, no externalities or agglomeration benefits and no scale economies. When market failures exist, free markets cannot allocate resources optimally and nations can improve their position by intervening to remedy (or exploit) market failures. Given imperfect markets, therefore, competitiveness becomes a legitimate policy issue related to the market failures affecting direct competition between countries.

The term ‘competitiveness’ is used in economics in different ways. The basic definition is purely macroeconomic: the lack of competitiveness is a real exchange rate problem, referring to a country (at full employment) running a persistent current-account deficit which would require adjustment in due course. Competitiveness is here measured by relative price and/or cost indices expressed in some common currencies. The definition assumes that underlying structural factors are constant and focuses on the kinds of short-term macroeconomic management that affect relative prices of national goods and services relative to other countries.

Most analysts of competitiveness, however, use the term more broadly. They focus on structural factors affecting long-term economic performance and tend to be concerned with productivity, skills and innovation. Actually, the specialized literature proposes several measures and indicators, developed in different fields and frameworks, and it is not easy to find a clear cut, broadly shared, operative definition.

The literature proposes competitiveness indicators and attractiveness indicators. The first concept is related to the ability of a nation or a region to create, produce, sell and distribute products in an international market, raising returns for its resources and

prosperity for its people. It is a very general and multifaceted concept that include facts and policies, natural resources and institutional framework; therefore, it has a typical macro perspective, including the solidity of economic structure, the level of the institutional framework and the technological development. It could be appreciated using “hard data” – that is, data coming from well-established statistics, together with data coming from surveys. Survey data can assess critical but not easily measurable factors such as the extent of corruption or public administration inefficiency.

Attraction is quite a different concept, assuming the point of view of a firm looking for an optimal investment location: the choice is based on comparative advantages and on resources availability in the given nation or regions, including relative input prices, access to the market, but also quality of the institutional framework and macroeconomic stability. Attraction is, therefore, an important component of competitiveness and is often considered its driving factor, allowing a system to attract and valorise critical resources for development. From another perspective, the firm evaluates not only the economic and socio-political context, but also the “living environment” surrounding the investment location, from the presence of an international environment to a safe, non corrupted business life. Moreover, attractiveness can generate jobs but can be short on income because of the use of an incentives strategy in order to compete.

Therefore, the differences between competitiveness and attractions cannot be limited to the context of a macro or micro analysis: in fact, both aspects are included in the two considered definitions. Competitiveness is linked to the optimal use of resources, attractiveness to the capacity to attract and retain resources in the given area. Therefore, competitiveness is more oriented in capturing development perspectives, while attractiveness is oriented towards the effective but also to the perceived business perspectives.

In both cases, we can easily represent the revealed component of two indicators: mostly, the GDP growth rate for competitiveness and the FDI share for attractiveness. But we are mainly interested in the potential capacity of nations and regions to compete and to attract resources. This concept is clearly multifaceted and in some sense vague because there is not a single “recipe” for achieving both targets. In turn, this leads to a proliferation of definitions.

From the previous analysis, it is clear that the empirical differences between indicators of competitiveness and attractiveness is basically a question of weights and not a question of “ingredients” or dimensions. The constitutive element of the two concepts can be traced in several analyses carried out in different frameworks. Today, suggestions for the definition of competitiveness and attractiveness come from almost five specific fields of analysis (see Dubini and Grassi, 2004):

1. the two concepts are measured by industrial economists mainly on the basis of the capacity to generate returns higher than in other sectors, taking into account the competitive structure of the markets. The basic drivers are lower costs for firms, exploiting scale and scope economies and locations; factors and demand conditions, institutional framework and business strategies for the country as a whole;

2. regional economists stress the availability of resources, institutions, skills and policies at a regional level for competing and attracting investments. A special role in an “uneven landscape” is played by innovation poles, networks and industrial clusters. Also, the “relational resources” having interaction with other firms and institutions at a territorial level can take part in competitiveness and attractiveness;
3. experts in innovation emphasize the impact of national and local innovation systems on competitiveness, that affect industrial specialization, product life cycle, geographical location, entry/exit rates, firm dimension and performances. An important role is attributed to the mix of institution and regulation framework that influences the innovative performance of firms;
4. experts in international strategies and international marketing point out that the importance of international diversification and specialization is related to the location choice of the firms. Effective and perceived comparative advantage of areas and countries has a substantial impact;
5. the strategic business view is the same as that of the firm, whose long run competitive advantage depends on the availability of specific competences, recognized by both customers and competitors. These competences are not easy to replicate because they spring from internal collective learning by the firm. This “resource-based view” suggests that the expected future competitiveness resides on strategic resources that have to be valorised.

The main competitiveness and attractiveness indexes tend to capture a large part of these aspects. The question is if, whether or not, the index comes to a meaningful and coherent synthesis.

Competitiveness indexes have to capture something more than simple growth factors’ analysis based on productivity. Note that the analysis of economic growth is, of course, important in its own right and has important lessons for policy. Moreover, it has a large and well-established literature based on theoretical models and authoritative econometrics. Variables and their causal relations with growth are specified clearly, though deliberately, in a simplified way. On the other side, the competitiveness literature has very different techniques. Unlike economics, they prefer diversity and detail, adducing a multitude of variables from economics, management and other disciplines, without analyzing if they are redundant, relevant or inter-related. The lack of a clear theoretical model leads to ignore complexities in the relationships and ambiguities in causation. Usually, they aggregate all variables rather than seeking out the most relevant ones. Therefore, they claim a degree of precision and reliability that seems greatly in excess of what the underlying theory and evidence support. In some sense, this is a case for a “measurement without theory”.

Actually, some index builders (e.g., IMD) argue that a country’s competitiveness cannot be reduced only to GDP and productivity because firms must cope with the political, cultural and educational dimensions of countries, as well as with their economies. But if we do not have a solid measure of the competitiveness of a country, there could be serious analytical confusion between inputs regarding competitiveness and its manifestation (Lall, 2001).

Other builders, such as WEF, use per capita GDP at purchasing power parity values in reference to national competitiveness. However, it is not clear if GDP is the right measure of international competitiveness. National income comprises significant elements that do not enter international competition, including several services as well as infrastructure, industrial and agricultural activities. While some services are directly traded or fed indirectly into tradable activities, a substantial part (e.g., real estates, catering or domestic services) is fairly remote from inter-country competition. In this case, the concept of competitiveness becomes productivity and has little to do with conflict in gaining market shares or remedying market failures in improving direct competitiveness (Lall, 2001).

The case for the attractiveness index is different. Here, the driving forces are the relative factor prices at a local level and the “receipt” is closely derived by the cost structure of a specific firm and industry. Other elements participate to the index, but have a minor role. Therefore, there is a clearer target and the identification of important variables can rely on the previous firms and industry experience: basically, the index should mimic the process of location choice by a (multinational) firm. The measurement problem is related to the acquisition of rich, comparable and reliable data, set on cost determinants and relative prices at local level: here, the value of the index depends more on the extent and the quality of data than on the rigour of the underlying analytical framework.

### **3. Methodological issues in index building**

The output of the competitiveness and attractiveness measurement process is a composite indicator that ranks countries and regions against each other according to selected criteria and measures of (national and regional) competitive and attractive potential prowess. The index reliability depends on both “ingredients” (the variables used to capture the multidimensional aspect of the concepts) and the “receipt” (how the variables are aggregated and weighted). Here, we analyze some issues related to the technicalities involved in index building and the effect on index reliability.<sup>1</sup>

Composite indicators face a relevant degree of scepticism among statisticians, economists and other groups of users, mainly due to the lack of transparency of some existing indicators, especially as far as methodologies and basic data are concerned. JRC and OECD have recently launched a project to provide builders of composite indicators with a set of recommendations on how to design and develop a composite indicator. In fact, methodological issues need to be addressed transparently prior to the construction and the use of composite indicators in order to avoid data manipulation and

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<sup>1</sup>Generally, the indexes consider three main areas of interest: economic (mainly macroeconomic) performances; institutional and governmental efficiency; business efficiency. A broad classification can consider the following:

- a. indexes oriented to capture growth competitiveness versus indexes oriented to capture business competitiveness;
- b. different geographic units of analysis, taking into consideration indexes addressed to international comparison and indexes oriented to compare groups of homogeneous countries or regions inside a country;
- c. the methodological approach, considering the use of hard data, surveys or combining both sources.

misrepresentation. The Handbook on constructing composite indicators (Nardo et al., 2005) contributes to a better understanding of the complexity of composite indicators and to an improvement of the techniques currently used to build composite indicators. Therefore, it will be used as a reference point in the analysis.

A very general and simplified structure for a composite competitiveness index  $I$  for the country  $i$  is the following :

$$I_i = h(x_{i1}, \dots, x_{in}; w_{i1}, \dots, w_{in}) \quad (1)$$

where  $h(\cdot)$  is an aggregation function,  $x_{i1}, \dots, x_{in}$  is a vector of  $n$  characteristics and  $w_{i1}, \dots, w_{in}$  is a vector of coefficients (weights), associated to each characteristic.

The main issues of collapsing several dimensions in a single composite indicator are linked to:

1. scope, related to the selection of variables in vector  $x$ ;
2. aggregation, related to the choice of the function  $h$  and of weights  $w$ ;
3. technical treatment of the data (normalization, missing value and others)

In this chapter we focus on aggregation, that is, how to select the weights that aggregate primitive variables into the composite index. Without an *ex ante* statistical or a theoretical model, the choice of the weights owes more to craftsmanship than to scientific rules.

Weights are essentially value judgements. For instance, they can reflect policy priorities or theoretical factors. Most composite indicators rely on equal weighting, i.e., all variables are given the same weight. This could correspond to the case in which all variables are “worth” the same in the composite but also it could cover up the absence of statistical or empirical basis, e.g. when there is insufficient knowledge of causal relationships or a lack of consensus from the other part.

A clear problem is the application of the same weight structure for each country and region. This can be implausible because the mix of resources, instruments and skills can be very different across countries and regions. The problem is similar to the international comparisons of purchasing power, measured with respect to a basket of goods and services changing across countries. All the main competitiveness indexes use a *prior*, exogenous weight structure. This can amplify differences and propose a meaningless comparison. A different proposal is to use endogenous weights, estimated on the basis of statistical methods (e.g. DEA). For instance, Bowen and Van Moses (2005) and Cherchye et al. (2006) propose to calculate the weights so that they maximize, for each country  $i$ , the value of an objective function, being that the composite index is considered. The interpretation of the index is not easy: the interesting result is the impact of these weighting procedure on the ranking system. Adopting weights that reflect a country’s individual performance, by variables, reduces the measure differences in competitiveness score among countries (more than 26% in their paper).

Weights may also be chosen to reflect the statistical quality of the data. Higher weights may be assigned to statistically reliable data with broad coverage. However, this method could be biased towards the readily available indicators, penalising the information that is statistically more problematic to be identified and measured. Usually, the main indicators use a mixture of qualitative data (questionnaire responses) and 'hard' data (from published sources). However, the extensive use of qualitative responses from businesses across the world can cover many ambiguities and weaknesses. The main problem is that the variability of qualitative sources is often much higher than the variability of quantitative data. In this case, weights should be adjusted in order to reduce the impact of aggregation of the different sources. Lall (2001) reports several cases where, on the basis of qualitative data, the change in the year-by-year ranking resulted dramatic.

#### 4. Robustness

In this chapter, an empirical analysis of the informative content regarding different indexes is presented. A broad set of 31 countries is selected<sup>2</sup>. This set is composed of some developed countries in Europe, North America, Asia and some developing countries in East Europe. Countries are chosen in order to have a relative homogeneous set of nations where structural differences across economies are reasonable and comparisons are meaningful. Countries are ranked using 7 main competitiveness indicators:

1. GDP per capita in 2005 US\$ (converted to 2005 price levels with updated 2002 EKS PPPs). Source: The Conference Board and Groningen Growth and Development Centre, Total Economy Database, January 2006, <http://www.ggdc.net>
2. Growth Competitiveness Index 2005 by World Economic Forum (WEF), <http://www.weforum.org>
3. Business Competitiveness Index 2005 by World Economic Forum, <http://www.weforum.org/>
4. World Competitive Rank 2005 by IMD, <http://www01.imd.ch>
5. Inward FDI Performance Index 2004 by UNCTAD, UN, <http://www.unctad.org>
6. Inward FDI Potential Index 2003 by UNCTAD, UN, <http://www.unctad.org>
7. Trade and Development Index 2005 by UNCTAD, UN, <http://www.unctad.org>

We have estimated the normalized ranking for each index using only the 31 countries mentioned.

Similarities between the level of growth (expressed by per capita GDP) and the other indicators are high. Excluding Inward FDI Performance Index, the correlation between per capita GDP ranking and index ranking is positive and significant for all measures: Spearman's *rho* is between 0.59 and 0.83; Kendall's *tau-a* between 0.46 and 0.69. In all

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<sup>2</sup> These countries are: Denmark, the U.S.A, the U.K., Sweden, Norway, Japan, Switzerland, Germany, Austria, Canada, France, Belgium, Australia, New Zealand, Finland, Iceland, Ireland, Portugal, the Netherlands, Spain, Italy, Slovenia, Greece, South Korea, Hungary, Estonia, Poland, Czech Republic, Slovak Republic, Turkey, Mexico.



cases, the correlation is statistically significant. The informative content of different measures is very similar and these measures can represent (with noise) the same phenomenon. The correlation with Inward FDI Performance Index is negative: lower the growth level, higher FDI inward flow, as expected. The difference between attractiveness and competitiveness is empirically evident. The correlation between WEF and IMD measure of competitiveness is 0.73. The difference is higher than expected, given the similarity of “receipt” and “ingredients”. Differences in the surveys and in qualitative information can play a crucial role in this context.

What is really surprising is the differences in the ranking of each country. Assuming to make a comparison the per capita GDP ranking with the IMD and WEF average ranking for 2005, if we consider only absolute differences larger than 10 position, we have 3 nations with a positive difference (Finland, Poland and Estonia) and 2 nations with a negative difference (Iceland and Italy). Therefore, Italy is by far the only large economy where the indexes forecast a competitiveness level much lower than the effective one.

The rank position of Italy across the 7 indexes is between the 21<sup>st</sup> and the 28<sup>th</sup> position. In term of per capita GDP, the position is the 19<sup>th</sup>. All the measures underestimated the potential of the country with respect to effective performances. This is not a question of 2005: in fact, the same undervaluation is present in the previous years as well, even if productivity levels are close to the performances of the most advanced economies. Note that Italy’s competitiveness index is lower than that of Portugal, Slovenia, Hungary, Estonia.

Why? My opinion of this problem is related to both “receipt” and “ingredients”, as follows:

1. without a theoretical model, the weighting system cannot capture the substantial factors of growth. The risk is in giving weight to a large amount of interconnected and interdependent variables, without selecting the relevant sources of growth;
2. the indices simplify a very complex real world, where non linearities, specialisations, scale and scope economies matter. In Italy, the strict relation between national and local development cannot be completely captured by these measures.

A consequence of the weighting system and the mix of hard data and survey data is the instability of the yearly ranking. Spearman’s *rho* between per capita GDP ranking in 2004 and 2005 is 0.99; between GCI 2005 and 2004 is 0.81. Therefore, the risk is to detect short-term competitiveness fluctuations, not long term factor dynamics.

## **5. Conclusions**

Policy makers express concern about national and local competitiveness. The concern has generated a proliferation of competitiveness and attractiveness indices, composite indicators ranking countries or regions against each other according to selected criteria and measures of national and local competitive prowess. While their real impact is difficult to assess, the leading indices attract considerable attention among the media, policy makers and also academics. In view of their importance, surprisingly little is

known about the economics and statistics of competitiveness indices, such as how soundly they are grounded in theory, how sensibly the variables are defined or how well they are measured and aggregated.

In this paper, we have presented a brief critical evaluation of the main indices. The principal remark is that the competitiveness indices have weak theoretical foundations. Moreover, the empirical specification is based on a priority weighting system that amplifies differences and suggest meaningless comparison. These aspects affect indices' robustness and can explain the relevant underestimation of Italy's growth performances.

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