The quality of competition law institutions and enforcement
(Some comparative empirical evidence from BRICS and other countries)

Vasiliki Bageri,
Athens University of Economics and Business (Greece)

Yannis Katsoulacos*,
Visiting Professor, ESSEC Business School; Full Professor, Dept. of Economics,
Athens University of Economics and Business (Greece)

Abstract

Empirical work on the influence of competition policy relies on the construction of indicators for measuring certain attributes of the relevant laws and institutions that can be hypothesized to influence the "quality" of these laws and institutions and hence their effect on competition and economic performance. This paper contributes to the methodological literature on indicators of the quality of Competition Law Institutions & Enforcement (CLI&E) and to the empirical literature relating to the measurement of these indicators in different countries. It presents the results of a recent empirical study, which objective has been to measure indicators of the quality of CLI&E, using data collected through a Questionnaire based survey of competition authorities in a large number of countries and data available from international organisations for these countries. The measurement of the indicators relies on a new methodology that focuses on the factors influencing the extent to which CLI&E improves competition and so enhances economic performance.

The overall conclusion is that the three BRICS countries included in our survey (Brazil, Russia and South Africa) are coming closer to the advanced jurisdictions in terms of the specific features of the countries' institutional and legislative set-up relating to CLI&E but still lag far behind in terms of the general conditions (economic, political, institutional, and socio-cultural) influencing the intensity of competition in a country.

Keywords: competition law, institutions, comparative empirical analysis.

JEL: L4, K21, L12.

* E-mail of the corresponding author: yanniskatsoulacos@gmail.com

1. Introduction

Competitive conditions in a country are fundamental for a more efficient resource allocation, lower prices, higher product quality, higher levels of innovation, increased productivity, ultimately higher growth, and social welfare. Furthermore, improved competition may favourably affect poverty reduction and redistribution of income and resources.

Several policies contribute to improving competition. Among these, competition law and specific regulators empowered to take measures that deter, identify, and prosecute anti-competitive conducts (such as cartels or abuses of dominance) and approve or prohibit notified concentrations can play a major role. A substantial amount of theoretical and empirical studies of the influence of both competition and competition policy on various dimensions of economic performance has already been undertaken.

Overall, the empirical literature shows that there is a statistically significant positive influence of various measures of competition intensity on innovation[1], though the relationship may be inverse U-shaped (Aghion et al., 2005, 2009, 2014). Furthermore, it shows a positive influence of the quality of CLI&E on productivity growth. The former relationship is reviewed in Benetatou et al. (2018) and in Katsoulacos, Genakos and Houpis (2018)[2]. For discussions about and evidence on the latter relationship see Buccirrossi et al. (2011, 2013), Benetatou et al. (2018), Voigt (2013), Baker (2003, 2007), Borrell et al. (2008), Bradford Anu et al. (2015), Claugherty (2010) and Crandall et al. (2003), Dutz and Vagliasindi (2000), Howitt (2004), Kee and Hoekman (2007), Krokowski (2005), Ma (2011), Shelanski and Katz (2007), Winston (1993).

The empirical work on the influence of competition policy generally relies on the construction of *indicators* for measuring certain attributes of the relevant laws and institutions that can be hypothesized to influence the "quality" of these laws and institutions and hence their effect on competition and economic performance[3].

Bradford et al. (2015) review a number of attempts of constructing indicators for measuring certain attributes of competition policy (or antitrust law) that can be hypothesized to influence economic performance (productivity growth or innovation). Apart from the attempts by Bradford herself and her co-researchers (see, for example, Bradford, Adam, 2018), one should mention here the articles by Buccirrossi et al. (2011, 2013), those of Voigt (2007, 2013), that of OECD (2013), Claugherty (2010), Guttman and Voigt (2014), and that by Hylton and Deng (2007). Our approach to constructing an indicator of the quality of Competition Law Institutions and Enforcement, which we describe in detail below, encompasses many of the features of the existing literature.

---

[1] Nickel (1996) and Blundell et al. (1995, 1999) find a positive relationship between competition and innovative activity at the industry level. Aghion et al. (2005) present evidence that supports the existence of a bell-shaped relationship between competition and innovation at the firm level.

[2] See also Dutz and Hayri (1999), Dutz et al. (2011), Gilbert (2006), Howitt (2007), Shapiro (2012), Schmutzler (2010), Vives (2008).

[3] These indicators are also useful for providing a guide for the diagnostic work of international organisations needed in designing and in better tailoring their technical cooperation work that aims to improve competition conditions according to the needs of their counterparts.

We believe that it represents the most comprehensive up to date approach in terms of the extensiveness of factors taken into account that can have a potential influence on the effectiveness of CLI&E in improving competition and economic performance[4].

More specifically, this paper adds to the methodological literature on indicators of the quality of CLI&E and to the empirical literature related to the measurement of such indicators. With regard to the latter, it presents the results of a recent empirical study, the objective of which has been to measure indicators of the *quality of Competition Law Institutions and Enforcement* (CLI&E) using the data collected through a Questionnaire based survey[5] of Competition Authorities (CAs) in a large number of countries, as well as the data concerning these countries available from international organisations. The measurement of the indicators relies on a new methodology[6] that focuses on the factors influencing the extent to which CLI&E improves competition and enhances economic performance (EP). Thus, the *quality of CLI&E is thought of as measuring the effectiveness of CLI&E in enhancing EP*[7].

Another well-known recent attempt to construct CL indicators belongs to Bradford Anu and her collaborators (see article in *Journal of Competition Law and Economics* (2018). Their CL indicator (CLI) has different objectives, as is obvious from the approach used in its construction. Specifically, the goal of CLI is to *provide a measure of the intensity or stringency of competition regulation* by coding the elements of countries' competition laws (so the indicator focuses on "law on the books"). The more types of behaviour the law prohibits or the more extensive remedies the law entails, the higher the CLI. At the same time, the more defences and exemptions the law provides, the lower the CLI. Researchers capture these elements by coding all laws containing competition provisions. Our methodology also contains a measure of stringency captured by one category of questions to which CAs are asked to respond in our survey under our Special Features indicator. But our indicators, along with much broader objectives, also capture a large number of other factors (they are more comprehensive).

It is worth reminding ourselves here that different jurisdictions are characterised by different degrees to which competition would be workable in products and services markets *in the absence of CLI&E.* The degree to which competition is workable depends on the anticompetitive conduct of firms, which CLI&E seeks to eliminate, and at the same time (may be even primarily) on the more general economic, political and socio-cultural conditions and characteristics in any given country, on its government's policies that

---

[4]   For example, unlike the Bradford and Chilton indicator, our indicator takes into account resources or efforts countries put into enforcing their competition laws and their ability to do so. Indeed, relying simply on a country's law on the books we may overstate the stringency of the country's competition law regime.

[5]   The study was commissioned and funded by EBRD. The author of this paper was the scientist in charge of the Questionnaire-based survey and the construction of the indicators utilizing the survey's results.

[6]   Professor Frederic Jenny has participated in the EBRD study and contributed to the development of the methodology, and was responsible for the implementation of the construction of the General Conditions (GC) indicators (see below).

[7]   As Kovacic (2009) notes, an appropriate assessment of quality should focus on the extent to which CLI&E improves economic performance (EP). Thus, *Q should be thought of as measuring the effectiveness of CLI&E in improving EP.*

influence entry, trade and foreign direct investment barriers in the markets, on the degree of market concentration, on the quality of physical infrastructure, and on the provision of public goods, as well as on the levels of education and health care (which determine the availability and quality of human resources), and on the extent to which there are missing institutions and underdeveloped financial markets[8]. This implies that the extent to which there is a need for CLI&E, the *type* of enforcement that should be applied when there is, and, ultimately, the quality of CLI&E in different jurisdictions depends on these "other" conditions and characteristics in each jurisdiction[9]. And in some cases, it is relatively more important to have effective CLI&E in less developed countries (LDCs) as compared to DCs, while in other cases it is relatively more important to have effective CLI&E in DCs as compared to LDCs.

Consider, for example, the case of an anticompetitive conduct (e.g. refusal to sell or give access) that on its own can limit entry into markets and thus can create harm. In this case, in jurisdictions with low "other" entry barriers, CLI&E stops these conducts and thus increases welfare more effectively than in jurisdictions with high "other" entry barriers. In the latter case, eliminating the anticompetitive conduct and hence one barrier will not have much impact on EP (that is, removing CLI&E will not matter much because the counterfactual price that would prevail without the anticompetitive conduct is much higher in these latter jurisdictions). Thus, for this type of conducts, CLI&E is more important in advanced jurisdictions with low "other" barriers.

Consider, in turn, an anticompetitive conduct (such as some predatory pricing or rebate schemes) that on their own would not be able to limit entry into markets but can do so (and will be used in order to do so) when some other entry barriers or market failures are present. In this case, in jurisdictions with few "other" entry barriers or market failures, CLI&E will not be needed much, while in jurisdictions with many "other" entry barriers the value of CLI&E will be relatively very high. Also, we can say that if CAs do remain involved in enforcing Competition Law (CL) for such conducts, they should be using effects-based assessment procedures or legal standards in jurisdictions in which other barriers are relatively low, but should use *per se* legal standards (which are administratively less costly) in jurisdictions in which other barriers are relatively high (since in the latter case, the presumption of illegality of these conducts – i.e. presumption that they create harm – is much higher)[10].

The next section describes the proposed methodology for the construction of aggregate indicators of the quality of CLI&E. In Section 3, we describe some results of the survey we undertook of the 38 EBRD countries of operation (including Russia), as well as of Germany, France, Sweden, UK, South Africa, and Brazil. Finally, section 4 offers concluding remarks.

---

[8] See, for example, Gal and Fox (2014), pp. 14–18. Also Nicholson (2008), who notes that: " (...) a significant gap exists between 'laws on the books' and the 'rule of law' in the realm of competition policy".

[9] This justifies our approach to break down the factors that influence the effectiveness of CLI&E in IEP in terms of general economic, political, institutional and socio-cultural conditions, and specific features of the institutional and legislative set-up relating to the CLI&E of each jurisdiction (see below).

[10] See Katsoulacos and Ulph (2009, 2016) for a formalization of the notion of the presumption of illegality and how it affects the choice of legal standards.

2. A methodology for constructing indicators of the quality of CLI&E

Our methodology for constructing an indicator of the quality of CLI&E starts from the observation that CLI&E can improve competition by effectively detecting and stopping anticompetitive conduct of firms in a way that maximises benefits in economic performance (EP) (implying decision error minimisation), and by minimising recidivism. In this sense, the more effective is CLI&E, the greater the improvement in EP in terms of lower prices, improved quality of products and services, and enhanced innovation.

However, as already noted in the Introduction above, it is also recognized and taken into account that the extent to which there is a need for CLI&E, the *type* of enforcement that should be applied when there is, and, ultimately, the quality of CLI&E in improving competition and EP in different jurisdictions depends on many *"other" conditions* and characteristics in each jurisdiction – other than those associated with the specific institutional and legislative set-up related to CL. To reiterate, these factors include the more general economic, technological, political, and socio-cultural conditions and characteristics in any given country, its government's policies that influence barriers to entry, trade and foreign direct investment in markets, and, more specifically, factors that contribute to a competitive environment in markets, such as, quality of physical infrastructure and provision of public goods, levels of education and health care (which determine availability and quality of human resources), and existence of missing institutions and underdeveloped financial markets.

Proceeding from this, the methodology we propose recognizes two distinct sets of factors that influence the quality of CLI&E:

1. General economic, political, institutional, and socio-cultural conditions (for short, henceforth, *General Conditions, GC*) of each jurisdiction. These *General Conditions* can be considered as complementary to CLI&E: the effectiveness of CLI&E depends on whether these conditions are favourable or not.

2. Specific features of the institutional and legislative set-up relating to the CLI&E of each jurisdiction (for short, henceforth, *Specific Features, SF*).

We start with the factors that are taken into account in order to construct the GC indicator (the General economic, political, institutional, and socio-cultural Conditions):

- *Quality of the country's legal and judicial systems[11]*
- *Degree of corruption[12]*

---

[11] The completeness of the legal system in terms of having in place property law, contract law, bankruptcy law, public procurement law, and the independence and effectiveness of the system (in terms of being free of influence from the executive, and in terms of the extent to which it is able to produce, without undue delays, error-free decisions) is fundamental for the smooth operation of markets and is a prerequisite for unhindered entry into and exit from markets, incentives to invest and risk-taking by entrepreneurs. Thus, higher quality legal and judicial systems constitute important (necessary, though not sufficient) factors for ensuring that there is high intensity of competition.

[12] Corruption has several deleterious effects on the competitive process. At the general level, the importance of corruption is an indicator of the weakness of respect for the rule of law in general, and of decisions of administrative authorities or courts. At the economic level, corruption means that the winners of the competitive game may not be the most efficient firms but the firms selected following the corrupt practices

- *Macroeconomic Environment – proxied by FDI & GFCF[13]*
- *Size of the informal sector[14]*
- *Regulatory burden – government barriers to competition[15]*
- *Degree of trade liberalisation[16]*
- *Quality of ICT, infrastructure, and logistics in economy[17]*
- *Degree of availability of suitable quality human resources and financial resilience[18]*

Data sources for measuring these factors and constructing an indicator of the favourableness of General Conditions are available in various international organisations, specifically: EBRD, WB, WEF, OECD, UNCTAD, IMF and WTO.

We next turn to the factors that allow us to construct the Specific Features (SF) indicator. These are divided into two sub-sets of factors:

A. Institutional pre-conditions for the effectiveness of the competition authority (CA).
B. Resources, productivity, and quality of enforcement of the CA.

Each of these two sub-indicators (abbreviated below as SFA and SFB) covers a large number of factors. Specifically, we divide these factors into 21 categories – 14 for SFA and 7 for SFB.

(for example, public procurements may not be attributed to the lowest bidders for a given level of quality). Thus, the effectiveness of competition and the efficiency of markets is likely to be weaker in corrupt countries than in others.

[13] A stable macroeconomic environment, characterized by low and predictable inflation and sustainable fiscal policy, improves investment incentives or capital accumulation and productivity growth. This suggests enhanced incentives to enter markets to exploit opportunities and implies higher intensity of competitive pressures in markets.

[14] The informal sector — the part of the economy, where operators do not rely on enforceable contracts — affects the effectiveness of competition law enforcement in a number of ways. First, within the informal sector, rules in general and competition law rules in particular do not apply. Second, in some industries, the informal sector may be competing with the formal sector, thus creating an uneven playing field with an unfair competition. Third, the informal sector can make competition law enforcement less effective. In particular, the definition of relevant markets and the assessment of the intensity of competition from firms in the informal sector becomes difficult for the competition authority. Thus, we expect that the larger the informal sector, the more limited will be the reach of competition law enforcement and the less effective the enforcement will be.

[15] One of the main sources of restrictions to competition is public regulation which either prevents competition by limiting entry, or restricts the freedom of economic actors to freely compete. Thus, regulation induces lower levels of competition intensity in markets and makes competition law enforcement either impossible in the regulated sectors, or less effective than it would be without the restrictions imposed by regulation.

[16] Competition law enforcement requires enabling *public policies* to be fully effective. *Trade liberalization* is thus a necessary complement to competition law enforcement as it allows foreign producers to compete among themselves and with domestic producers on the domestic market. International competition is particularly important in small economies or in developing countries in which there are only very few domestic suppliers.

[17] The quality of ICT, infrastructure, and logistics is important for investment and economic growth. The relationship between the quality of ICT and infrastructure and competition is based on the fact that infrastructures allow mobility of goods and services through the economy and contribute to improved competition by allowing entry when the entrants have access to essential facilities.

[18] Efficient financial markets and an educated workforce ensuring high quality of human resources facilitate market entry, risk taking, entrepreneurship, and innovation and are an important precondition for effective competition.

These 21 categories are the following:

A.1. Institutional features. These cover issues related to:

(i)   Independence (that must be measured by taking into account both formal and factual conditions).

(ii)   Powers during investigation.

(iii) Transparency and fairness of the process.

(iv)   Accountability.

A.2. Completeness and quality of the competition law and of related statutes. These cover the following factors:

(i)   Goals of CL and whether in practice they diverge from the goals of efficiency or protection of consumer welfare.

(ii)   Scope of CL (Does the CA have competence in all the main categories of anticompetitive conduct?).

(iii) Advocacy role attributed to the CA (range of advocacy responsibilities assigned to the CA).

(iv)   Prioritisation procedures.

(v)   Completeness and quality of the secondary legislation.

A.3. Scope of competences:

(i)   Compliance with the principle of competitive neutrality.

(ii)   Sectors / firms exempted by CL itself or that can be exempted *ex post* by ministerial decree.

A.4. Enforcement tools:

(i)   Existence and quality of a sanctioning regime.

(ii)   Ability to impose remedies.

(iii) Existence and quality of a leniency program.

Concerning SFB — the indicator measuring the resources, productivity and quality of enforcement of the CA — seven sets of factors are taken into account:

B.1. Resources of the CA[19].

B.2. Experience, learning-by-doing, investment in human capital, and knowledge base.

B.3. Productivity: output of enforcement activity (decisions) relative to resources.

B.4. Length of procedures.

B.5. Other activities that improve the quality of enforcement[20].

B.6. Quality of decisions[21].

B.7. Advocacy activities undertaken by the CA in practice and resources devoted to advocacy.

---

[19] Lack of human and financial resources can lead to underenforcement or to incompetent enforcement efforts that produce many errors and undermine the standing and reputation of the CA. It is widely recognised that while adequate resources are not a sufficient condition for effective antitrust enforcement, they undoubtedly constitute a necessary condition. The CA has to employ suitably educated and experienced economists, lawyers, and administrators and it must be able to offer attractive compensation schemes competing with the rest of the public sector and the private sector.

[20] Here, we include activities that aim to reduce recidivism and collaboration of the CA with other regulators and the procurement agency.

[21] Captured by the appropriateness of the adopted legal standards and hence the extent to which decision errors are minimized.

3. Some empirical findings

As mentioned above, the data for constructing the General Conditions (GC) indicator are available from a number of international organisations.

3.1. Data for constructing the SF indicator

The data for measuring the SF indicator were collected through the Questionnaire based survey. The Questionnaire consisted of 113 questions covering 21 categories of relevant factors identified above. It turned out that the responses to 94 out of the 113 questions could be finally utilised. The respondents were CAs.

3.2. Coverage

The Questionnaire was sent to the CAs of the 38 EBRD countries of operation. Of these, 30 responded: Albania, Armenia, Belarus, Bosnia, Bulgaria, Croatia, Cyprus, Egypt, Estonia, Georgia, Greece, Hungary, Jordan, Latvia, Lithuania, Moldova, Montenegro, Mongolia, North Macedonia, Poland, Romania, Russia, Serbia, Slovenia, Slovakia, Tunisia, Turkey, Ukraine, Uzbekistan, Kazakhstan. It was also sent to 4 countries with "advanced" jurisdictions: France, Germany, Sweden, the UK. Finally, Brazil and South Africa were included in the survey, ensuring responses from 3/5 BRICS, including Russia (that is also one of the EBRD countries of operation). Thus, a total of 37 countries were included and taken into account in the results presented below.

The responses to most of the questions were in the form of "Yes" or "No" answers, to which we assigned the value "1" or "0" respectively. For some questions a quantitative answer was required and to these an appropriate preliminary normalisation procedure was added (e.g. dividing the CA's annual budget by a measure of the country's nominal GDP). The variables (responses to the questions) were all normalised using the min-max procedure, and so all values were expressed as values between 0 and 1[22]. For filling in missing data (when there was lack of response) the *multivariate imputation by chained equations* (MICE) procedure was used[23]. Finally, a linear aggregation was used to successively obtain more aggregate indicators using weights between 0 and 1 for each variable and then for each sub-indicator, according to which we considered the relative importance that should be assigned to the variable or sub-indicator in constructing a more aggregate indicator.

---

[22] The min-max normalization method is as follows:

$$x_{norm} = \frac{x - x_{min}}{x_{max} - x_{min}},$$

where x_{min} and x_{max} are the lowest and highest values in the sample respectively.

[23] We wish to thank Prof. Katerina Kyriazidou and Mr. Germanos Hadjiathanasiou for their invaluable help in implementing this procedure. See also Van Buuren et al. (2011).

We present below some results that emerged from the survey of the three BRICS (Brazil, Russia and South Africa) and four advanced jurisdictions (Germany, France, Sweden and the UK), and we compare these to the averages for the 30 EBRD countries that responded to our survey and the averages of three groups of countries that we constructed in order to create "group dummies" for the purposes of imputing missing values. The three groups of countries are the following:

- Developing countries A (Czech Republic, Greece, Latvia, Slovenia, Cyprus, Lithuania, Hungary, Estonia, Slovak Republic, Romania, South Africa, Brazil, Turkey)
- Developing countries B (Georgia, Albania, Bulgaria, Serbia, Poland, Republic of North Macedonia, Croatia, Ukraine)
- Developing countries C (Tunisia, Armenia, Egypt, Jordan, Republic of Moldova, Uzbekistan, Montenegro, Bosnia and Herzegovina, Mongolia, Republic of Belarus, Kazakhstan)

The results are shown in the Tables below. First we show the sub-indicators SFA and SFB, then the aggregate SF indicator, then the GC indicator, and then the overall Aggregate Indicator.

Table 1. Specific Features A indicator (SFA)
(Institutional pre-conditions for the effectiveness of the competition authority)

Countries	Indicator SF_A		Averages	Indicator SF_A
UK	0.951		Advanced	0.835
France	0.869		BRICS	0.832
Russia	0.856		Developing A	0.787
Brazil	0.821		Developing B	0.673
South Africa	0.820		Developing C	0.707
Sweden	0.769		EBRD	0.753
Germany	0.752			

Table 2. Specific Features B indicator (SFB)
(Resources, productivity, and quality of enforcement of the CA)

Countries	Indicator SF_B		Averages	Indicator SF_B
Germany	0.713		Advanced	0.597
UK	0.603		BRICS	0.512
South Africa	0.566		Developing A	0.360
France	0.553		Developing B	0.376
Russia	0.552		Developing C	0.354
Sweden	0.517		EBRD	0.380
Brazil	0.418			

Table 3 shows the values of the SF indicator that is constructed using sub-indicators SFA and SFB with weights 0,5 each.

Table 3. Specific Features indicator, SF
(Specific features of the institutional and legislative set-up relating to the CLI&E)

Countries	*Indicator SF*	Averages	*Indicator SF*
UK	0.777	Advanced	0.716
Germany	0.732	BRICS	0.672
France	0.711	Developing A	0.574
Russia	0.704	Developing B	0.524
South Africa	0.693	Developing C	0.530
Sweden	0.643	EBRD	0.567
Brazil	0.619		

In Table 4, we transform the SF indicator values so that they lie between 1 and 10 in order to make the SF indicator comparable to the GC indicator shown below.

Table 4. Specific Features indicator, SF [1−10]
(Specific features of the institutional and legislative set-up relating to the CLI&E)

Countries	*Indicator SF* [1−10]	Averages	*Indicator SF* [1−10]
UK	7.994	Advanced	7.444
Germany	7.591	BRICS	7.049
France	7.400	Developing A	6.162
Russia	7.335	Developing B	5.607
South Africa	7.238	Developing C	5.773
Sweden	6.790	EBRD	6.099
Brazil	6.573		

Table 5. General Conditions indicator, GC [1−10]
(General economic, political, institutional, and socio-cultural conditions)

Countries	*Indicator GC* [1−10]	Averages	*Indicator GC* [1−10]
Germany	8.044	Advanced	7.514
UK	7.686	BRICS	4.466
Sweden	7.502	Developing A	5.330
France	6.826	Developing B	4.260
South Africa	4.943	Developing C	4.364
Russia	4.559	EBRD	4.824
Brazil	3.896		

Table 6 shows the values of the Aggregate Indicator that is constructed using sub-indicators SF and GC (Tables 4, 5) with weights 0,3 and 0,7 respectively. To the extent that this can be considered the minimum weight that can be assigned to GC, for which advanced countries have a significant advantage, our calculation of the Aggregate Indicator may be overestimating the relative performance of BRICS and EBRD countries.

Table 6. Aggregate indicator [1−10]

Countries	Aggregate indicator [1−10]	Averages	Aggregate indicator [1−10]
UK	7.902	Advanced	7.465
Germany	7.727	BRICS	6.274
France	7.228	Developing A	5.912
Sweden	7.004	Developing B	5.203
South Africa	6.550	Developing C	5.350
Russia	6.502	EBRD	5.717
Brazil	5.770		

3.3. Discussion of empirical results

1. Our findings indicate that the UK leads the countries in our sample in terms of the SF indicator (Specific features of the institutional and legislative set-up relating to the CLI&E) and in terms of the overall Aggregate Indicator of the quality of CLI&E. Germany leads the countries in our sample in terms of the GC indicator (capturing the general economic, political, institutional, and socio-cultural conditions influencing the intensity of competition in a country).

2. Probably the most interesting empirical finding emerging from our survey concerns the SFA indicator — the Institutional pre-conditions for the effectiveness of the CA (Table 1). The survey findings indicate that BRICS have made substantial improvements and have already reached the levels of the advanced jurisdictions in terms of these Institutional preconditions. Also, the average of the EBRD countries is not very far behind the advanced jurisdictions (0,835 versus 0,755). This may indicate that the work of international organisations such as OECD, the World Bank and the EBRD that were promoting the set-up of the institutional preconditions during the last 3 or so decades has paid-off.

Some important details concerning SFA are worth mentioning:

a) the advanced countries and the BRICS are essentially at the same level as regards A.1 and A.2 (Institutional features and Completeness of CL statutes respectively);

b) BRICS are, very interestingly, ahead of the advanced countries in "exemptions" and in the "sanctioning regime", but they are far behind in their leniency programs. Thus, we find that the advanced countries have a less "stringent competition policy regime" (in the sense of Bradford et al., 2018) than the BRICS included in our survey;

c) among the three BRICS countries covered by our survey, Russia is slightly ahead as regards SFA, with Brazil and South Africa in second and third place (this ranking is reversed for SFB — see below).

3. Advanced countries are, however, still about 17% ahead of the BRICS as regards the SFB indicator — Resources, productivity and quality of enforcement of the CA (Table 2), and the gap rises to 35,2% for the EBRD countries average. In terms of sub-components, BRICS are ahead of the advanced jurisdictions (but only slightly) in resources, but they are far behind in experience and productivity.

Among the BRICS, the situation is reversed as regards SFB in relation to SFA. As for SFB, it is South Africa that is clearly in the lead, with Russia and Brazil in the second and third place respectively.

4. Overall, as for the SF indicator (Specific features of the institutional and legislative set-up relating to the CLI&E) (Tables 3 or 4), the "other" countries seem to have improved significantly in relation to the advanced countries: the gap between the BRICS and the advanced countries is only 6,4%, and the gap with the EBRD countries average is 13,2%.

5. But as anticipated, the advanced countries still perform much better in terms of the general Conditions (GC) indicator capturing the general economic, political, institutional and socio-cultural conditions which influence the intensity of competition in a country (Table 5). Specifically, they are 78,6% ahead of the BRICS and 94% ahead of the EBRD countries average.

6. Mainly as a result of this, and even with a weight of only 30% in the GC indicator and 70% in the SF indicator, the advanced countries are ahead in terms of the Aggregate Indicator of the quality of CLI&E by 20,5% in regard to the BRICS, and by 30% in relation to the EBRD countries average. As for the BRICS, South Africa tops the list of the Aggregate indicator, while Brazil is generally behind both in the SF sub-indicators and especially in the GC indicator and thus also in the Aggregate indicator (by over 12% in relation to Russia, which ranks second among the BRICS countries).

7. Finally, the three BRICS countries perform better regarding indicators SFA, SFB (and hence SF) than all the sub-groups of the Developing Countries (A, B, and C) and than the EBRD countries average (Tables 1—4). However, they perform worse than some sub-groups of Developing Countries (specifically group A) and than the EBRD countries average as regards the GC indicator (Table 5). But the lower value of the GC indicator is not sufficient to weight the BRICS' superior performance in terms of the SF indicator and as a result, the BRICS rating on the Aggregate indicator is higher than that of all the sub-groups of the Developing Countries (A, B, C) and than the EBRD countries average.

4. Concluding remarks

This paper contributes to the methodological literature on constructing indicators of the quality of Competition Law Institutions & Enforcement and also to the empirical literature related to the measurement of such indicators. Specifically, it presents

the results of a recent empirical study, which objective has been to measure indicators of the quality of Competition Law Institutions and Enforcement using data collected through the Questionnaire based survey of Competition Authorities and data available from international organisations operating in the 38 EBRD countries (including Russia), four advanced jurisdictions (Germany, France, Sweden, the UK), Brazil and South Africa.

We ascertain that in terms of the Institutional Pre-conditions for the Effectiveness of the Competition Authority (our sub-indicator SFA), the three BRICS countries surveyed have made substantial improvements and have already reached the levels of the advanced jurisdictions in terms of these preconditions, while substantial improvements (on average) have been made by the other developing countries in our sample. However, the advanced countries are still about 17% ahead of the BRICS as regards our SFB indicator (Resources, productivity and quality of enforcement of the Competition Authority). Moreover, they perform significantly better in terms of the General Conditions indicator, being 78,6% ahead of the BRICS and 94% ahead of the EBRD average. Mainly as a result of this, the advanced countries are still significantly ahead in terms of the Aggregate indicator of the quality of Competition Law Institutions & Enforcement — by 20,5% in relation to the BRICS and by 30% in relation to the EBRD countries average.

The overall conclusion is that the three BRICS countries included in our survey are converging to the advanced jurisdictions in terms of the Specific Features of the institutional and legislative set-up relating to the CLI&E (captured by the indicator SF), but still lag far behind in terms of the General Conditions (GC) indicator, capturing the general economic, political, institutional, and socio-cultural conditions influencing the intensity of competition in a country.

References

Aghion, Ph., Bloom, N., Blundell, R., Griffith, R., & Howitt, P. (2005). Competition and innovation: An inverted-U relationship. *The Quarterly Journal of Economics, 120*(2), 701−728.

Aghion, Ph., Blundell, R., Griffith, R., Howitt P., & Prantl S. (2009). The effects of entry on incumbent innovation and productivity. *The Review of Economics and Statistics, 91*(1), 20−32.

Aghion, Ph., Bachtold, St., Cassar, L., & Herz, H. (2014, February). *The causal effects of competition on innovation: Experimental evidence.* Harvard University Working Paper.

Baker, J. B. (2003). The case for antitrust enforcement. *Journal of Economic Perspectives, 17*, No. 4, 27−50. https://doi. org/10.1257/089533003772034880.

Baker, J. B. (2007). Beyond Schumpeter vs. arrow: How antitrust Fosters innovation. *Antitrust Law Journal, 74,* 575−602.

Benetatou, K., Katsoulacos, Y., Kyriazidou, K., & Makri G. (2018). Competition policy and labour productivity growth: Some new evidence. *Empirical Economics. Forthcoming.*

Blundell, R., Griffith, R., & van Reenen, J. (1995). Dynamic count data models of technological innovation. *The Economic Journal of the Royal Economic Society, 105,* 333−344.

Blundell, R., Griffith R., & van Reenen, J. (1999). Market share, market value and innovation in a panel of British manufacturing firms. *Review of Economic Studies, 66,* 529−554.

Borrell, J. R., & Tolosa, M. (2008). Endogenous antitrust: Cross country evidence on the impact of competition enhancing policies on productivity. *Applied Economics Letters*, *15*(11), 827−831.

Bradford, An., & Adam, Ch. S. (2018). Competition law around the world from 1889 to 2010: The competition law index. *Journal of Competition Law & Economics, 14*(3), 393-432.

Bradford, An., O'Halloran, Sh., & Sokol, N. (2015). *Does antitrust policy promote market innovation and competitiveness.* Columbia University. http://acle.uva.nl/binaries/content/assets/subsites/ amsterdam-center-for-law--economics/conferences/celse-2016/conference-papers/session-iv/paper-bradfordetal---2016.pdf?1466032585608

Buccirossi, P., Ciari, L., Duso, T., Spagnolo, G., & Vitale, C. (2011). Measuring the deterrence effect of competition policy: The competition policy indices. *Journal of Competition Law and Economics*, 7, 165−204.

Buccirossi, P., Ciari, L., Duso, T., Spagnolo, G., & Vitale, C. (2013). Competition policy and productivity growth: An empirical assessment. *The Review of Economics and Statistics*, *95*(4), 1324−1336.

Clougherty, J. A. (2010). Competition policy trends and economic growth: Cross-National empirical evidence. *International Journal of the Economics of Business, Vol. 17*(1), 111−127.

Crandall, R. W., & Winston, Cl. (2003). Does antitrust policy improve consumer welfare? Assessing the Evidence. *Journal of Economic Perspectives, 17,* No. 326. https://doi.org/10.1257/089533003772034871.

Dutz, M. A., & Hayri A. (1999). *Does more intense competition lead to higher growth?* CEPR Discussion Paper.

Dutz M. A., & Vagliasindi, M. (2000). Competition policy implementation in transition economies: An empirical assessment. *European Economic Review, 44*(46), 762−772.

Dutz, M. A., Kessides, L., O'Connell, St., & Willig, R. D. (2011). *Competition and innovation driven inclusive growth.* World Bank Policy Research Working Paper, 5852.

Gal, M., & Fox, E. M. (2014). Drafting competition law for developing jurisdictions: Learning from experience. *NY University Law and Economics WP,* 374.

Gilbert, R. (2006). Looking for Mr. Schumpeter: Where are we in the competition-innovation debate. In A. Jaffe, J. Lerner, & S. Stern (Eds.), *Innovation Policy and the Economy, 6*, 159−215. University of Chicago Press.

Gutmann, J., & Voigt, St. (2014). Lending a hand to the invisible hand? *Assessing the Effects of Newly Enacted Competition Laws, Feb. 8.* Unpublished manuscript. https://papers.ssrn.com/sol3/ papers.cfm?abstract_id=2392780

Howitt, P. (2004). Endogenous growth, productivity and economic policy: A progress report. In *International Productivity Monitor, 8,* 315.

Howitt, P. (2007). *Innovation, competition and growth: A Schumpeterian perspective on Canada's economy*. In Commentary. CD Howe Institute.

Hylton, K. N., & Deng, F. (2007). *Antitrust around the world: An empirical analysis of the scope of competition methods and their effects.*

Katsoulacos, Y., Genakos, C., & Houpis, G. (2018). Product market regulation and competitiveness: Towards a national competition and competitiveness policy in Greece. In C. Meghir, C. Pissarides, D. Vayanos, & N. Vettas (Eds.), *Reforming the Greek economy*, MIT Press.

Katsoulacos, Y. & Ulph, D. (2009). Optimal legal standards for competition policy. *Journal of Industrial Economics, 57*(3), 410−437.

Katsoulacos, Y. & Ulph, D. (2016). Regulatory decision errors, legal uncertainty and welfare: A general treatment. *International Journal of Industrial Organisation*.

Kee, H. L., & Hoekman B. (2007). Imports, entry and competition law as market disciplines. *European Economic Review, 51*(4), 831−858.

Kovacic, W. E. (2009). Rating competition agencies: What constitutes good performance? *Geo. Mason L. Rev., 16*, 4.

Krokowski, M. (2005). *Competition policy works: The effect of competition policy on the intensity of competition − An international cross country comparison*. HWWA.

Ma, T. C. (2011). The effect of competition law enforcement on economic growth. *Journal of Competition Law and Economics, 7*(2), 301−304.

Nickel, St. J. (1996). Competition and corporate performance. *Journal of Political Economy, 104*, 724−746.

Nicholson, M. W. (2008). An antitrust law index for empirical analysis of international competition policy. *Journal of Competition Law & Economics*, *4*(4), April, 1009−1029.

OECD (2013). *New indicators of competition law and policy in 2013 for OECD and Non-OECD countries*. OECD Economics Dept. WP No. 1104.

Schmutzler, Ar. (2010). *The relation between competition and innovation: Why is it such a mess?* Working paper, Socioeconomic Institute, University of Zurich, 0716.

Shapiro, C. (2012). Competition and innovation: Did arrow hit the bull's eye? In J. Lerner & S. Stern (Eds.) *The Rate & Direction of Economic Activity Revisited*. University of Chicago Press.

Shelanski, H., & Katz, M. L. (2007). Mergers and Innovation. *Antitrust Law Journal*, *74*, 185.

van Buuren, S., & Groothuis-Oudshoorn K. (2011). Multivariate imputation by chained equations in R. *Journal of Statistical Software, 45*(3).

Vivès, X. (2008). Innovation and competitive pressure. *The Journal of Industrial Economics, 56*(3), 419−469.

Voigt, S. (2007). *The economic effects of competition policy − Cross-Country evidence using four new indicators.* Mimeo.

Voigt, S. (2013). How (Not) to measure institutions. *Journal of Institutional Economics*, *9*(1), 1−26.

Winston, C. (1993). Economic deregulation: Days of reckoning for microeconomists. *Journal of Economic Literature, 31*, September, 126−389.