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# 2017

# INTERNATIONAL PROPERTY RIGHTS INDEX

## PROPERTY RIGHTS ALLIANCE

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# INTERNATIONAL PROPERTY RIGHTS INDEX 2017

## I. Property Rights: the essence of Liberty

> *"In a free government almost all other rights would become worthless*
> *if the government possessed power over the private fortune of every citizen"*
> US Supreme Court Declaration,1897
> (Chicago, Burlington & Quincy R.R. v. Chicago, 166 U.S. 226)

Property is the substance of a free society. It is the foundation of the citizenship's ability to control its own life and to strive to shape its own destiny. Property rights protect all other rights, because property enables citizens to be independent and hence capable of self-government. As Arthur Lee of Virginia stated on 1775[1]:

> *"The right of property is the guardian of every other right and to deprive the people of this, is in fact to deprive them of their liberty"*.

The discussion of the role of private property is longstanding: Aristotle[2] (1988 [c.330BCE]) argued that private property promoted human virtues like responsibility and prudence, enhanced self-possession and therefore the practice of self-control – a positive force that suited a person for citizenship; John Locke[3] linked the discussion to the state of nature and gave a moral defense of the legitimacy of unilateral appropriation in what is known as the First Occupancy theory; Hegel[4] connected property ownership to self-development and individual freedom; while Bentham[5] considered property as a creature of law; and John Stuart Mill[6] defined individual property as a *"primary and fundamental institution (…) the economical arrangements of society have always rested."*

Beyond the theoretical and philosophical discussions, empirical evidence also affirms the relevance of property rights. These rights are the border guards of an individual's ability to live as they wish- they limit the power of the state to control livelihoods and impose social controls. As the Hungarian economist Janos Kornai observed:

> *"The further elimination of private ownership is taken, the more consistently can full subjection be imposed"*[7]

Equally important, are those observations that relate to the relevance of private property as the most important bulwark of privacy. As Chicago's University Professor, Richard Epstein, expresses *"private property gives the right to exclude others without the need for any*

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[1] Lee, Arthur, 1775. *An appeal to the justice and interest of the people of Great Britain in the present dispute with America*, 4th edition. New York. P.14

[2] Aristotle, 1988 [c.330BCE]. *The Politics* Stephen Everson (ed.), Cambridge: Cambridge University Press

[3] Locke, J., 1988 [1689]. *Two Treatises of Government*. Peter Laslett (ed.), Cambridge: Cambridge University Press

[4] Hegel, G.W. F. 1967 [1821], The Philosophy of Right, T.M. Knox (trans.), Cambridge: Cambridge University Press

[5] Bentham, J., 1843. *Principles of the Civil Code*.[http://www.laits.utexas.edu/poltheory/bentham/pcc/index.html]

[6] Mill, J. S., 1909 [1848]. *Principles of Political Economy with some of their Applications to Social Philosophy*. W. J. Ashley (ed.) London: Longmans, Green and Co. [http://www.econlib.org/library/Mill/mlPCover.html]

[7] Quoted in Skidelsky, Robert. 1997. *The Road from Serfdom*. New York: Penguin. P.99.

*justification. Indeed, it is the ability to act at will and without need for justification within some domain which is the essence of freedom, be it of speech or of property*"[8], showing that unavoidable link between property and liberty.

One of the most fertile and complex areas of debate around property rights is liberty. In this sense, creating a property system becomes a highly useful institution for a society, as it works to protect and to foster individual liberty.[9] In this view, individual liberty is the most important appropriation a system of property rights must protect, following the creation of the moral consciousness and the essence of our symbolic values that frame our sense of living.

Following Hayek[10] in *The Constitution of Liberty*, we should define at least two terms, Freedom: as the ability to do what we consider right (innate); and Liberty: as the government concession of freedom, creating the opportunity to exercise social rights. Hayek also differentiates between liberty: the ability to do everything that is not forbidden, and liberties: the prohibition of everything that is not explicit. Hayek favors the negative concept of freedom (avoiding discretionary coercion) as the concept becomes positive when it is exercised. Liberty does not assure any special opportunity; it leaves to our discretion the decision related to the use we will make of the circumstances in which we find ourselves. This way, liberty produces more benefits for the discipline it imposes than for the opportunities it offers.

On the other hand, property is the basis of freedom of contract, which is simply liberty in action. Without freedom to exchange, a third party, generally the government, places all exchanges at the discretion of the political-bureaucratic ruling class. Freedom is more than the right to own property or the right to make transactions, to exchange, to buy and sell. But once the citizens lose the right to own they drop the ability to control their own lives[11]. Property rights and market economies are vital rocks to political freedom. Private property gives people a place to stand if they must resist the government. Market economies and private property allow citizens to build up resistance to government pressure.

This way property rights nurture economic growth and social development. As property rights engender innovation and productivity they are the most effective mechanism to guarantee civil rights and civil liberties, giving rise to what Pipes[12] defines as the co-sovereign citizen, as in modern democratic and liberal republics sovereignty is also an attribute of citizenship and not only of the nation-state.

Finally, it should be noted that property rights are human rights. Private property rights are the rights of humans to use specified goods and to exchange them. Any restraint on private property rights shifts the balance of power from impersonal attributes toward personal attributes and toward behavior that political authorities approve. That is a fundamental reason for preference of

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[8]  Epstein, Richard 1985. *Takings*. Cambridge, Mass.: Harvard University Press. P. 66.

[9]  Freyfogle, E.T., 2010. "Property and Liberty" *Harvard Environmental Law Review*Vol.34(1):75-118 [http://ssrn.com/abstract=1024574 or http://dx.doi.org/10.2139/ssrn.1024574]

[10] Hayek, F.A. 1996[1959] "Libertad y Libertades" in *Los Fundamentos de la Libertad*, Barcelona: Unión Editorial. Cap. 1, pp.31-46 (*The Constitution of Liberty*)

[11] Bovard, James 2000.  *Property and Liberty*. Foundation for Economic Education. Articles (Justice) Sep. 01, 2000. (https://fee.org/articles/property-and-liberty/)

[12] Pipes, R., 1999. *Property and Freedom*.New York: Alfred A. Knopf and London: The Harvill Press.

a system favoring strong private property rights: private property rights protect individual liberty.[13]

As described previously, the property rights are more than the mere ownership of things. By being connected to liberty property rights allow individuals and societies to express their values and beliefs in the world, creating prosperity and the creation of a virtuous circle for human life in society.

## II. IPRI Structure and Methodology

Since 2007, Property Rights Alliance (PRA) - dedicated to the protection of property rights all around the world - instituted the Hernando de Soto fellowship to produce a yearly edition of the International Property Rights Index, IPRI.

The IPRI was developed to serve as a barometer for the status of property rights across the world. A vast review of the literature on property rights was done in order to conceptualize and operationalize a comprehensive characterization of property rights. Following convention set in place by previously compiled indexes, several experts and practitioners in the field of property rights were consulted to finalize the set of core categories (here-after referred to as "components" or 'sub-indexes') and the items that create the components.

The following are the three core components of the IPRI:
1. Legal and Political Environment, LP
2. Physical Property Rights, PPR
3. Intellectual Property Rights, IPR

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[13] Alchian, Armen A. Property Rights (http://www.econlib.org/library/Enc/PropertyRights.html)

Figure 1. IPRI Structure
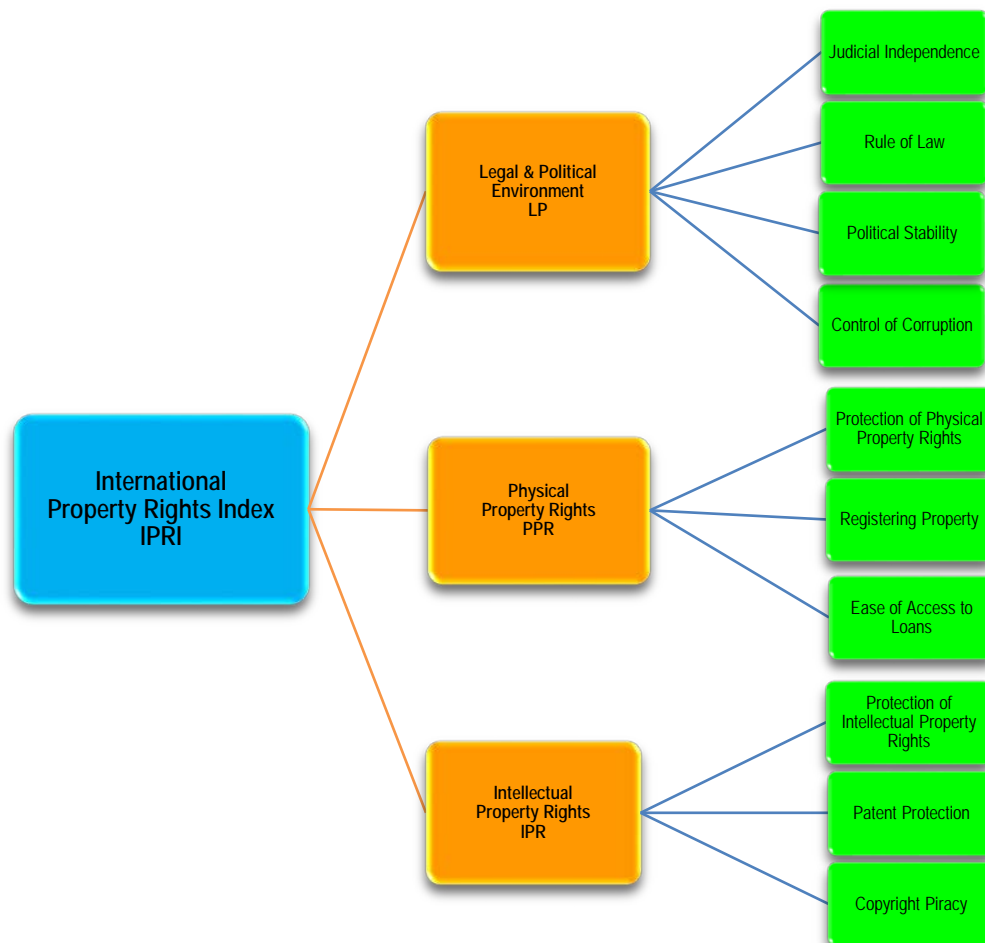


The Legal and Political Environment (LP) component provides an insight into the strength of governance institutions of a country, the respect for the 'rules of the game' among citizens; consequently, the measures used for the LP are broad in scope. This component has a significant impact in the development and protection of physical and intellectual property rights.

The other two components of the index - Physical and Intellectual Property Rights (PPR and IPR) - reflect two forms of property rights, both of which are crucial to the economic development of a country. The items included in these two categories account for both *de jure* rights and *de facto* outcomes for the countries considered.

The IPRI is comprised of 10 items in total, each gathered under one of the three components: LP, PPR, or IPR. While there are numerous items related to property rights, the final IPRI is specific to the core factors that are directly related to the strength and protection of physical and intellectual property rights, and the political institutions responsible for their protection. Furthermore, items for which data was available more regularly and in a greater number of countries were given preference. This was done to ensure that scores were comparable across countries and years.

The IPRI-2017, the eleventh edition, keeps the previous years' methodology to allow for a full comparison of its results with previous editions.

## II.1. Legal and Political Environment (LP)

The Legal and Political Environment component grasps the ability of a nation to enforce a *de jure* system of property rights and for that four items or indicators are considered: the independence of its judicial system, the strength of the rule of law, control of corruption, and the stability of its political system.

### Judicial Independence

This item examines the judiciary's freedom from influence by political, individual or business groups. The independence of the judiciary is a central underpinning for the sound protection and sovereign support of the court system with respect to private property.

For this item, the chosen data source was the Global Competitiveness Index from the World Economic Forum's 2016-2017 (http://bit.ly/2lHs5Mn). The original data scale is [1 - 7], where 7 is the best score. The full question and associated answers of the Executive Opinion Survey for this indicator was:

*In your country, how independent is the judicial system from influences of the government, individuals, or companies? [1= not independent at all; 7 = entirely independent]*

### Rule of Law

This item measures the extent to which agents have confidence in and abide by the rules of society. In particular, it measures the quality of contract enforcement, property rights, police, and courts, as well as the likelihood of crime and violence.

The item combines several indicators that include: fairness, honesty, enforcement, speed, affordability of the court system, protection of private property rights, and judicial and executive accountability. This item complements the Judicial Independence variable.

For this indicator, the chosen data source was the World Bank Worldwide Governance Indicators, 2015 (http://bit.ly/1rwwuAb). The original data scale is [-2.5 to 2.5], where 2.5 was the best score.

### Political Stability

The degree of political stability influences incentives to obtain or to extend ownership and/or management of property. The higher the likelihood of government instability, the less likely people will be to obtain property and to develop trust in the validity of the rights attached.

For this item, the chosen data source was the World Bank Worldwide Governance Indicators, 2015 (http://bit.ly/1rwwuAb). The original data scale is [-2.5 to 2.5], where 2.5 was the best score.

**<u>NOTE</u>**: *A special warning must be made regarding the Political Stability indicator, since this year it presents a value outside its normal range for a country (Yemen -2.63). This country value was considered as an extreme of the range scale (minimum value) for the rescaling process.*

### Control of Corruption

This item combines several indicators that measure the extent to which public power is exercised for private gain. This includes petty and grand forms of corruption, as well as the 'capture' of the state by elites and private interests. As with the other items in the LP component, corruption influences people's confidence in the existence of sound implementation and enforcement of property rights. Corruption reflects the degree of informality in the economy, which is a distracting factor to the expansion of respect for legal private property.

The research by Dong and Torgler (2011) supports these ideas. They provide theoretical and empirical evidence of 108 countries from 1995-2006, showing that the effects of democratization on control of corruption depend on the protection of property rights and income equality, creating in this way a virtuous circle.

The data source chosen for this item was the World Bank Worldwide Governance Indicators, 2015 (http://bit.ly/1rwwuAb). The original data scale is [-2.5 to 2.5], where 2.5 was the best score.

## II.2.   Physical Property Rights (PPR)

A strong property rights regime must earn the confidence of people in its effectiveness to protect private property rights. It also provides for unified transactions related to the registry of property and it allows access to the required credit to convert property into capital. For these reasons, the following items are used to measure private property rights protection (PPR).

### Protection of Physical Property Rights

The Protection of Physical Property Rights relates directly to the strength of a country's property rights system based on the expert's views of the quality of the judicial protection of private property, including financial assets. Additionally, it encompasses the expert's opinion on the clarity of the legal definition of property rights.

The data source to measure this item was the World Economic Forum's 2016-2017 Global Competitiveness Index of the (http://bit.ly/2lHs5Mn). The original data scale is [1 - 7], where 7 is the best score. The full question and associated answers of the Executive Opinion Survey for this indicator was:

*In your country, to what extent are property rights, including financial assets, protected? [1 = not at all; 7 = to a great extent]*

### Registering Property

This item measures the number of days and procedures necessary to register a property according to the formal government ledger system. It records the full sequence of procedures necessary to transfer the property title from seller to buyer when a business purchases land or a building. This information is critical because the more difficult property registration is, the more likely it is that assets stay in the informal sector, thus restricting the development of the broader public's

understanding and support for a strong legal and sound property rights system. Moreover, registration barriers discourage the movement of assets from lower to higher valued uses.

The Registering Property indicator reflects one of the main economic arguments set forth by Hernando de Soto: "*what the poor lack is easy access to the property mechanisms that could legally fix the economic potential of their assets so they could be used to produce, secure or guarantee greater value in the extended market*" (2000:48). This item is calculated as:

$$\text{Registering Property} = 0.7 * \#\text{days} + 0.3 * \#\text{procedures}$$

The data source chosen for measuring this item was The World Bank Group's 2017 Doing Business Report (http://bit.ly/2mm9poK). The original data scale is [1- ∞], where 1 is the best score.

### Ease of Access to Loans

Access to a bank loan without collateral serves as a proxy for the level of development of financial institutions in a country. Financial institutions play an integral role in a strong property rights system, they bring economic assets into the formal economy. An important channel trying to alleviate poverty have been credit facilities. Singh and Huang[14] conducted a study of 37 countries in Sub-Saharan Africa from 1992-2006 and concluded that not only do property rights reinforce the effect of narrowing inequalities with financial deepening, but that in their absence, it could be in detrimental to the poor.

The data chosen for this item was the Global Competitiveness Index of the World Economic Forum's 2016-2017 (http://bit.ly/2lHs5Mn). The original data scale is [1 - 7], where 7 is the best score. The full question and associated answers of the Executive Opinion Survey for this indicator was:

*In your country, how easy is it for businesses to obtain a bank loan? [1 = extremely difficult; 7 = extremely easy]*

## II.3. - Intellectual Property Rights (IPR)

The Intellectual Property Rights component evaluates the protection of intellectual property. In addition to an opinion-based measure of the protection of intellectual property, it assesses protection of two major forms of intellectual property rights (patents and copyrights) from *de jure* and *de facto* perspectives, respectively.

### Protection of Intellectual Property Rights

This indicator captures a nation's protection of intellectual property; therefore, it is a crucial aspect of the IPR component.

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[14] Huang, Yifei and Singh, Raju Jan 2011. *Financial Deepening, Property Rights and Poverty: Evidence from Sub-Saharan Africa*. IMF Working Papers. Pp 1-31

The data source chosen for this item was the World Economic Forum's 2016-2017 Global Competitiveness Index (http://bit.ly/2lHs5Mn). The original data scale is [1 - 7], where 7 was the best score. Its Executive Opinion Survey used the following question and associated answers:

*In your country, to what extent is intellectual property protected? [1 = not at all; 7 = to a great extent]*

### Patent Protection

This item reflects the strength of a country's patent laws based on five extensive criteria: coverage, membership in international treaties, restrictions on patent rights, enforcement, and duration of protection. The data used for this item came from Ginarte-Park Patent Protection (1960-2010, International Patent Protection: 1960-2005, Research Policy, 2008, Vol. 37(4):761-766. Specific Source: http://bit.ly/2mlYH1J Data: 2010). The original data scale is [0 - 5], where 5 was the best score. While this source is updated on a quinquennial basis, the next data release will occur in 2017.

### Copyright Piracy

The level of piracy in the IP sector is an important indicator of the effectiveness of the intellectual property rights enforcement in a country. The data source chosen for this item was the BSA Global Software Survey; The Compliance Gap (2016 edition, http://bit.ly/1TXs7i0) which estimates the volume and value of unlicensed software installed on personal computers, and also reveals attitudes and behaviors related to software licensing, intellectual property and emerging technologies. The original data scale is [0 – 100%], where 0 was the best score.

## III. Methodology

The IPRI's 2017 scores and rankings are based on data obtained from official sources made publicly available by established international organizations (see Appendix I). This means that most data is provided in different styles and on different scales. Consequently, the data is rescaled in order to accurately compare among countries and within IPRI's individual components and the overall score.

The overall grading scale of the IPRI ranges from [0 – 10], where 10 is the highest value for a property rights system and 0 is the lowest value (i.e. most negative) for a property rights system within a country. The same interpretative logic is applied to the three components and to the 10 items or indicators. While the average mechanisms applied assume equal importance for each component of the final IPRI score (and also of each item for each component), some weights could be applied to evaluate the relative importance of the different aspects of a property rights system of a country.

The IPRI for 2017 uses data from the 2010 – 2017 period. The 10 items are collected from different sources, which imply that they have different accessibility times for the most updated data available. The applied logic in the analysis has been to include the latest available data sets for the 2017 IPRI. Most of the items present a lag of 1 year (see Appendix I), so the time difference among data, should not affect our analysis. Almost all the items needed to be rescaled to the IPRI range. The rescaling process was done as follow:

1.      For bounded data series with same direction:

$$\left[\left(\frac{\text{Country Value} - \text{MIN Original Scale}}{\text{MAX Original Scale} - \text{MIN Original Scale}}\right) * (\text{MAX New Scale} - \text{MIN New Scale})\right] + \text{MIN New Scale}$$

2.      For unbounded data series with same direction:

$$\frac{(\text{MAX Value of data serie} - \text{Country Value})}{(\text{MAX Value of data serie} - \text{MIN Value of data serie})} * 10$$

3.      For bounded data series with inverse direction:

$$10 - \left[\left(\frac{\text{Country Value} - \text{MIN Original Scale}}{\text{MAX Original Scale} - \text{MIN Original Scale}}\right) * (\text{MAX New Scale} - \text{MIN New Scale})\right] + \text{MIN New Scale}$$

IPRI Calculations:

$$LP = \frac{\text{Judicial independence} + \text{Rule of Law} + \text{Political Stability} + \text{Control of Corruption}}{\text{\# Items}}$$

$$PPR = \frac{\text{Property Rights} + \text{Registering Property} + \text{Ease Access Loans}}{\text{\#Items}}$$

$$IPR = \frac{\text{Intellectual Property Protection} + \text{Patent Protection} + \text{Copyright Piracy Level}}{\text{\#Items}}$$

$$\boldsymbol{IPRI = \frac{LP + PPR + IPR}{3}}$$

After calculating the score of the IPRI and its components, countries were ranked according to their scores. With some frequency, a few countries can exhibit almost the same score and they will be placed in the same rank. This way, i.e., Country A could be ranked #1, while Country B and Country C #2, and Country X, Country Y and Country Z are #3. To minimize this situation and a diffusion bias, ranking calculations were made using IPRI scores with all their decimals, this way the final scores were differentiated, and such were the ranking positions.

## III.1   Countries and Groups

The 2017 IPRI ranks a total of 127 countries. This year there are four countries that were part of the index last year but they are not included in this year's index: Guyana, Haiti, Myanmar and Swaziland. While three were added: Brunei Darussalam, Democratic Republic of Congo, and Republic of Yemen.

The selection of countries was determined only by the availability of the required data. In order to keep the meaningfulness of the data and analysis, only country-year combinations respecting specific rules have been considered.

Since the 6th edition of the IPRI the rule of two-thirds was implemented signifying the least amount  of data required for each component to make it into the index. Or, more specifically, if a country does not have data available for at least 3 items in the LP component, 2 items in the PPR component, and 2 items in IPR component, it has to be excluded from the analysis.

All countries were grouped following different criteria (Appendix II):

1. Geographical regions: Latin America and Caribbean, Western Europe, Central Eastern Europe and Central Asia, Middle East and North Africa, Africa, Asia and Oceania, and North America

2. Income classification, according to the World Bank, July 2016 update: High income, Upper-Middle-Income, Lower-Middle-Income, and Low-Income.

3. Regional and Development classification, according to the International Monetary Fund as of April, 2016: Advanced Economies; Commonwealth of Independent States; Emerging and Developing Asia; Emerging and Developing Europe; Latin America and the Caribbean; Middle East, North Africa, Afghanistan and Pakistan; and Sub-Saharan Africa.

4. Economic and Regional Integration Agreements: Organization for Economic Co-operation and Development, European Union, Southern African Development Community, Economic Community of Western African States, Association of Southeast Asian Nations, Central American Parliament, Gulf Cooperation Council, Pacific Alliance, southern Common Market, South Asian Association for Regional Cooperation, Central African Economic and Monetary Community, Central American Common Market, Commonwealth of Independent States, Arab Maghreb Union, Caribbean Community, Andean Community, European Free Trade Association, Intergovernmental Authority on Development, North American Free Trade Agreement, Organization of the Petroleum Exporting Countries, Economic Community of Central African States and Trans-Pacific Partnership.

## IV.    IPRI 2017 Country Results

This section presents the results of the 2017 International Property Rights Index. Starting with the scores of the overall IPRI and its three (3) components, we follow with detail rankings of the IPRI and its components. Then, movement between the 2016 and 2017 editions, of both individual IPRI components and of the overall IPRI score, are presented. This chapter also includes an analysis of the IPRI for country groups.

As an average, the sample of the 127 countries this year yielded an IPRI score of 5.63, where the Legal and Political Environment (LP) was the weakest component with a score of 5.17, followed by the Intellectual Property Rights (IPR) component with a score of 5.50, and the Physical Property Rights (PPR) was the strongest component with a score of 6.23. For the third consecutive year we found an overall improvement of the average IPRI score and for all components (see Table 1).

Table 1. Average Score: IPRI and its components. 2015 - 2017.

|          | IPRI    | LP      | PPR     | IPR     |
|----------|---------|---------|---------|---------|
| **2015** | 5.30074 | 4.99304 | 5.76678 | 5.14241 |
| **2016** | 5.44588 | 5.13028 | 5.87459 | 5.33276 |
| **2017** | 5.63357 | 5.17152 | 6.22653 | 5.50267 |

Using SPSS® a normality test was run for IPRI and its components, it showed a Gaussian behavior. All of them showed unimodal distributions (see Table 2, Table 3 and Figure 1).

Table 2. Statistics: IPRI and its Components. 2017.

|                     |         | IPRI        | LP          | PPR         | IPR         |
|---------------------|---------|-------------|-------------|-------------|-------------|
| N                   | Valid   | 127         | 127         | 127         | 127         |
|                     | Missing | 0           | 0           | 0           | 0           |
| Mean                |         | 5.63357244  | 5.17152126  | 6.22652677  | 5.50267008  |
| Std. Error of Mean  |         | .133172391  | .162104523  | .121291880  | .146484361  |
| Median              |         | 5.33090000  | 4.73460000  | 6.23010000  | 5.22130000  |
| Std. Deviation      |         | 1.500776625 | 1.826825194 | 1.366890064 | 1.650794907 |
| Variance            |         | 2,252       | 3,337       | 1,868       | 2,725       |
| Range               |         | 5.905400    | 7.351600    | 5.565700    | 7.008000    |
| Minimum             |         | 2.728100    | 1.679500    | 3.259800    | 1.707500    |
| Maximum             |         | 8.633500    | 9.031100    | 8.825500    | 8.715500    |
| Percentiles         | 25      | 4.58260000  | 3.81270000  | 5.13460000  | 4.36160000  |
|                     | 50      | 5.33090000  | 4.73460000  | 6.23010000  | 5.22130000  |
|                     | 75      | 6.61020000  | 6.53470000  | 7.37720000  | 6.61080000  |

Table 3. Tests of Normality:   One-Sample Kolmogorov-Smirnov Test

|  |  | IPRI | LP | PPR | IPR |
|---|---|---|---|---|---|
| N |  | 127 | 127 | 127 | 127 |
| Normal Parameters[a,b] | Mean | 5.63357244 | 5.17152126 | 6.22652677 | 5.50267008 |
|  | Std. Deviation | 1.500776625 | 1.826825194 | 1.366890064 | 1.650794907 |
| Most Extreme Differences | Absolute | ,109 | ,126 | ,061 | ,088 |
|  | Positive | ,109 | ,126 | ,050 | ,088 |
|  | Negative | -,074 | -,070 | -,061 | -,088 |
| Kolmogorov-Smirnov Z |  | 1,233 | 1,416 | ,689 | ,991 |
| Asymp. Sig. (2-tailed) |  | ,095 | ,036 | ,729 | ,279 |

a. Test distribution is Normal.       b. Calculated from data.

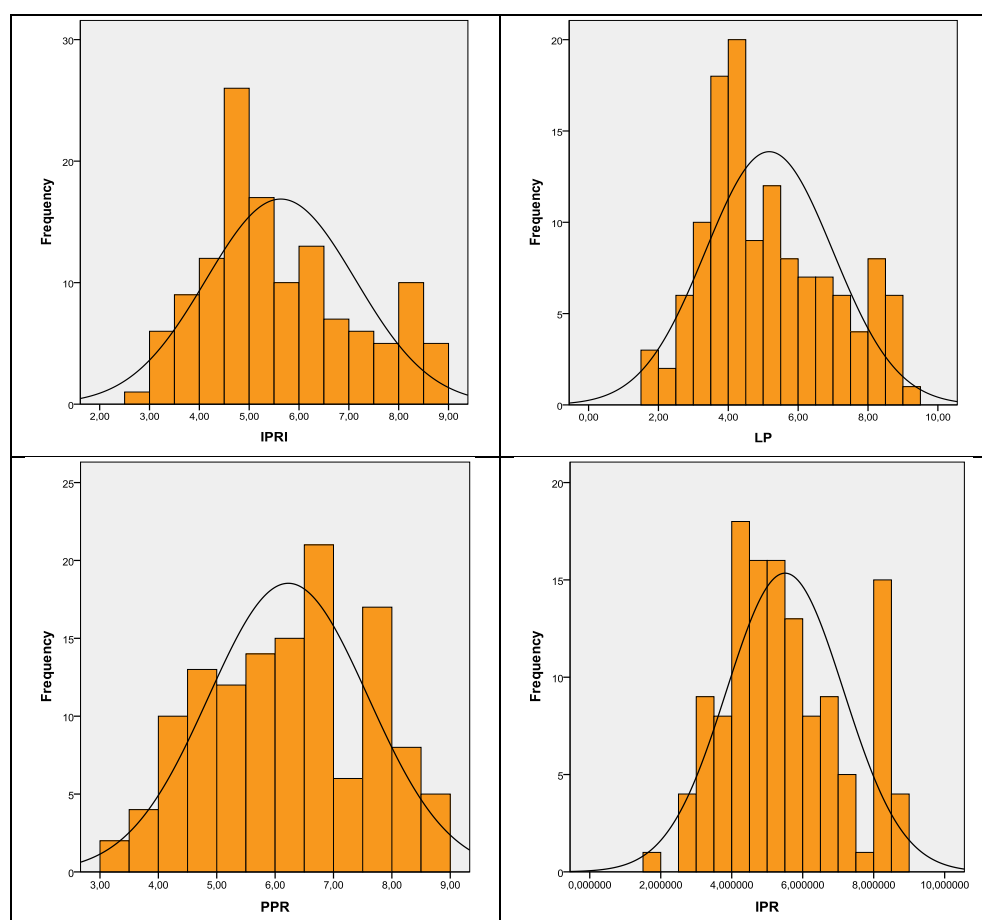Figure 2.  Histogram: IPRI and its components. 2017.



Table 4 shows -alphabetically ordered- the score value of the 127 countries included in the IPRI 2017, as the scores of its components: Legal and Political Environment (LP), Physical Property

Rights (PPR) and Intellectual Property Rights (IPR). Figure 3 displays countries organized by their IPRI scores from ranked from highest to lowest.

Table 5 shows the IPRI 2017 rankings by quintile for all the 127 countries in our sample. In general, the number of countries belonging to each quintile increases from the top 20% to the bottom 20% (1st quintile 17 countries, 2nd quintile 22 countries, 3rd quintile 25 countries, 4rd quintile 29 countries and 5th quintile 36 countries).  Hence, the fourth and the fifth quintiles include 65 countries which is 50.18% of our sample, while the first three quintiles includes almost the same amount, 64 countries, being the 50.39% of the sample.

Table 4. IPRI 2017. IPRI and its Components Scores by Country

| COUNTRY | Rank | IPRI | LP | PPR | IPR | COUNTRY | Rank | IPRI | LP | PPR | IPR | COUNTRY | Rank | IPRI | LP | PPR | IPR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ALBANIA | 118 | 3.8223 | 4.2412 | 3.9405 | 3.2854 | GREECE | 60 | 5.3887 | 4.9469 | 5.1937 | 6.0255 | OMAN | 39 | 6.2797 | 5.9750 | 7.6701 | 5.1941 |
| ALGERIA | 106 | 4.1603 | 3.5344 | 5.1955 | 3.7512 | GUATEMALA | 71 | 5.0768 | 3.5911 | 6.9604 | 4.6790 | PAKISTAN | 121 | 3.4743 | 2.8390 | 4.2351 | 3.3487 |
| ARGENTINA | 97 | 4.5683 | 3.8127 | 5.0544 | 4.8378 | HONDURAS | 80 | 4.9018 | 3.5771 | 6.5373 | 4.5910 | PANAMA | 51 | 5.7982 | 4.5292 | 7.5795 | 5.2859 |
| ARMENIA | 107 | 4.1261 | 4.1441 | 5.1736 | 3.0606 | HONG KONG | 19 | 7.7856 | 8.2339 | 7.8514 | 7.2716 | PARAGUAY | 100 | 4.4778 | 3.4330 | 6.2234 | 3.7770 |
| AUSTRALIA | 10 | 8.2435 | 8.2716 | 8.2386 | 8.2204 | HUNGARY | 48 | 5.9919 | 5.2857 | 6.1786 | 6.5113 | PERU | 65 | 5.2173 | 3.8597 | 6.8331 | 4.9591 |
| AUSTRIA | 15 | 8.0122 | 7.8543 | 7.9702 | 8.2121 | ICELAND | 20 | 7.6996 | 8.1749 | 7.9266 | 6.9973 | PHILIPPINES | 64 | 5.3309 | 4.1370 | 6.4766 | 5.3792 |
| AZERBAIJAN | 115 | 3.9463 | 3.8420 | 4.6153 | 3.3818 | INDIA | 54 | 5.5637 | 4.4939 | 6.3310 | 5.8662 | POLAND | 41 | 6.2533 | 6.0433 | 6.6025 | 6.1142 |
| BAHREIN | 42 | 6.1568 | 5.2800 | 7.5265 | 5.6640 | INDONESIA | 68 | 5.1666 | 4.3394 | 6.9236 | 4.2368 | PORTUGAL | 31 | 6.8479 | 6.7809 | 6.7476 | 7.0152 |
| BANGLADESH | 125 | 3.1170 | 3.2262 | 3.5024 | 2.6225 | IRAN | 99 | 4.5212 | 3.6076 | 5.7703 | 4.1858 | QATAR | 22 | 7.3478 | 7.1045 | 8.3744 | 6.5645 |
| BELGIUM | 18 | 7.8388 | 7.5489 | 7.5153 | 8.4522 | IRELAND | 17 | 7.8724 | 8.1919 | 7.2465 | 8.1787 | ROMANIA | 73 | 5.0418 | 5.1501 | 4.2341 | 5.7413 |
| BENIN | 96 | 4.5826 | 4.1692 | 4.4480 | 5.1308 | ISRAEL | 27 | 6.9741 | 6.3991 | 6.8884 | 7.6347 | RUSSIA | 111 | 4.0431 | 3.4641 | 3.7222 | 4.9432 |
| BOLIVIA | 113 | 3.9706 | 2.9663 | 5.3810 | 3.5645 | ITALY | 49 | 5.9791 | 5.2311 | 5.9132 | 6.7930 | RWANDA | 33 | 6.5078 | 5.9816 | 7.5056 | 6.0361 |
| BOSNIA&HERZEGOVINA | 116 | 3.9169 | 4.0292 | 4.2621 | 3.4596 | JAMAICA | 46 | 6.0101 | 5.1662 | 6.6331 | 6.2309 | SAUDI ARABIA | 43 | 6.1333 | 5.4711 | 7.3772 | 5.5516 |
| BOTSWANA | 44 | 6.1258 | 6.5447 | 7.0664 | 4.7665 | JAPAN | 8 | 8.3267 | 7.9358 | 8.4578 | 8.5865 | SENEGAL | 75 | 4.9419 | 4.7420 | 5.5740 | 4.5098 |
| BRAZIL | 58 | 5.4338 | 4.4380 | 6.1175 | 5.7459 | JORDAN | 40 | 6.2665 | 5.5082 | 7.4546 | 5.8366 | SERBIA | 110 | 4.0442 | 4.4719 | 4.2012 | 3.4593 |
| BRUNEI DARUSSALAM | 92 | 4.6317 | 6.1875 | 3.2598 | 4.4477 | KAZAKHSTAN | 102 | 4.4318 | 4.3968 | 4.9339 | 3.9646 | SIERRA LEONE | 98 | 4.5232 | 3.6086 | 4.9655 | 4.9954 |
| BULGARIA | 85 | 4.8127 | 4.4139 | 4.8029 | 5.2213 | KENYA | 82 | 4.8558 | 3.6694 | 6.3094 | 4.5887 | SINGAPORE | 7 | 8.3585 | 8.3002 | 8.7039 | 8.0713 |
| BURUNDI | 122 | 3.4300 | 2.0979 | 4.8325 | 3.3595 | KOREA, REP | 34 | 6.4951 | 5.7566 | 6.7813 | 6.9474 | SLOVAKIA | 37 | 6.3956 | 5.3224 | 6.9959 | 6.8684 |
| CAMEROON | 104 | 4.2936 | 3.1444 | 5.3858 | 4.3505 | KUWAIT | 61 | 5.3799 | 5.1929 | 6.5510 | 4.3958 | SLOVENIA | 47 | 5.9936 | 6.2072 | 5.8452 | 5.9283 |
| CANADA | 11 | 8.1789 | 8.3684 | 7.9058 | 8.2624 | LATVIA | 63 | 5.3411 | 5.8363 | 4.9326 | 5.2544 | SOUTH AFRICA | 26 | 7.0003 | 5.7123 | 7.8379 | 7.4508 |
| CHAD | 117 | 3.8915 | 2.5762 | 4.8143 | 4.2839 | LEBANON | 103 | 4.3315 | 2.9617 | 6.6668 | 3.3659 | SPAIN | 35 | 6.4219 | 5.8661 | 6.6453 | 6.7542 |
| CHILE | 28 | 6.9262 | 6.8691 | 7.5037 | 6.4058 | LIBERIA | 81 | 4.8932 | 3.8475 | 6.0281 | 4.8040 | SRI LANKA | 59 | 5.3896 | 5.0325 | 6.3383 | 4.7981 |
| CHINA | 52 | 5.7122 | 4.5244 | 6.9986 | 5.6136 | LITHUANIA | 50 | 5.9178 | 6.2008 | 5.4793 | 6.0732 | SWEDEN | 3 | 8.6084 | 8.6753 | 8.6600 | 8.4900 |
| COLOMBIA | 62 | 5.3541 | 3.7689 | 6.5752 | 5.7181 | LUXEMBURG | 6 | 8.4593 | 8.6200 | 8.3131 | 8.4449 | SWITZERLAND | 4 | 8.5614 | 8.7717 | 8.5083 | 8.4043 |
| CONGO, DEM. REP. | 119 | 3.8184 | 1.8236 | 5.4352 | 4.1965 | MACEDONIA, FYR | 91 | 4.6545 | 4.4009 | 5.3328 | 4.2299 | TAIWAN (China) | 24 | 7.2678 | 6.5862 | 8.2826 | 6.9345 |
| COSTA RICA | 45 | 6.0599 | 6.3980 | 6.3987 | 5.3829 | MADAGASCAR | 109 | 4.0638 | 3.5014 | 4.4949 | 4.1950 | TANZANIA, UNITED REP. OF | 72 | 5.0510 | 4.1977 | 5.6975 | 5.2578 |
| CÔTE D'IVOIRE | 95 | 4.5873 | 3.9174 | 5.7245 | 4.1199 | MALAWI | 90 | 4.6704 | 4.5108 | 5.1346 | 4.3659 | THAILAND | 66 | 5.2150 | 4.3232 | 6.8654 | 4.4565 |
| CROATIA | 86 | 4.7541 | 5.1497 | 4.3486 | 4.7638 | MALAYSIA | 32 | 6.6102 | 5.8082 | 7.5945 | 6.4278 | TRINIDAD & TOBAGO | 55 | 5.5031 | 4.9031 | 5.6822 | 5.9241 |
| CYPRUS | 57 | 5.4468 | 6.5680 | 4.0168 | 5.7555 | MALI | 84 | 4.8142 | 3.3901 | 5.8757 | 5.1767 | TUNISIA | 70 | 5.0806 | 4.4569 | 6.1260 | 4.6588 |
| CZECH REP. | 30 | 6.8605 | 6.4351 | 6.8603 | 7.2859 | MALTA | 29 | 6.8809 | 6.8439 | 7.3285 | 6.4704 | TURKEY | 78 | 4.9246 | 3.9328 | 5.3787 | 5.4623 |
| DENMARK | 12 | 8.1584 | 8.5074 | 7.6839 | 8.2838 | MAURITANIA | 108 | 4.0911 | 3.3678 | 4.4391 | 4.5665 | UGANDA | 69 | 5.1023 | 3.7307 | 6.3744 | 5.2020 |
| DOMINICAN REP. | 83 | 4.8228 | 3.8766 | 6.2301 | 4.3616 | MAURITIUS | 38 | 6.3155 | 6.5347 | 7.2278 | 5.1839 | UKRAINE | 123 | 3.4243 | 2.4762 | 3.3779 | 4.4189 |
| ECUADOR | 93 | 4.6274 | 3.2746 | 5.5428 | 5.0649 | MEXICO | 67 | 5.1942 | 3.6267 | 6.1022 | 5.8537 | UNITED ARAB EMIRATES | 21 | 7.4826 | 7.0301 | 8.2030 | 7.2146 |
| EGYPT | 101 | 4.4328 | 4.0750 | 4.7528 | 4.4706 | MOLDOVA | 124 | 3.1781 | 3.3620 | 3.5102 | 2.6622 | UNITED KINGDOM | 13 | 8.1292 | 8.0987 | 7.8320 | 8.4570 |
| EL SALVADOR | 74 | 4.9449 | 4.1792 | 6.2072 | 4.4484 | MONTENEGRO | 105 | 4.1915 | 4.8795 | 4.3999 | 3.2952 | UNITED STATES | 14 | 8.0741 | 7.3927 | 8.1141 | 8.7155 |
| ESTONIA | 25 | 7.1992 | 7.3396 | 7.6472 | 6.6108 | MOROCCO | 56 | 5.5004 | 4.5829 | 6.5473 | 5.3709 | URUGUAY | 36 | 6.4115 | 7.1761 | 6.7077 | 5.3507 |
| ETHIOPIA | 87 | 4.7180 | 3.8259 | 5.9020 | 4.4260 | MOZAMBIQUE | 94 | 4.6253 | 3.4871 | 5.5706 | 4.8181 | VENEZUELA, BOLIVARIAN REP | 126 | 3.0566 | 1.6795 | 4.6892 | 2.8012 |
| FINLAND | 2 | 8.6257 | 8.8596 | 8.3461 | 8.6714 | NEPAL | 76 | 4.9409 | 4.0112 | 6.6540 | 4.1576 | VIETNAM | 77 | 4.9295 | 4.4765 | 5.7947 | 4.5174 |
| FRANCE | 23 | 7.3364 | 7.0381 | 6.8786 | 8.0924 | NETHERLANDS | 9 | 8.2960 | 8.3913 | 7.9496 | 8.5471 | YEMEN, REP. | 127 | 2.7281 | 1.6929 | 4.7837 | 1.7075 |
| GABON | 89 | 4.6942 | 4.0556 | 4.9807 | 5.0463 | NEW ZEALAND | 1 | 8.6335 | 9.0311 | 8.8255 | 8.0438 | ZAMBIA | 79 | 4.9168 | 4.7346 | 6.0969 | 3.9187 |
| GEORGIA | 88 | 4.7074 | 5.3176 | 5.8393 | 2.9652 | NICARAGUA | 112 | 3.9899 | 3.2630 | 4.9574 | 3.7494 | ZIMBABWE | 120 | 3.7597 | 2.9813 | 4.7944 | 3.5035 |
| GERMANY | 16 | 7.9593 | 7.8379 | 7.6642 | 8.3759 | NIGERIA | 114 | 3.9505 | 2.8759 | 5.0707 | 3.9048 | **ALL Countries** | | **5.6336** | **5.1715** | **6.2265** | **5.5027** |
| GHANA | 53 | 5.6456 | 5.2644 | 5.8779 | 5.7944 | NORWAY | 5 | 8.5326 | 8.8052 | 8.5115 | 8.2811 | | | | | | |

Figure 3. IPRI 2016: Scores and Rankings

| | 0.0000 | 2.0000 | 4.0000 | 6.0000 | 8.0000 | |
|---|---|---|---|---|---|---|
| NEW ZEALAND | | | | | | 1 |
| FINLAND | | | | | | 2 |
| SWEDEN | | | | | | 3 |
| SWITZERLAND | | | | | | 4 |
| NORWAY | | | | | | 5 |
| LUXEMBURG | | | | | | 6 |
| SINGAPORE | | | | | | 7 |
| JAPAN | | | | | | 8 |
| NETHERLANDS | | | | | | 9 |
| AUSTRALIA | | | | | | 10 |
| CANADA | | | | | | 11 |
| DENMARK | | | | | | 12 |
| UNITED KINGDOM | | | | | | 13 |
| UNITED STATES | | | | | | 14 |
| AUSTRIA | | | | | | 15 |
| GERMANY | | | | | | 16 |
| IRELAND | | | | | | 17 |
| BELGIUM | | | | | | 18 |
| HONG KONG | | | | | | 19 |
| ICELAND | | | | | | 20 |
| UNITED ARAB EMIRATES | | | | | | 21 |
| QATAR | | | | | | 22 |
| FRANCE | | | | | | 23 |
| TAIWAN (China) | | | | | | 24 |
| ESTONIA | | | | | | 25 |
| SOUTH AFRICA | | | | | | 26 |
| ISRAEL | | | | | | 27 |
| CHILE | | | | | | 28 |
| MALTA | | | | | | 29 |
| CZECH REP. | | | | | | 30 |
| PORTUGAL | | | | | | 31 |
| MALAYSIA | | | | | | 32 |
| RWANDA | | | | | | 33 |
| KOREA, REP | | | | | | 34 |
| SPAIN | | | | | | 35 |
| URUGUAY | | | | | | 36 |
| SLOVAKIA | | | | | | 37 |
| MAURITIUS | | | | | | 38 |
| OMAN | | | | | | 39 |
| JORDAN | | | | | | 40 |
| POLAND | | | | | | 41 |
| BAHREIN | | | | | | 42 |
| SAUDI ARABIA | | | | | | 43 |
| BOTSWANA | | | | | | 44 |
| COSTA RICA | | | | | | 45 |
| JAMAICA | | | | | | 46 |
| SLOVENIA | | | | | | 47 |
| HUNGARY | | | | | | 48 |
| ITALY | | | | | | 49 |
| LITHUANIA | | | | | | 50 |
| PANAMA | | | | | | 51 |
| CHINA | | | | | | 52 |
| GHANA | | | | | | 53 |
| INDIA | | | | | | 54 |
| TRINIDAD & TOBAGO | | | | | | 55 |
| MOROCCO | | | | | | 56 |
| CYPRUS | | | | | | 57 |
| BRAZIL | | | | | | 58 |
| SRI LANKA | | | | | | 59 |
| GREECE | | | | | | 60 |
| KUWAIT | | | | | | 61 |
| COLOMBIA | | | | | | 62 |
| LATVIA | | | | | | 63 |
| PHILIPPINES | | | | | | 64 |
| PERU | | | | | | 65 |
| THAILAND | | | | | | 66 |
| MEXICO | | | | | | 67 |
| INDONESIA | | | | | | 68 |
| UGANDA | | | | | | 69 |
| TUNISIA | | | | | | 70 |
| GUATEMALA | | | | | | 71 |
| TANZANIA, UNITED REP. OF | | | | | | 72 |
| ROMANIA | | | | | | 73 |
| EL SALVADOR | | | | | | 74 |
| SENEGAL | | | | | | 75 |
| NEPAL | | | | | | 76 |
| VIETNAM | | | | | | 77 |
| TURKEY | | | | | | 78 |
| ZAMBIA | | | | | | 79 |
| HONDURAS | | | | | | 80 |
| LIBERIA | | | | | | 81 |
| KENYA | | | | | | 82 |
| DOMINICAN REP. | | | | | | 83 |
| MALI | | | | | | 84 |
| BULGARIA | | | | | | 85 |
| CROATIA | | | | | | 86 |
| ETHIOPIA | | | | | | 87 |
| GEORGIA | | | | | | 88 |
| GABON | | | | | | 89 |
| MALAWI | | | | | | 90 |
| MACEDONIA, FYR | | | | | | 91 |
| BRUNEI DARUSSALAM | | | | | | 92 |
| ECUADOR | | | | | | 93 |
| MOZAMBIQUE | | | | | | 94 |
| CÔTE D'IVOIRE | | | | | | 95 |
| BENIN | | | | | | 96 |
| ARGENTINA | | | | | | 97 |
| SIERRA LEONE | | | | | | 98 |
| IRAN | | | | | | 99 |
| PARAGUAY | | | | | | 100 |
| EGYPT | | | | | | 101 |
| KAZAKHSTAN | | | | | | 102 |
| LEBANON | | | | | | 103 |
| CAMEROON | | | | | | 104 |
| MONTENEGRO | | | | | | 105 |
| ALGERIA | | | | | | 106 |
| ARMENIA | | | | | | 107 |
| MAURITANIA | | | | | | 108 |
| MADAGASCAR | | | | | | 109 |
| SERBIA | | | | | | 110 |
| RUSSIA | | | | | | 111 |
| NICARAGUA | | | | | | 112 |
| BOLIVIA | | | | | | 113 |
| NIGERIA | | | | | | 114 |
| AZERBAIJAN | | | | | | 115 |
| BOSNIA&HERZEGOVINA | | | | | | 116 |
| CHAD | | | | | | 117 |
| ALBANIA | | | | | | 118 |
| CONGO, DEM. REP. | | | | | | 119 |
| ZIMBABWE | | | | | | 120 |
| PAKISTAN | | | | | | 121 |
| BURUNDI | | | | | | 122 |
| UKRAINE | | | | | | 123 |
| MOLDOVA | | | | | | 124 |
| BANGLADESH | | | | | | 125 |
| VENEZUELA, BOLIVARIAN REP | | | | | | 126 |
| YEMEN, REP. | | | | | | 127 |

Table 5. IPRI 2017. Rankings by Quintiles

| Top 20 Percent | 2nd Quintile | 3rd Quintile | 4th Quintile | Bottom 20 Percent |
|---|---|---|---|---|
| NEW ZEALAND | BELGIUM | MAURITIUS | LATVIA | BRUNEI DARUSSALAM |
| FINLAND | HONG KONG | OMAN | PHILIPPINES | ECUADOR |
| SWEDEN | ICELAND | JORDAN | PERU | MOZAMBIQUE |
| SWITZERLAND | UNITED ARAB EMIRATES | POLAND | THAILAND | CÔTE D'IVOIRE |
| NORWAY | QATAR | BAHREIN | MEXICO | BENIN |
| LUXEMBURG | FRANCE | SAUDI ARABIA | INDONESIA | ARGENTINA |
| SINGAPORE | TAIWAN (China) | BOTSWANA | UGANDA | SIERRA LEONE |
| JAPAN | ESTONIA | COSTA RICA | TUNISIA | IRAN |
| NETHERLANDS | SOUTH AFRICA | JAMAICA | GUATEMALA | PARAGUAY |
| AUSTRALIA | ISRAEL | SLOVENIA | TANZANIA, UNITED REP. OF | EGYPT |
| CANADA | CHILE | HUNGARY | ROMANIA | KAZAKHSTAN |
| DENMARK | MALTA | ITALY | EL SALVADOR | LEBANON |
| UNITED KINGDOM | CZECH REPUBLIC | LITHUANIA | SENEGAL | CAMEROON |
| UNITED STATES (USA) | PORTUGAL | PANAMA | NEPAL | MONTENEGRO |
| AUSTRIA | MALAYSIA | CHINA | VIETNAM | ALGERIA |
| GERMANY | RWANDA | GHANA | TURKEY | ARMENIA |
| IRELAND | KOREA, REP | INDIA | ZAMBIA | MAURITANIA |
| | SPAIN | TRINIDAD AND TOBAGO | HONDURAS | MADAGASCAR |
| | URUGUAY | MOROCCO | LIBERIA | SERBIA |
| | SLOVAKIA | CYPRUS | KENYA | RUSSIA |
| | | BRAZIL | DOMINICAN REPUBLIC | NICARAGUA |
| | | SRI. LANKA | MALI | BOLIVIA |
| | | GREECE | BULGARIA | NIGERIA |
| | | KUWAIT | CROATIA | AZERBAIJAN |
| | | COLOMBIA | ETHIOPIA | BOSNIA AND HERZEGOVINA |
| | | | GEORGIA | CHAD |
| | | | GABON | ALBANIA |
| | | | MALAWI | CONGO, DEM. REP. |
| | | | MACEDONIA, FYR | ZIMBABWE |
| | | | | PAKISTAN |
| | | | | BURUNDI |
| | | | | UKRAINE |
| | | | | MOLDOVA |
| | | | | BANGLADESH |
| | | | | VENEZUELA, BOLIVARIAN REP. OF |
| | | | | YEMEN, REP. |

Strongest

↓

Weakest

Figure 4 shows the top 15 countries in this IPRI edition. New Zealand leads the IPRI overall position (8.6335) and the LP (9.0311) and the PPR (8.8255) components. Finland ranks second at the IPRI (8.6257) and its IPR component (8.6714) is second overall as well. It is followed by Sweden (8.6084), Switzerland (8.5614) and Norway (8.5326). The Scandinavian countries keep reporting top IPRI rankings (Finland #2, Sweden #3, Norway #5, and Denmark #12). At the end of this top list we find Austria (8.0122), the USA (8.0741) and the United Kingdom (8.1292). The USA leads the IPR component (8.7155), followed by Finland and Japan (8.3267).

Figure 4. IPRI 2017. Top 15 Countries
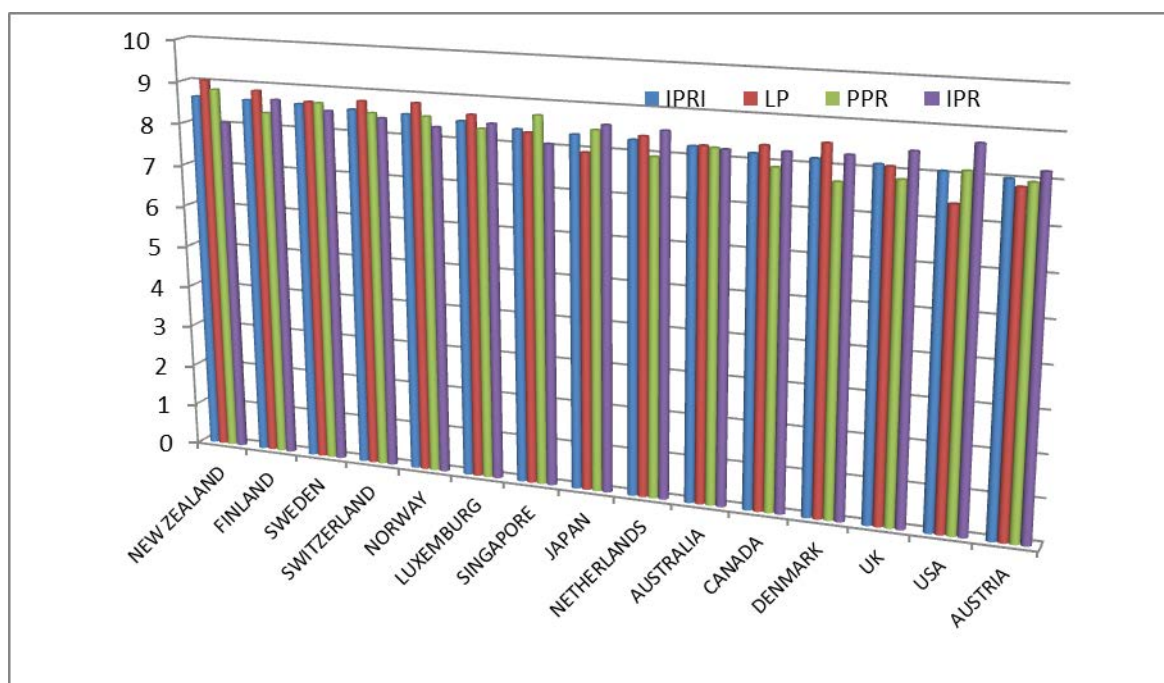


Most of the top countries are the strongest in the IPRI the LP or the IPR components, this is not the case for Singapore.

Countries in the top quintile vary little from the previous IPRI edition, the group is composed of mostly the same countries and their scores differ only slightly from previous years (see Figure 5).

Figure 5. IPRI 2017 vs. IPRI 2016. Top Countries Ranking Change
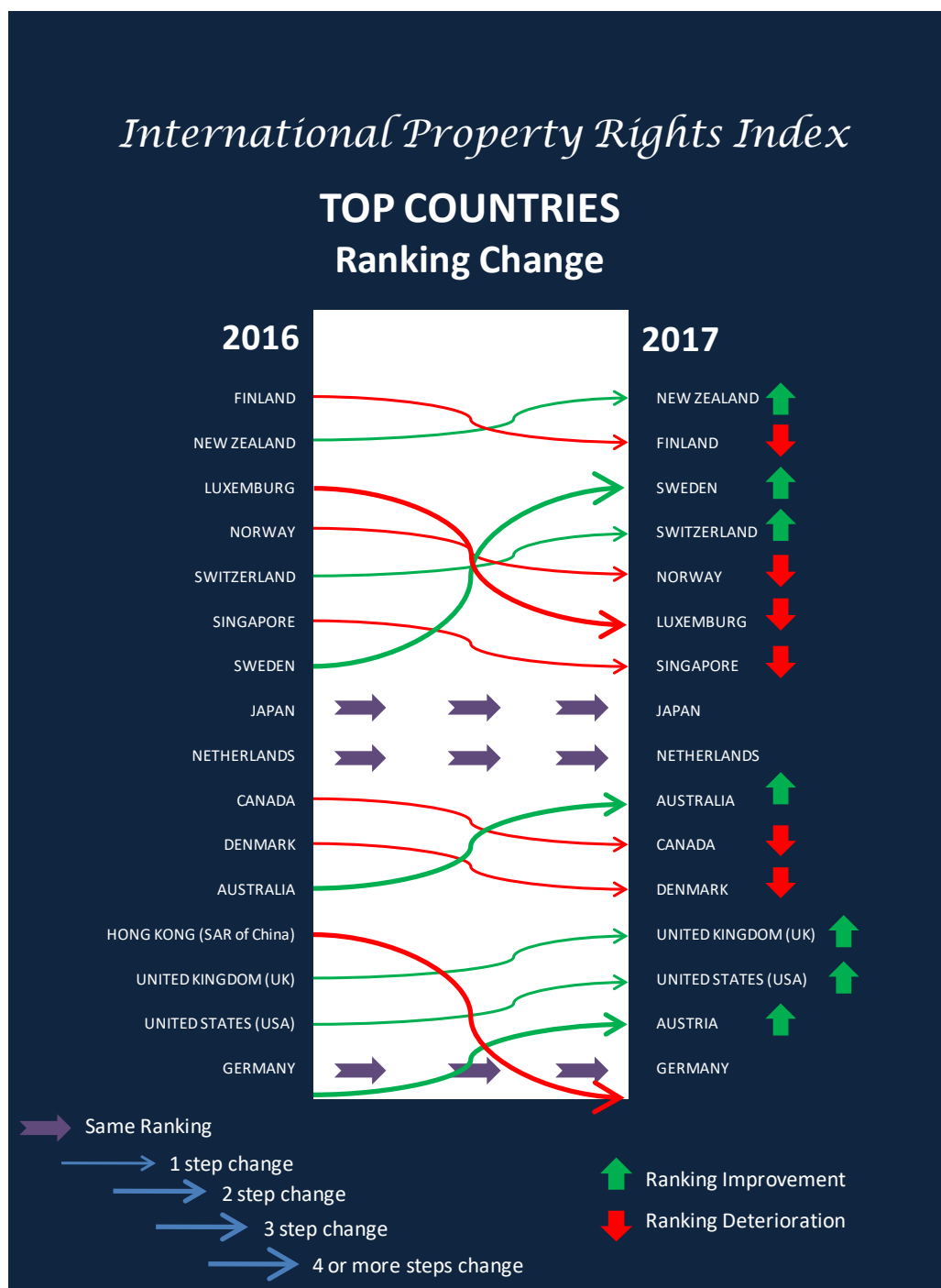


The bottom 15 countries are shown in Figure 6. The Republic of Yemen is #127 in the IPRI ranking (2.7281) followed by the Bolivarian Republic of Venezuela (3.0566), Bangladesh (3.1170), Moldova (3.1781), Ukraine (3.4243) and Burundi (3.43).

Considering the IPRI components we find the following bottom countries:

- LP: the Bolivarian Rep. of Venezuela (1.6795), Rep. of Yemen (1.6929), the Dem. Rep. of Congo (1.8236) and Burundi (2.0979).
- PPR: Brunei (3.2598), Ukraine (3.3779), Bangladesh (3.5024), and Moldova (3.5102).
- IPR: Rep. of Yemen (1.7075), Bangladesh (2.6225), Moldova (2.6622) and the Bolivarian Rep. of Venezuela (2.8012).

Most of the bottom countries show the PPR (not the case for Albania and Ukraine) as the stronger IPRI component, while the weakest is the LP, even though it is not the case for Azerbaijan, Bosnia & Herzegovina, Albania, Moldova and Bangladesh. This situation is the opposite for the top countries and this seems to be a hint to evaluate the ability of LP to pull the rest of the components.

Figure 6. IPRI 2017. Bottom 15 Countries
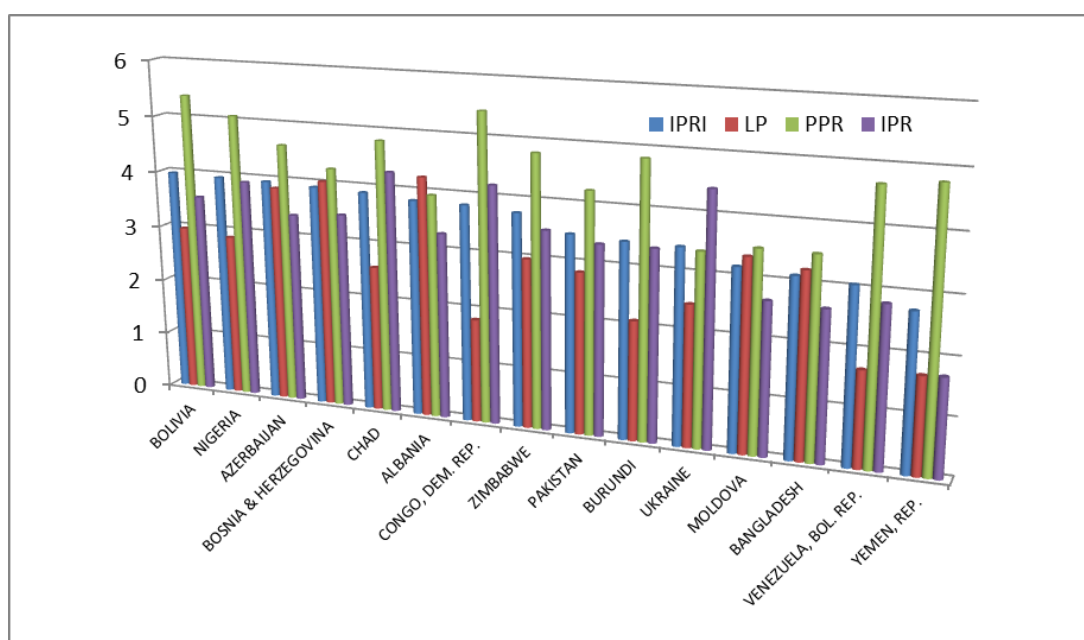


A comparison between the IPRI scores in 2016 and 2017 reveal an improvement, not only in the averages of the IPRI scores and of its components, but also in the maximum level showed by the sample of countries. In both years the minimum score was 2.73, in 2016 for the Bolivarian Rep. of Venezuela and in 2017 for Rep. of Yemen. The 2017 IPRI highest score is 8.6335 (New Zealand) while last year was 8.3768 (Finland).This allows for an improvement of the average IPRI score.

This year, five countries show the highest improvement in their IPRI score: Spain (0.5723), Israel (0.5636), Sweden (0.5099), Ethiopia (0.5069) and Lebanon (0.5005); while the ones with highest decreases in their 2017 IPRI scores were: Romania (-0.4077), Ukraine (-0.5086), Russia (-0.5363), Moldova (-0.5450) and Cyprus (-0.6743).

Looking at these comparisons of the IPRI components we found:

- LP: the average improvement in 2017-2016 was 0.0413 points. The highest LP improvements came from Nigeria (0.3913), Mauritania (0.3442) and the United Republic of Tanzania (0.3106). Countries with the largest decreases were Macedonia (-0.4480), Burundi (-0.4032) and Bolivia (-0.3960). Changes in LP component score between 2017 and 2016 are shown in Figure 8.

- PPR: the average improvement in 2017-2016 was 0.352 points. Spain (1.1866) and Nepal (1.1545) showed the highest improvements, while Cyprus (-1.8972) and Russia (-1.8431) showed the deepest declines. Changes in PPR component scores 2017-2016 are shown in Figure 9.

- IPR: this year the average IPRI score was 5.50267, showing an improvement of 0.17 from the previous year. The most significant increases in the IPR component were reported by Mauritania (0.5907) and Azerbaijan (0.5334) while the largest decreases were incurred by Bolivia (-0.2802) and Liberia (-0.1530). Changes in IPR component scores between 2017 and 2016 can be seen in Figure 10.

Figure 7. IPRI Score 2017-2016 and variation
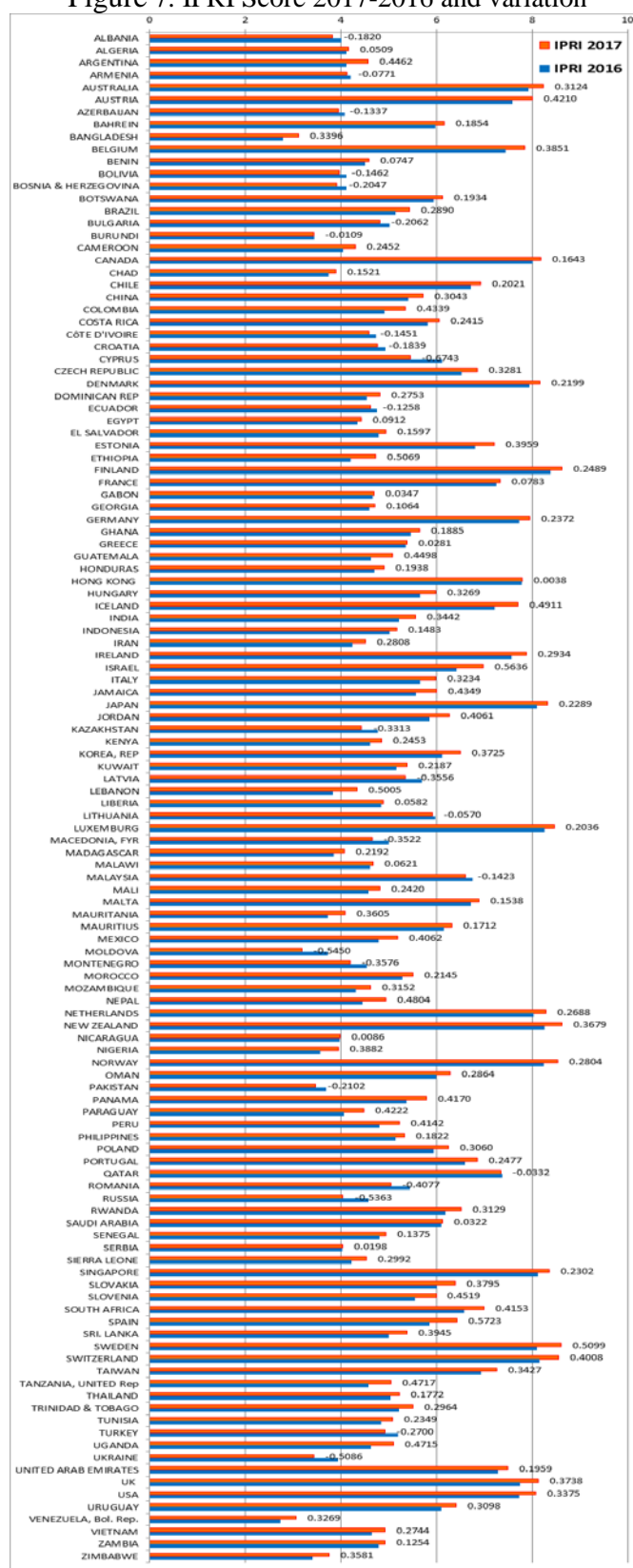
Figure 8. LP Score 2015-2016 and variation
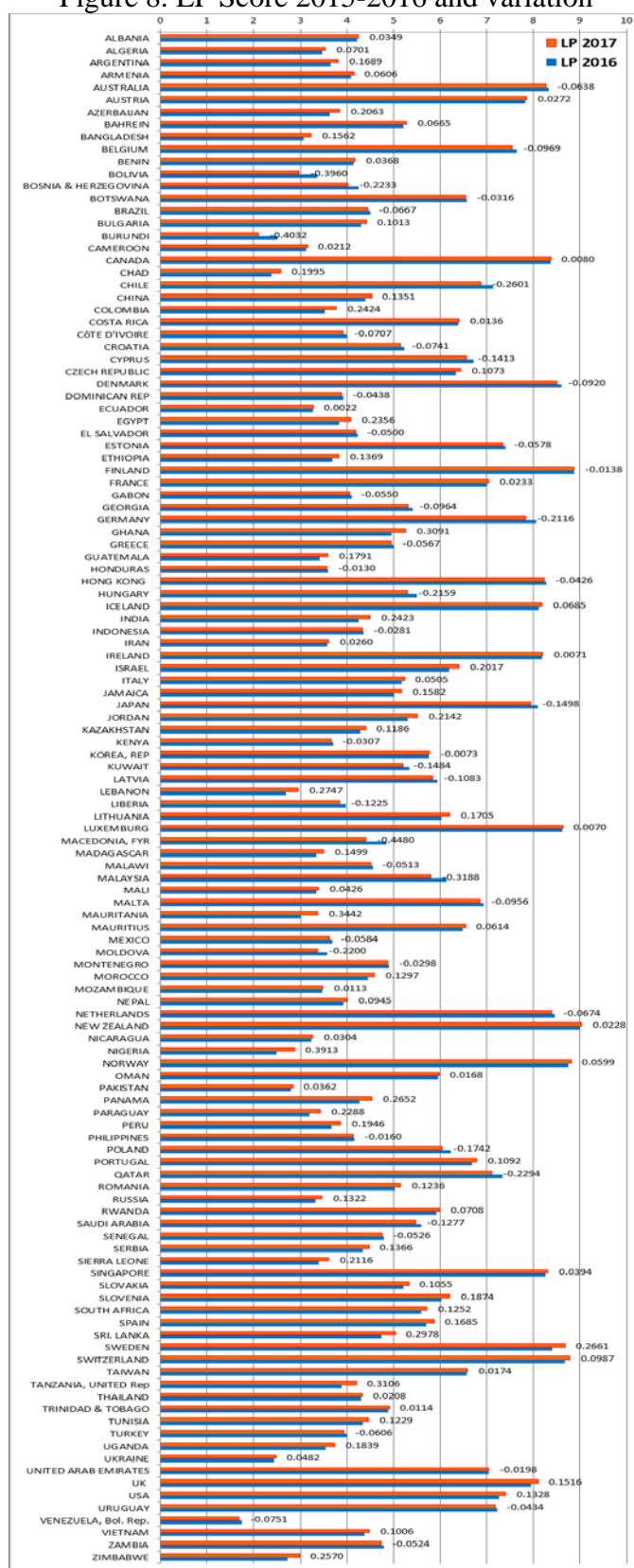
## Figure 9. PPR Score 2017-2016 and variation
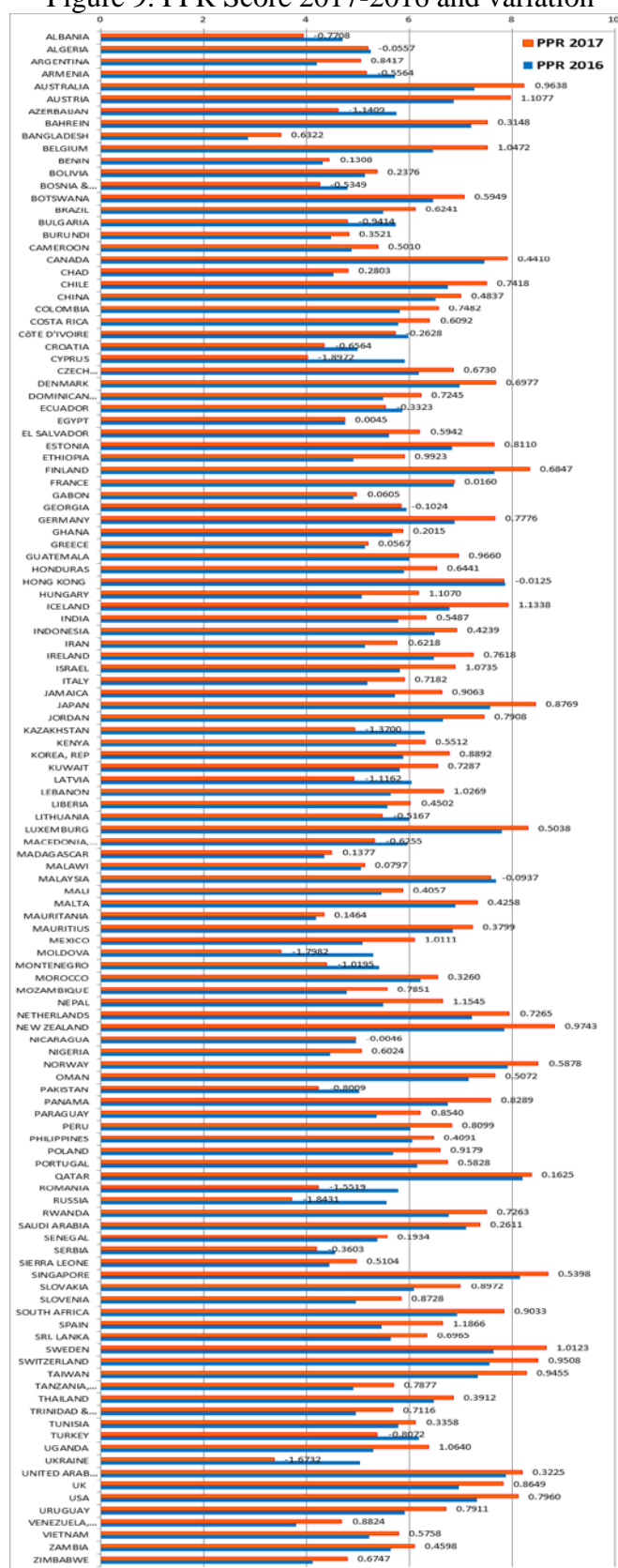
Figure 10. IPR Score 2017-2016 and variation
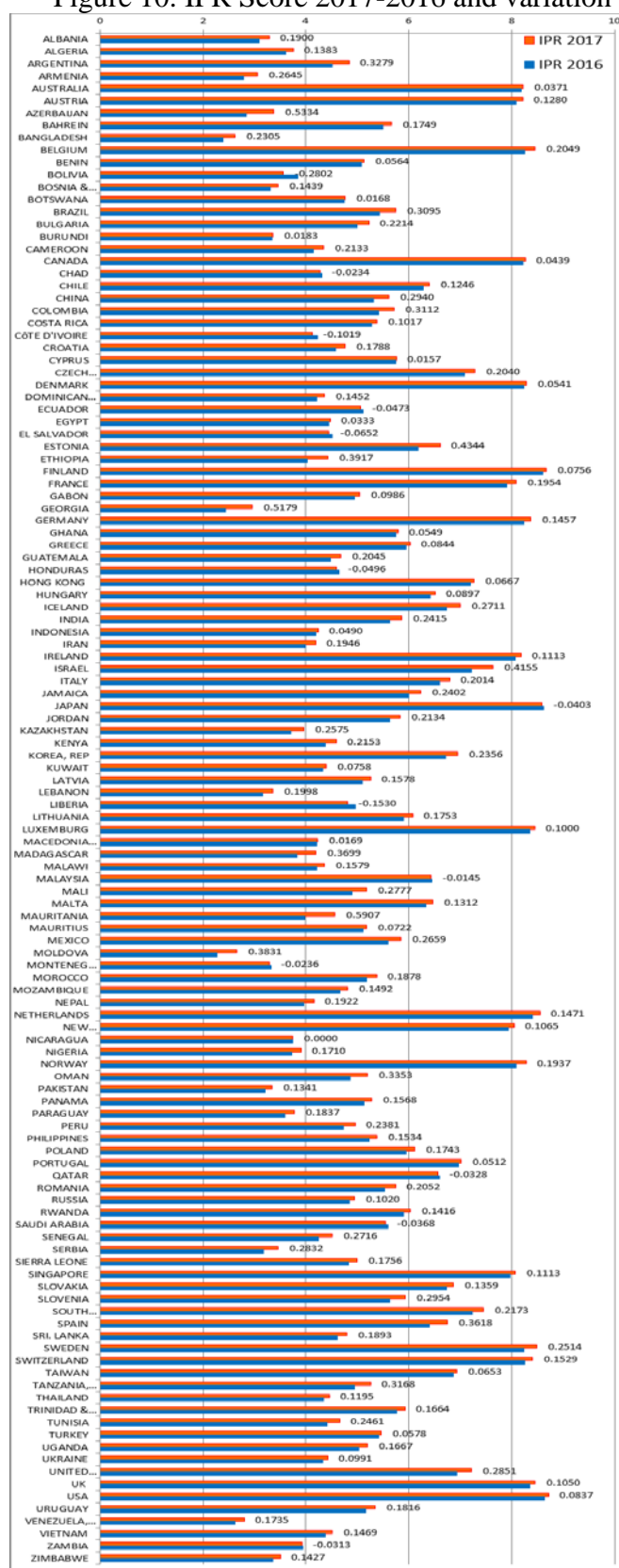
## IV.1   IPRI 2016 Groups Results

After individual country scores were calculated, countries were then sorted into respective groups according to geographical regions, income level, degree of development, membership of trade and regional integration agreements to make further macro comparisons possible. For each group, the IPRI score and of its components were calculated. Past year IPRI classifications were also kept for comparison purposes (see Table 6 and Figures 11-15).

All regions except for CEECA, which declined by 0.124 points, improved their scores. North America and Western Europe keep the top positions, with scores of 8.126 and 7.664 respectively, while Africa (4.810) and CEECA (4.937) countries are at the bottom. Under World Bank region classifications (see Figure 12) Oceania remains the leader with an IPRI score of 8.439, followed by the European Union (6.815) and North America (7.149). Latin America and the Caribbean increased its IPRI score the most from 4.747 to 5.234, or 10.25%.

This year, according to the income criteria of the World Bank there were only four group- each remained the same or improved modestly. The Upper-Middle-Income group recorded a reduction of a 6 thousandth basis point. The strongest improvements in the group were those of the High Income (of 0.364, or 5.44%) and of the Low Income (of 0.333, equivalent to a 7.79%) groups. The Low-Income group (4.608) have higher scores than the Lower-Middle-Income group (4.487). This is the first year IPRI scores do not follow the income classification directly.

IPRI scores under the Regional and Development classification, according International Monetary Fund, show that the top IPRI-2017 scores are held by the Advanced Economies (7.419) followed by the Middle East, North Africa, Pakistan and Afghanistan group (5.210), Emerging and Developing Asia (5.146) which had the highest IPRI score improvement of 7.72%, and Latin American and Caribbean countries (5.117) which experienced a strong improvement of 7.61%. At the bottom, we find the CIS countries scoring 3.98 with an important step back of 0.289 points, followed by Emerging and Developing Europe 4.764 and Sub-Saharan Africa (4.838) which showed a slight improvement of 3.62%.

Considering economic integration agreements, we included this year the OECD countries, as they are not anymore part of the Income criteria used by World Bank. The top five groups are EFTA (8.265), OECD (7.278), NAFTA (7.149), TPP (6.944) and EU (6.815). On the other extreme we found: CIS (3.858), CEMA (4.293), CEECA (4.439) and SAARC (4.497). The group with the highest level of improvement was CARICOM at 28.6% (improving from 4.476 in 2016 to 5.757 in 2017), followed by CEECA (11.7%), IGAD (9.1%) and MERCOSUR (8.1%). The only group that showed an important reduction was the CIS (-8.4%).

It should be noted that in spite of the political decision by the UK to exit the EU, we still include it in this economic union as data used is prior to that decision.

We also want to highlight that some groups are in different classifications and they report different score values. That is the case of Commonwealth of Independent States and Latin America and the Caribbean. This is because in some of the classifications they include or exclude  particular countries.

Table 6. IPRI 2017. Groups Score

| IPRI Regions | IPRI | LP | PPR | IPR |
|---|---|---|---|---|
| A | 4.810 | 4.011 | 5.680 | 4.739 |
| AO | 6.063 | 5.659 | 6.743 | 5.787 |
| CEECA | 4.937 | 4.916 | 5.065 | 4.829 |
| LAC | 5.117 | 4.219 | 6.196 | 4.937 |
| MENA | 5.518 | 4.858 | 6.659 | 5.038 |
| NA | 8.126 | 7.881 | 8.010 | 8.489 |
| WE | 7.664 | 7.634 | 7.518 | 7.839 |
| **Past IPRI Groupings** | IPRI | LP | PPR | IPR |
| EU | 6.815 | 6.759 | 6.637 | 7.050 |
| Rest Europe | 4.988 | 5.034 | 5.292 | 4.637 |
| Africa | 4.808 | 4.030 | 5.677 | 4.716 |
| North Am. | 7.149 | 6.463 | 7.374 | 7.611 |
| Ctrl Am & Caribe | 5.234 | 4.387 | 6.354 | 4.961 |
| South Am | 5.004 | 4.128 | 6.063 | 4.822 |
| Asia | 5.676 | 5.156 | 6.596 | 5.278 |
| Oceania | 8.439 | 8.651 | 8.532 | 8.132 |
| **World Bank Income Group** | IPRI | LP | PPR | IPR |
| High income | 7.068 | 6.998 | 7.156 | 7.051 |
| Upper middle income | 4.975 | 4.386 | 5.809 | 4.729 |
| Lower middle income | 4.487 | 3.765 | 5.489 | 4.207 |
| Low income | 4.608 | 3.675 | 5.535 | 4.613 |
| **IMF Dev. And Reg. Group** | IPRI | LP | PPR | IPR |
| Adv. Econ. | 7.419 | 7.367 | 7.352 | 7.539 |
| CIS | 3.980 | 3.858 | 4.453 | 3.628 |
| Emrg and Dev Asia | 5.146 | 4.596 | 6.067 | 4.775 |
| Emrg and Dev Europe | 4.764 | 4.727 | 4.880 | 4.686 |
| Lat. Am & Caribe | 5.117 | 4.219 | 6.196 | 4.937 |
| MENA & Pakistan | 5.210 | 4.542 | 6.348 | 4.740 |
| Sub-Saharan Africa | 4.838 | 4.036 | 5.732 | 4.746 |
| **Integration Groups** | IPRI | LP | PPR | IPR |
| OECD | 7.278 | 7.093 | 7.279 | 7.462 |
| EU | 6.815 | 6.759 | 6.637 | 7.050 |
| SADC | 5.035 | 4.403 | 5.936 | 4.766 |
| ECOWAS | 4.742 | 3.977 | 5.446 | 4.804 |
| ASEAN | 5.749 | 5.367 | 6.517 | 5.362 |
| PARLACEN | 4.922 | 3.836 | 6.412 | 4.519 |

| | | | | |
|---|---|---|---|---|
| GCC | 6.463 | 6.009 | 7.617 | 5.764 |
| AP | 5.758 | 4.842 | 6.832 | 5.601 |
| MERCOSUR | 4.790 | 4.108 | 5.758 | 4.503 |
| SAARC | 4.497 | 3.921 | 5.412 | 4.159 |
| CEMAC | 4.293 | 3.259 | 5.060 | 4.560 |
| MCCA | 4.995 | 4.202 | 6.212 | 4.570 |
| CIS | 3.858 | 3.614 | 4.222 | 3.739 |
| ARAB M Un | 4.708 | 3.986 | 5.552 | 4.587 |
| CARICOM | 5.757 | 5.035 | 6.158 | 6.078 |
| CAN | 4.792 | 3.467 | 6.083 | 4.827 |
| EFTA | 8.265 | 8.584 | 8.315 | 7.894 |
| IGAD | 4.892 | 3.742 | 6.195 | 4.739 |
| NAFTA | 7.149 | 6.463 | 7.374 | 7.611 |
| CEEAC | 4.439 | 3.280 | 5.492 | 4.545 |
| TPP | 6.944 | 6.677 | 7.278 | 6.876 |
| OPEP | 5.135 | 4.383 | 6.175 | 4.848 |

Figure 11. IPRI 2017 and Components. Groups Score
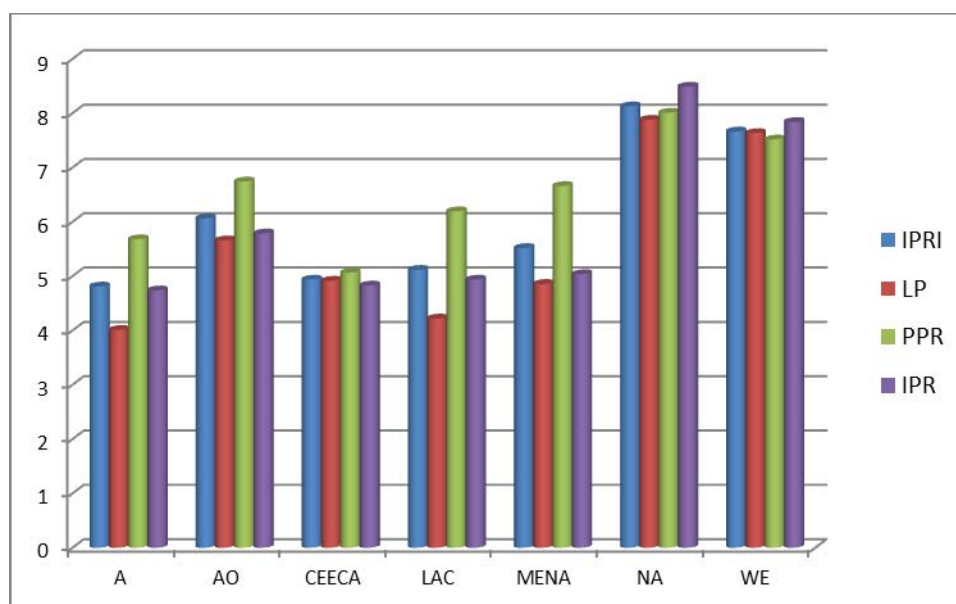


Figure 12. IPRI 2017 and Components. Regional Groups Score
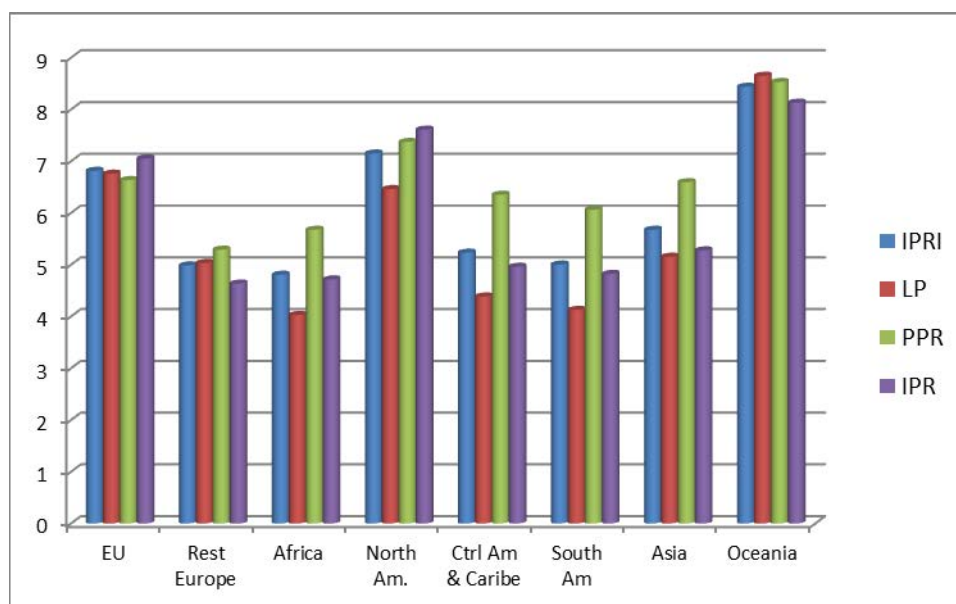
Figure 13. IPRI 2017 and Components. Development Groups Score
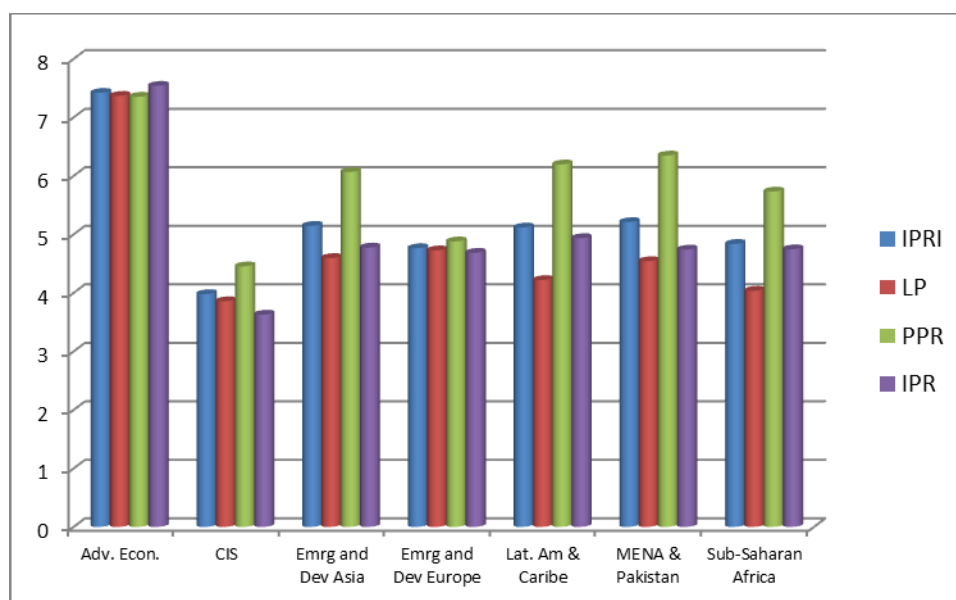


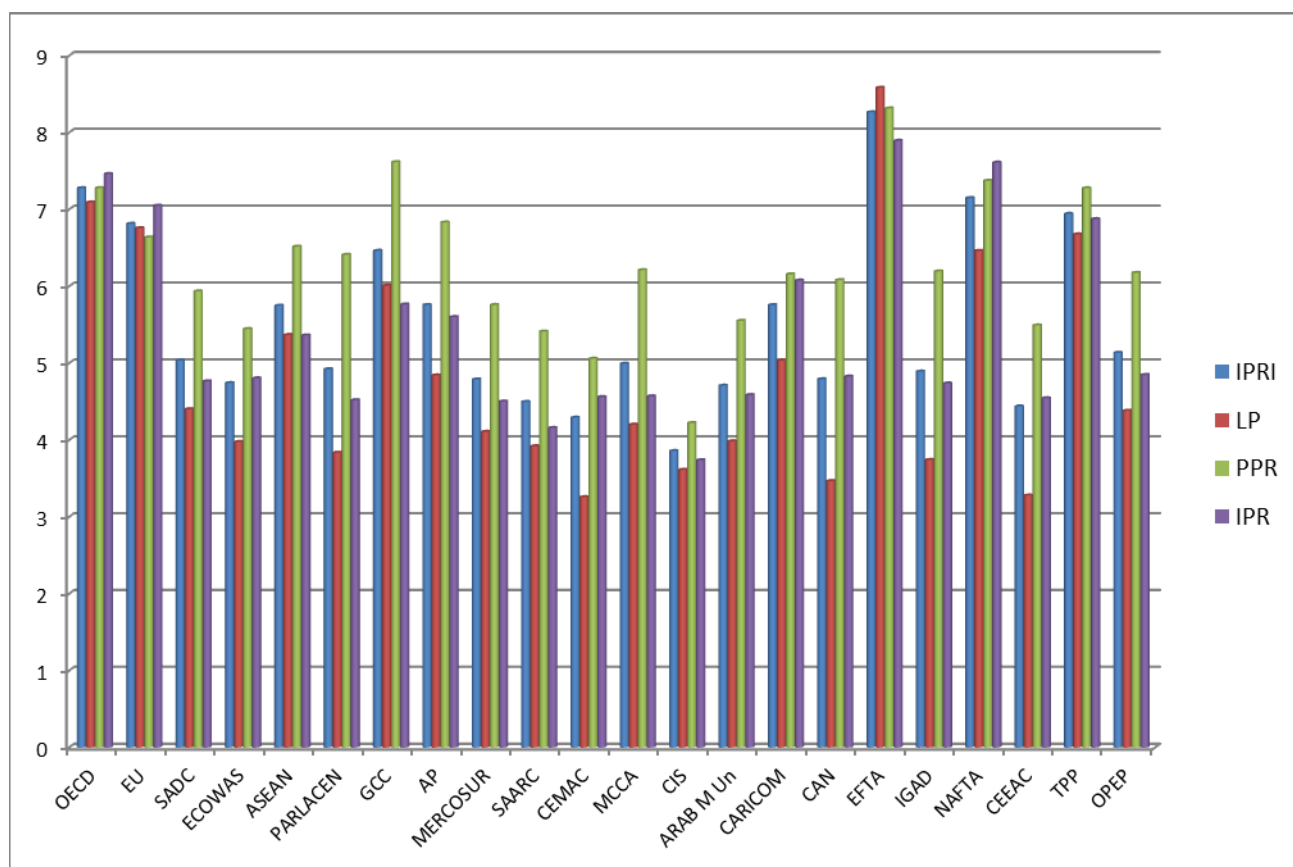Figure 14. IPRI 2017 and Components. Income Groups Score
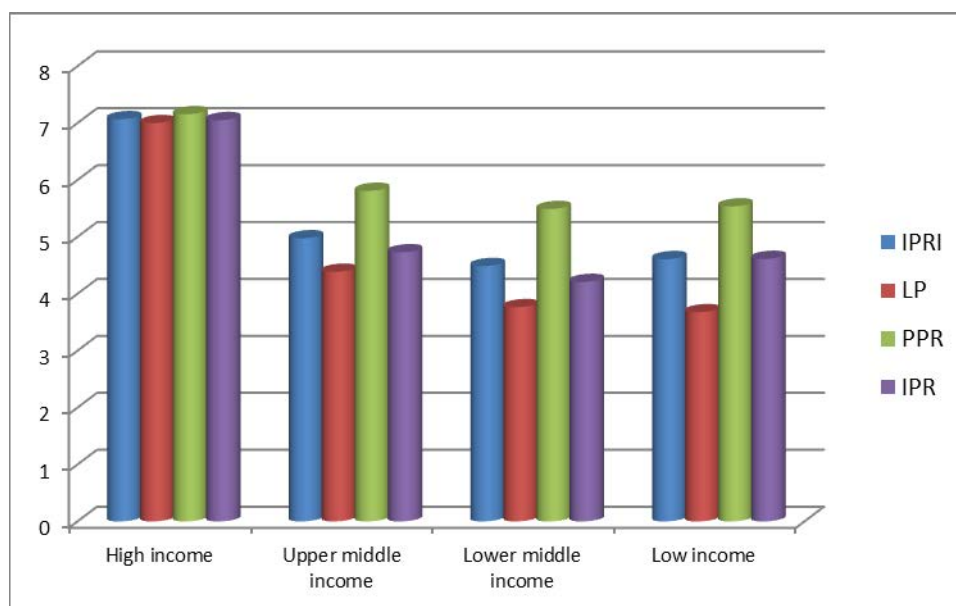
Figure 15. IPRI 2017 and Components.
Economic & Regional Integration Agreement Groups Score

## V.    IPRI-Population

Since 2015 the IPRI has computed a population incidence into the index. In this regard, we note that although the IPRI-2017 average score is 5.6336, when it is weighted by population, it is 5.522. This is a slight decrease from the 2016 population weighted IPRI score of 5.28, but still better than the 2015 score of 5.176. Clearly, property rights for the vast majority of the world's people must continue to improve.

Taking into account a demographic perspective is very important for an index such as the IPRI, which considers property rights a human right, irrespective of political boundaries. With this approach, the IPRI becomes an even more powerful tool for policy makers

This year's sample of 127 countries has a population of 6.87 billion people, with 68% of the population residing in 66 countries that tolerate weak middle-of-the-road IPRI ratings [4.5-6.4]. The highest level of property right protections [6.5-9.4] are enjoyed by only 15.2% of the population in 34 countries, and 14% of the population live in 27 countries with the lowest levels [2.5-4.4] of property rights. This year the ranges were widened as the maximum score of this year is 8.6335 earned by New Zealand.

Table 7.  IPRI 2016 and Population

| IPRI 2017 | Countries (number) | Population (Thousand) | % Population | Incidence (%) | IPRI-Population |
|---|---|---|---|---|---|
| 2.5 a 3.4 | 6 | 279,008 | 4.06 | 2.646 | 2.307 |
| 3.5 a 4.4 | 21 | 873,551 | 12.72 | 11.846 | 9.062 |
| 4.5 a 5.4 | 44 | 1,693,397 | 24.66 | 30.365 | 22.571 |
| 5.5 a 6.4 | 22 | 2,978,506 | 43.38 | 18.510 | 44.605 |
| 6.5 a 7.4 | 13 | 285,176 | 4.15 | 12.615 | 5.215 |
| 7.5 a 8.4 | 15 | 723,165 | 10.53 | 16.830 | 15.472 |
| 8.5 a 9.4 | 6 | 33,888 | 0.49 | 7.187 | 0.768 |
|  | 127 | 6,866,690 | 100 | 100 | 100 |

Figure 16 shows a combination of elements while analysing changes in the IPRI scores: country, population and belonging to particular group. It's  positive news to see that most of the countries have improved their scores, particularly since densely populated countries show a mildly positive to positive change in fostering their property rights system.

Figure 16. IPRI 2017. Country score changes (population and groups)
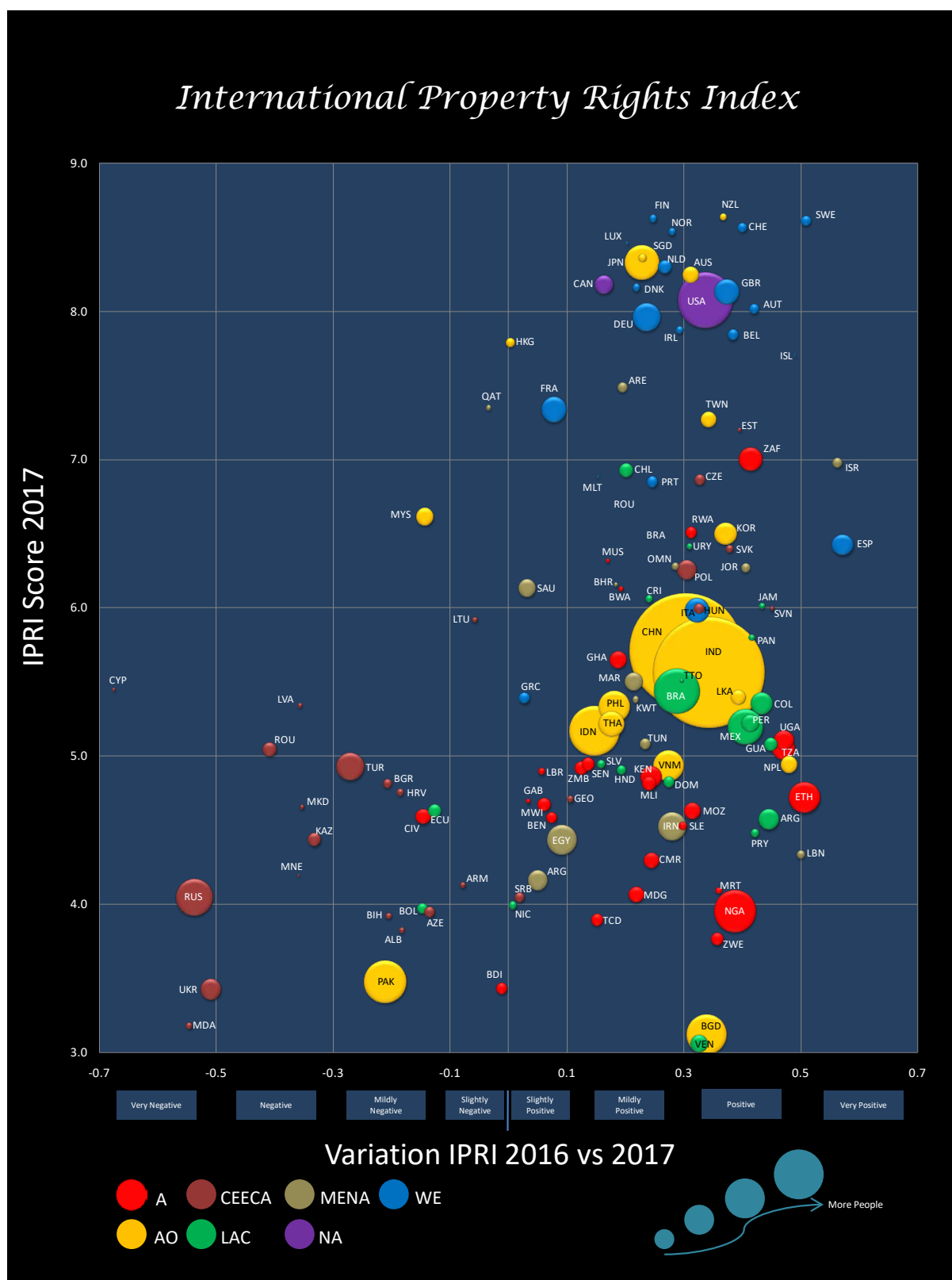
## VI.    IPRI and Gender

It is known that property rights within countries can sharply contrast between genders. The IPRI would simply not be complete without measuring this unfortunate dynamic. Gender Equality refers to equal rights, responsibilities and opportunities for women and men. Being a subject of human rights and social justice gender equality is a goal in itself. At the same time, its relevance has been demonstrated in fostering development, particularly in some areas such as health, education, agriculture and unbiased access to credit for reducing poverty. In this way gender equality plays a decisive role for less developed and developing countries.

Although organized by countries, the IPRI measures the property right protections of people, so its gender component grasps possible bias due to this condition. We used the Social Institutions and Gender Index, SIGI (by OECD), to calculate the Gender component for the IPRI, using those items most closely related to property rights and its impact in economic development. The SIGI is composed of five sub-indexes, each representing a separate dimension of discrimination: Discriminatory Family Code, Restricted Physical Integrity, Son Bias, Restricted Resources and Assets and Restricted Civil Liberties.

To account for gender equality, this chapter extends the standard IPRI measure to include a measure of gender equality (GE) concerning property rights. The IPRI formula was modified to incorporate gender equality as following:

$$IPRI\text{-}GE = IPRI + 0.2*GE$$

A weight of 0.2 for the gender equality measure is arbitrary. We varied the weight to 0.5 or according to the female and male population in each country, but scores were highly correlated. We decided to keep the weight of 0.2 for comparison purposes with previous data series.

### VI.1    Data & Methodology of Gender Equality Measure

The GE component is calculated using the following five indicators (Source: OECD Gender, Institutions, and Development Database 2014 (GID-DB) details in Appendix III):

1.  **Women's Access to Land**: estimates whether women and men have equal and secure access to land use, control and ownership.

2.  **Women's Access to Credit**: measures whether women and men have equal access to financial services.

3.  **Women's Access to Property Other than Land**: determines whether women and men have equal and secure access to non-land assets use, control and ownership

4.  **Inheritance Practices**: combines two elements:

a.  Inheritance Practice to Daughters: considers whether daughters and sons have equal inheritance rights.

b.  Inheritance Practice to Widows: assesses whether widows and widowers have equal inheritance rights.

5.  **Women's Social Rights,** covers broader aspects of women's equality and it is a composite of four other items crucial to equal standing in society:

a.  Parental authority

i.  *In marriage*: determines whether women and men have the same right to be the legal guardian of a child during marriage.

ii.  *After divorce*: measures whether women and men have the same right to be the legal guardian of and have custody rights over a child after divorce.

b.  Female genital mutilation: measures the occurrence of female genital mutilation.

c.  Access to public space: evaluates whether women face restrictions on their freedom of movement and access to public space.

d.  Son preference in education: express the percentage of people agreeing that university is more important for boys than for girl.

The original data has three levels: 0 (Best), 0.5 (Average) and 1 (Worst). All data series were rescaled to IPRI the scale (0-10). The final GE score is an index based on the average of the five equally weighted variables. Those variables with more than one item were equally weighted as well. A minimum score (0) means complete discrimination against women, while maximum score (10) is given to countries with gender equality. After calculating GE as an independent measure, it is added to the IPRI as an 11th component to make the IPRI-GE ratings using a scale of (0-12). As the GE data source is discrete, equal outcomes are likely to be found. That is minimized in the IPRI-GE thanks to the variability of the IPRI scores.

## VI.2. IPRI-GE and GE. Country Results

The IPRI-GE shows results for 123 of the 127 countries included in the 2017 IPRI, data was unavailable for Brunei Darussalam, Malta, Montenegro and Taiwan. On the other hand, Haiti, Myanmar, Swaziland and Latvia were present in 2016, but they are not in 2017, while Democratic Rep. of Congo and Rep. of Yemen were included this year.

As an average, the 123 countries show a GE score of 7.118 which is lower than the prior two years (2016=7.466; 2015=7.39). while the IPRI-GE score is 7.438 showing a sustained improvement (2016=6.933; 2015= 6.76). This means that gender equality is deteriorating as an average, while the property rights protection improves. Looking in detail to the GE component we find that the Inheritance Practices (for widows and daughters) and Women Access to Land Ownership are the two items with lower scores (Figures 17a and 17b).

As in 2016 edition, the same 14 countries received the maximum score of GE=10: Austria, Belgium, Croatia, Czech Rep., Denmark, Dominican Rep. Iceland, Ireland, Latvia, Lithuania, Luxemburg, Panama, Portugal and Slovakia, and 30 other countries were in the range of [9-10]. The bottom scores of GE are held by the Democratic Republic of Congo (2.67), Nigeria (3.12), Zambia (3.25), Egypt (3.37), Yemen Rep. (3.59), Oman (3.67), United Arab Emirates (3.67), Saudi Arabia (3.67), Chad (3.71), Iran (3.73) and Mauritania (3.85).

New Zealand leads the IPRI-GE (10.628), followed by Finland (10.62), Sweden (10.61), Norway (10.53), Luxemburg (10.46), Switzerland (10.45), Japan (10.31), Netherlands (10.29), Australia (10.24), Canada (10.17), Denmark (10.16), USA (10.07) and Austria (10.01). All of them are very close in their score values and over 10. In a score range [10-9] we find Germany, Singapore, Ireland, Belgium, UK, Iceland, France, Hong Kong and Estonia.

On the other extreme of the IPRI-GE, with scores below 5, we find Yemen Rep. (3.45), Bangladesh (3.91), Congo Dem. Rep. (4.35), Pakistan (4.47), Nigeria (4.57), Burundi (4.63), Chad (4.63), Moldova (4.76), Mauritania (4.86) and Algeria (4.998).

Analyzing the IPRI-GE score by country groups we found very interesting results (see Figure18):

- Geographical Regions: at the top, we find North America (10.121) and Western Europe (9.655), while at the bottom are Africa (5.887) and MENA countries (6.463). In the former group the GE component is particularly low, pushing down the IPRI-GE score. just the opposite happens to CEECA, where better GE (9.133) scores pulls up its IPRI-GE (6.795) score.

- Regional and Development criteria (IMF): Advanced Economies (9.367) is leading the group followed by Latin America and the Caribbean (6.785), Emerging and Developing Europe (6.630), Emerging and Developing Asia (6.388), and MENA & Pakistan (6.086). At the bottom, we find CIS (5.664) and Sub-Saharan Africa (5.926). CIS countries show a high GE score (8.422) but the IPRI score (3.980) pulls down the IPRI-GE, similar situation happens with Latin America and the Caribbean (GE=8.336; IPRI=5.117; IPRI-GE=6.785), while the opposite happens with MENA & Pakistan (GE= 4.377) and Emerging and Developing Asia (5.952) where the GE score is low.

- Income classification (World Bank): this year the GE does not follow the same pattern than the IPRI, nor of the IPRI-GE. This is because the Low-Income group shows scores slightly better than the Lower-Middle-Income group in IPRI and IPRI-GE, and GE scores.

- Economic and Regional Integration Agreements: As in the IPRI the five top groups are: EFTA (10.227), OECD (9.207), NAFTA (8.938), TPP (8.822) and EU (8.778). The bottom groups are: CEMAC (5.184), CEEAC (5.355), SAARC (5.557) and CIS (5.602). It should be noted that CIS, MERCOSUR, CAN, MCCA and CARICOM show high GE scores, but their IPRI scores reduce their IPRI-GE values.
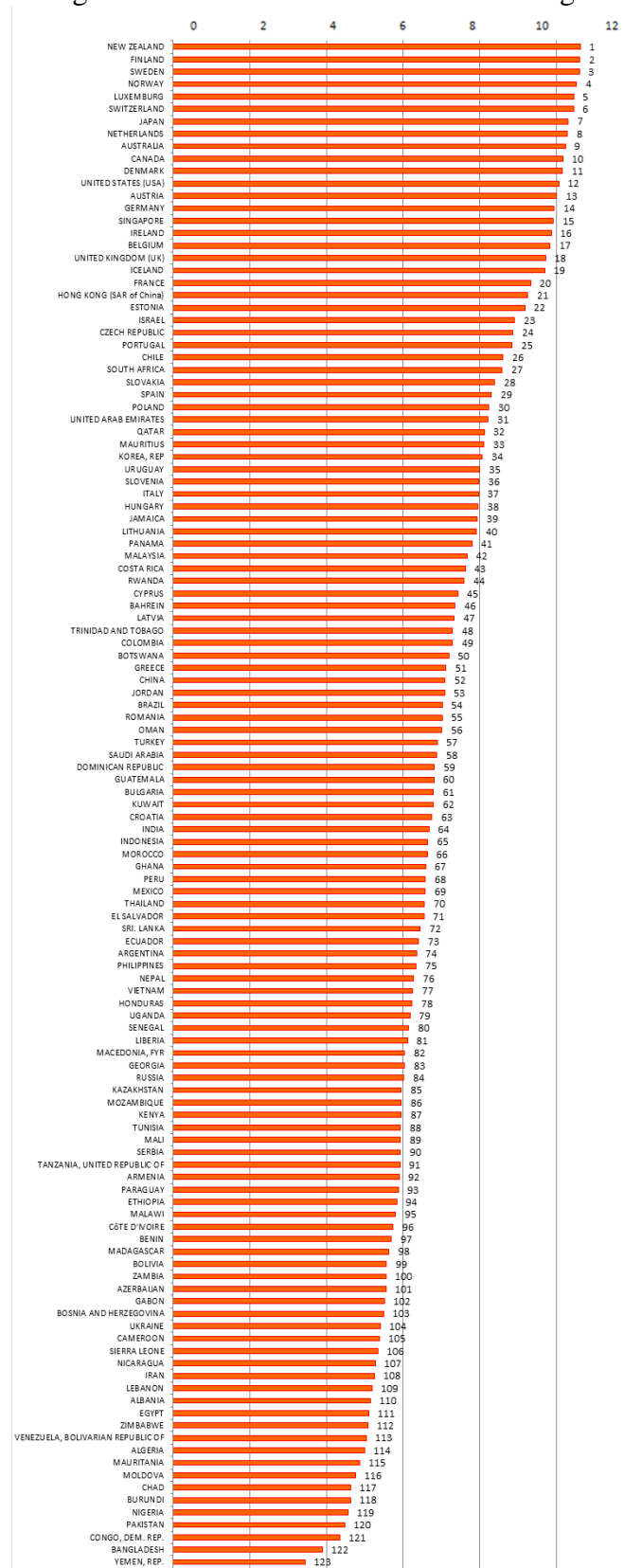
## Fig. 17a. IPRI-GE 2017. Scores & Rankings

| Rank | Country |
|---|---|
| 1 | NEW ZEALAND |
| 2 | FINLAND |
| 3 | SWEDEN |
| 4 | NORWAY |
| 5 | LUXEMBURG |
| 6 | SWITZERLAND |
| 7 | JAPAN |
| 8 | NETHERLANDS |
| 9 | AUSTRALIA |
| 10 | CANADA |
| 11 | DENMARK |
| 12 | UNITED STATES (USA) |
| 13 | AUSTRIA |
| 14 | GERMANY |
| 15 | SINGAPORE |
| 16 | IRELAND |
| 17 | BELGIUM |
| 18 | UNITED KINGDOM (UK) |
| 19 | ICELAND |
| 20 | FRANCE |
| 21 | HONG KONG (SAR of China) |
| 22 | ESTONIA |
| 23 | ISRAEL |
| 24 | CZECH REPUBLIC |
| 25 | PORTUGAL |
| 26 | CHILE |
| 27 | SOUTH AFRICA |
| 28 | SLOVAKIA |
| 29 | SPAIN |
| 30 | POLAND |
| 31 | UNITED ARAB EMIRATES |
| 32 | QATAR |
| 33 | MAURITIUS |
| 34 | KOREA, REP |
| 35 | URUGUAY |
| 36 | SLOVENIA |
| 37 | ITALY |
| 38 | HUNGARY |
| 39 | JAMAICA |
| 40 | LITHUANIA |
| 41 | PANAMA |
| 42 | MALAYSIA |
| 43 | COSTA RICA |
| 44 | RWANDA |
| 45 | CYPRUS |
| 46 | BAHREIN |
| 47 | LATVIA |
| 48 | TRINIDAD AND TOBAGO |
| 49 | COLOMBIA |
| 50 | BOTSWANA |
| 51 | GREECE |
| 52 | CHINA |
| 53 | JORDAN |
| 54 | BRAZIL |
| 55 | ROMANIA |
| 56 | OMAN |
| 57 | TURKEY |
| 58 | SAUDI ARABIA |
| 59 | DOMINICAN REPUBLIC |
| 60 | GUATEMALA |
| 61 | BULGARIA |
| 62 | KUWAIT |
| 63 | CROATIA |
| 64 | INDIA |
| 65 | INDONESIA |
| 66 | MOROCCO |
| 67 | GHANA |
| 68 | PERU |
| 69 | MEXICO |
| 70 | THAILAND |
| 71 | EL SALVADOR |
| 72 | SRI LANKA |
| 73 | ECUADOR |
| 74 | ARGENTINA |
| 75 | PHILIPPINES |
| 76 | NEPAL |
| 77 | VIETNAM |
| 78 | HONDURAS |
| 79 | UGANDA |
| 80 | SENEGAL |
| 81 | LIBERIA |
| 82 | MACEDONIA, FYR |
| 83 | GEORGIA |
| 84 | RUSSIA |
| 85 | KAZAKHSTAN |
| 86 | MOZAMBIQUE |
| 87 | KENYA |
| 88 | TUNISIA |
| 89 | MALI |
| 90 | SERBIA |
| 91 | TANZANIA, UNITED REPUBLIC OF |
| 92 | ARMENIA |
| 93 | PARAGUAY |
| 94 | ETHIOPIA |
| 95 | MALAWI |
| 96 | CÔTE D'IVOIRE |
| 97 | BENIN |
| 98 | MADAGASCAR |
| 99 | BOLIVIA |
| 100 | ZAMBIA |
| 101 | AZERBAIJAN |
| 102 | GABON |
| 103 | BOSNIA AND HERZEGOVINA |
| 104 | UKRAINE |
| 105 | CAMEROON |
| 106 | SIERRA LEONE |
| 107 | NICARAGUA |
| 108 | IRAN |
| 109 | LEBANON |
| 110 | ALBANIA |
| 111 | EGYPT |
| 112 | ZIMBABWE |
| 113 | VENEZUELA, BOLIVARIAN REPUBLIC OF |
| 114 | ALGERIA |
| 115 | MAURITANIA |
| 116 | MOLDOVA |
| 117 | CHAD |
| 118 | BURUNDI |
| 119 | NIGERIA |
| 120 | PAKISTAN |
| 121 | CONGO, DEM. REP. |
| 122 | BANGLADESH |
| 123 | YEMEN, REP. |

## Fig. 17b. GE-2017 Scores & Rankings

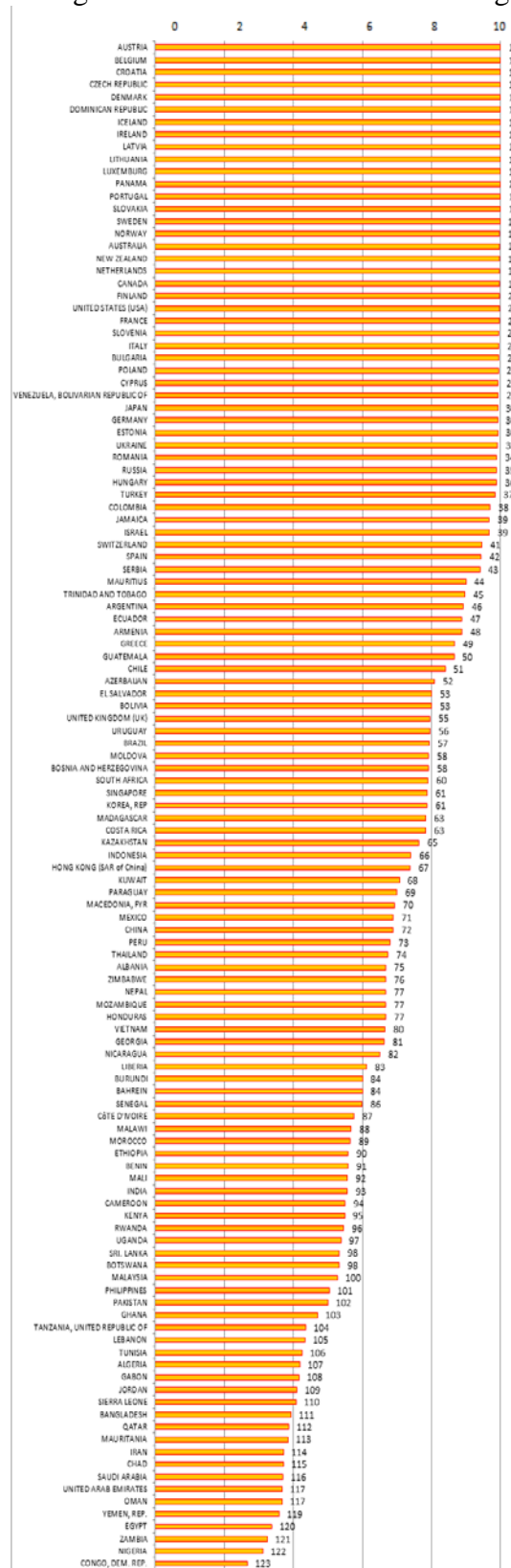| Country | Rank |
|---|---|
| AUSTRIA | 1 |
| BELGIUM | 1 |
| CROATIA | 1 |
| CZECH REPUBLIC | 1 |
| DENMARK | 1 |
| DOMINICAN REPUBLIC | 1 |
| ICELAND | 1 |
| IRELAND | 1 |
| LATVIA | 1 |
| LITHUANIA | 1 |
| LUXEMBURG | 1 |
| PANAMA | 1 |
| PORTUGAL | 1 |
| SLOVAKIA | 1 |
| SWEDEN | 15 |
| NORWAY | 16 |
| AUSTRALIA | 16 |
| NEW ZEALAND | 18 |
| NETHERLANDS | 18 |
| CANADA | 18 |
| FINLAND | 21 |
| UNITED STATES (USA) | 21 |
| FRANCE | 22 |
| SLOVENIA | 24 |
| ITALY | 24 |
| BULGARIA | 26 |
| POLAND | 27 |
| CYPRUS | 28 |
| VENEZUELA, BOLIVARIAN REPUBLIC OF | 29 |
| JAPAN | 30 |
| GERMANY | 30 |
| ESTONIA | 30 |
| UKRAINE | 33 |
| ROMANIA | 34 |
| RUSSIA | 35 |
| HUNGARY | 36 |
| TURKEY | 37 |
| COLOMBIA | 38 |
| JAMAICA | 39 |
| ISRAEL | 39 |
| SWITZERLAND | 41 |
| SPAIN | 42 |
| SERBIA | 43 |
| MAURITIUS | 44 |
| TRINIDAD AND TOBAGO | 45 |
| ARGENTINA | 46 |
| ECUADOR | 47 |
| ARMENIA | 48 |
| GREECE | 49 |
| GUATEMALA | 50 |
| CHILE | 51 |
| AZERBAIJAN | 52 |
| EL SALVADOR | 53 |
| BOLIVIA | 53 |
| UNITED KINGDOM (UK) | 55 |
| URUGUAY | 56 |
| BRAZIL | 57 |
| MOLDOVA | 58 |
| BOSNIA AND HERZEGOVINA | 58 |
| SOUTH AFRICA | 60 |
| SINGAPORE | 61 |
| KOREA, REP | 61 |
| MADAGASCAR | 63 |
| COSTA RICA | 63 |
| KAZAKHSTAN | 65 |
| INDONESIA | 66 |
| HONG KONG (SAR of China) | 67 |
| KUWAIT | 68 |
| PARAGUAY | 69 |
| MACEDONIA, FYR | 70 |
| MEXICO | 71 |
| CHINA | 72 |
| PERU | 73 |
| THAILAND | 74 |
| ALBANIA | 75 |
| ZIMBABWE | 76 |
| NEPAL | 77 |
| MOZAMBIQUE | 77 |
| HONDURAS | 77 |
| VIETNAM | 80 |
| GEORGIA | 81 |
| NICARAGUA | 82 |
| LIBERIA | 83 |
| BURUNDI | 84 |
| BAHREIN | 84 |
| SENEGAL | 86 |
| CÔTE D'IVOIRE | 87 |
| MALAWI | 88 |
| MOROCCO | 89 |
| ETHIOPIA | 90 |
| BENIN | 91 |
| MALI | 92 |
| INDIA | 93 |
| CAMEROON | 94 |
| KENYA | 95 |
| RWANDA | 96 |
| UGANDA | 97 |
| SRI LANKA | 98 |
| BOTSWANA | 98 |
| MALAYSIA | 100 |
| PHILIPPINES | 101 |
| PAKISTAN | 102 |
| GHANA | 103 |
| TANZANIA, UNITED REPUBLIC OF | 104 |
| LEBANON | 105 |
| TUNISIA | 106 |
| ALGERIA | 107 |
| GABON | 108 |
| JORDAN | 109 |
| SIERRA LEONE | 110 |
| BANGLADESH | 111 |
| QATAR | 112 |
| MAURITANIA | 113 |
| IRAN | 114 |
| CHAD | 115 |
| SAUDI ARABIA | 116 |
| UNITED ARAB EMIRATES | 117 |
| OMAN | 117 |
| YEMEN, REP | 119 |
| EGYPT | 120 |
| ZAMBIA | 121 |
| NIGERIA | 122 |
| CONGO, DEM. REP. | 123 |

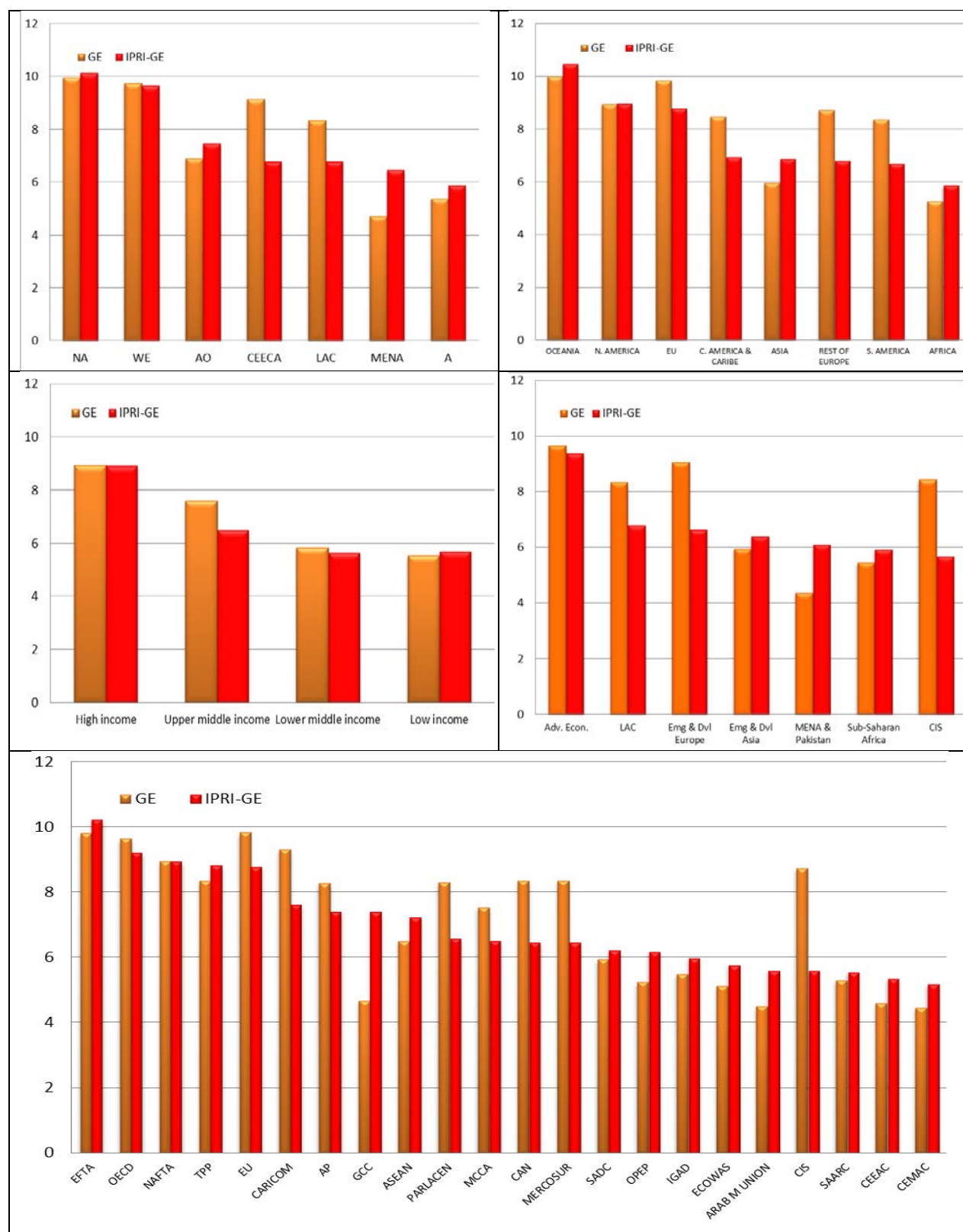Figure18. GE and IPRI-GE 2017. Groups of countries

Table 8 shows the IPRI-GE 2017 rankings by quintile for the 123 countries in our sample. As in the IPRI, the number of countries belonging to each quintile increases from the top 20% to the bottom 20% (1st quintile 17 countries, 2$^{nd}$ quintile 20 countries, 3$^{rd}$ quintile 24 countries, 4$^{th}$ quintile 28 countries and 5th quintile 34 countries). Hence, the forth and the fifth quintiles include 50.4% of the countries (62 countries) of the sample.

Table 8. IPRI-GE 2017 Ranking by quintiles

| Top 20 % | 2nd Quintile | 3rd Quintile | 4th Quintile | Bottom 20 % |
|---|---|---|---|---|
| NEW ZEALAND | UNITED KINGDOM | HUNGARY | KUWAIT | SERBIA |
| FINLAND | ICELAND | JAMAICA | CROATIA | TANZANIA, UNITED REP. OF |
| SWEDEN | FRANCE | LITHUANIA | INDIA | ARMENIA |
| NORWAY | HONG KONG | PANAMA | INDONESIA | PARAGUAY |
| LUXEMBURG | ESTONIA | MALAYSIA | MOROCCO | ETHIOPIA |
| SWITZERLAND | ISRAEL | COSTA RICA | GHANA | MALAWI |
| JAPAN | CZECH REP. | RWANDA | PERU | CÔTE D'IVOIRE |
| NETHERLANDS | PORTUGAL | CYPRUS | MEXICO | BENIN |
| AUSTRALIA | CHILE | BAHREIN | THAILAND | MADAGASCAR |
| CANADA | SOUTH AFRICA | LATVIA | EL SALVADOR | BOLIVIA |
| DENMARK | SLOVAKIA | TRINIDAD & TOBAGO | SRI LANKA | ZAMBIA |
| UNITED STATES | SPAIN | COLOMBIA | ECUADOR | AZERBAIJAN |
| AUSTRIA | POLAND | BOTSWANA | ARGENTINA | GABON |
| GERMANY | UNITED ARAB EMIRATES | GREECE | PHILIPPINES | BOSNIA & HERZEGOVINA |
| SINGAPORE | QATAR | CHINA | NEPAL | UKRAINE |
| IRELAND | MAURITIUS | JORDAN | VIETNAM | CAMEROON |
| BELGIUM | KOREA, REP | BRAZIL | HONDURAS | SIERRA LEONE |
| | URUGUAY | ROMANIA | UGANDA | NICARAGUA |
| | SLOVENIA | OMAN | SENEGAL | IRAN |
| | ITALY | TURKEY | LIBERIA | LEBANON |
| | | SAUDI ARABIA | MACEDONIA, FYR | ALBANIA |
| | | DOMINICAN REP. | GEORGIA | EGYPT |
| | | GUATEMALA | RUSSIA | ZIMBABWE |
| | | BULGARIA | KAZAKHSTAN | VENEZUELA, BOL. REP. OF |
| | | | MOZAMBIQUE | ALGERIA |
| | | | KENYA | MAURITANIA |
| | | | TUNISIA | MOLDOVA |
| | | | MALI | CHAD |
| | | | | BURUNDI |
| | | | | NIGERIA |
| | | | | PAKISTAN |
| | | | | CONGO, DEM. REP. |
| | | | | BANGLADESH |
| | | | | YEMEN, REP. |

Strongest

Weakest

## VII.   IPRI and Development

The notion of development in its evolution has widened by incorporating dimensions and perspectives, weaving them into a multidimensional concept that nowadays includes economic, political, social, cultural, technological and ecological dimensions, for contemporaneous and future generations. Simultaneously, macro aggregates made way for micro details; the preponderance of averages demanded attention to deviations; quantitative indices were complemented with qualitative indicators; and objective evaluations gave up under subjective perceptions. Consequently, we have moved from those vertical plans to achieve 'progress' as a result, to open alternatives for expanding opportunities that allow individuals to achieve their goals in freedom.

This way, ethics is central to the analysis of the complexities of human social development, having received important theoretical contributions this century from Amartya Sen (1999)[15] and Marta Nussbaum (2011).[16] The body of work created by Sen and Nussbaum define development as the increase of human capabilities to achieve 'development as freedom,' providing a normative philosophical foundation for a theory of human rights, an essential requirement for a dignified life with social justice. According to them, 'capability' or 'substantial freedom' is the essential element of development. The central players in their model are human beings, how they assess their quality of life, and how they are able to make proactive efforts to improve their wellbeing. From this perspective, development does not refer to goods or services to which people have access, but rather to their ability to accomplish their goals in life. Therefore, the expansion of freedom is central to this approach (Levy-Carciente, S. *et al*. 2014)[17]

With this in mind, and given the extensive literature that informs the important interactions between property rights and development, we analyzed in this edition different dimensions of development with the IPRI and its components, as follows:

- Economic outcomes

- Liberties

- Human Capabilities

- Social Capital

- Research and Innovation

- Ecological performance

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[15] Sen, Amartya. 1999. *Development as Freedom*. Oxford: Oxford University Press.

[16] Nussbaum, Martha C. 2011. *Creating Capabilities: The Human Development Approach*. Cambridge: Harvard University Press

[17] Levy-Carciente, Sary *et al*. 2014. "From Progress to Happiness: Measurements for Latin America". *Social Change Review*, Summer 2014, Vol. 12(1): 73-112. DOI: 10.2478/scr-2014-0004
     .

## VII.1. Economic Outcomes

Economic outcomes, obviously do not capture each factor of development. Many other factors are likely to influence it, however it is a first approach to it. Four economic elements are considered to evaluate the correlations with the IPRI and its components (for source details see Appendix IV):

- Production: using the Gross Domestic Product (GDP) in constant USD in *per capita* terms and also adjusted by the Gini coefficient. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.

  The Gini coefficient is a statistical measure of the degree of variation represented in a set of values. When adjusting the GDP it captures income inequality (Source: World Bank).

- Domestic Investment: using the Gross Capital Formation in current *per capita* terms, which consists of outlays on addition to the fixed assets of the economy plus net changes in the level of inventories (Source: World Bank).

- Composition of production: using the Index by the Atlas of Economic Complexity. The complexity of an economy is related to the multiplicity of useful knowledge embedded in it. We can measure economic complexity by the mix of products that countries are able to make. (Source: The Observatory of Economic Complexity, MIT).

- Entrepreneurship ecosystem: using the Global Entrepreneurship Index of GEDI that measures the health of the entrepreneurship ecosystems in countries. It then ranks the performance of these countries against each other; providing a picture of how each of them performs in both the domestic and international context. (Source: The Global Entrepreneurship and Development Institute)

Then we used the Pearson Correlation Coefficient, which is a measure of the linear dependence between two variables, to evaluate their correlations with the IPRI and its components. Most of the correlations[18] found were significant and positively strong (see Table 9). We consider the following tranches or correlation ranges: None [0], Weak (0 - 0.3), Medium [0.3 - 0.5], Important [0.5 - 0.6), Good [0.6 - 0.8), Strong [0.8 – 1), Perfect [1].

GDP *per capita* correlations increased when it was adjusted by the Gini Coefficient, which is a measure of dispersion or inequality, giving to the GDP per capita a more adjusted measure in each country. This situation is valid for the IPRI and also for its components. The highest correlation was found for the IPRI and the adjusted GDP *per capita* (0.8392) followed by the IPR and the adjusted GDP *per capita* (0.8344) and the LP and the adjusted GDP *per capita* (0.8255).

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[18]Correlation theory is aimed to show the possible relationship, association or dependence between two or more observed variables. Besides it allows for the analysis of the type of association (direct or indirect) and the level or degree of intensity between them.

| | Table 9. Pearson Correlation Coefficient | | | |
|---|---|---|---|---|---|
| | | IPRI | LP | PPR | IPR |
| Production | GDP *per capita* (constant 2010 USD) | 0.8137 | 0.8214 | 0.6298 | 0.7875 |
| | GDP *per capita* * GINI (constant 2010 USD) | 0.8392 | 0.8255 | 0.6585 | 0.8344 |
| Investment | Gross Capital Formation *per capita* (current USD) | 0.7636 | 0.7672 | 0.6354 | 0.7073 |
| Comp. Prod. | Economic Complexity | 0.7204 | 0.7207 | 0.5137 | 0.7439 |
| Entrepreneurship | Global Entrepreneurship | 0.8781 | 0.8861 | 0.6903 | 0.8402 |

The relationship with domestic investments (Gross Capital Formation), showed for the LP a Pearson's of 0.7672 followed by the IPRI (0.7636), the IPR (0.7073) and the PPR (0.6354) component.

Domestic production composition (Economic Complexity) exhibited also a high Pearson's fit, IPR being the strongest with (0.7439), followed by the LP (0.7207), the IPRI (0.7204) and the PPR (0.5137) component.

Of all the items, the entrepreneurial environment was the one with the highest correlations in this order: LP (0.8861), IPRI (0.8781), IPR (0.8402) and PPR (0.6903). This finding points to entrepreneurship as a building block of innovation, investment, production and economic growth.

Figure 20 reports that, on average, countries in the top quintile of IPRI scores (i.e. top 20%) show a *per capita* income almost 13 times that of the countries in the bottom quintile. Even though it is an important disparity, it has improved in time as in 2016 that inequality was almost 21 times and in 2015 almost 24 times. Statistics are based on the averages of IPRI-2017 scores and corresponding data on average GDP *per capita* in USD constant terms (2010=100, source: World Bank data) for the last available year.

These results reinforce the significant and positive relationship between prosperity and a property rights system, measured at an individual level. The statistical dispersion of the GDP distribution in each country was considered in this analysis using the GINI coefficient, which improved the correlations.

Figures 19a an 19b display the best fit curve for the IPRI and its components with each economic variable and the coefficients of determination[19] ($R^2$). Figure 19a displays the relationship IPRI-economic outcomes showing countries with a population indicator. This reflects the huge proportion of population (represented by the radius of each circle) living in countries of middle level of IPRI and low to mid economic outcomes.

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[19]The coefficient of determination ($R^2$) is a key output of the regression analysis. It is interpreted as the proportion of the variance in the dependent variable that is predictable from the independent variable. It ranges from 0 to 1.

Figure 19a. IPRI Correlations with economic outcomes variables (with population information)
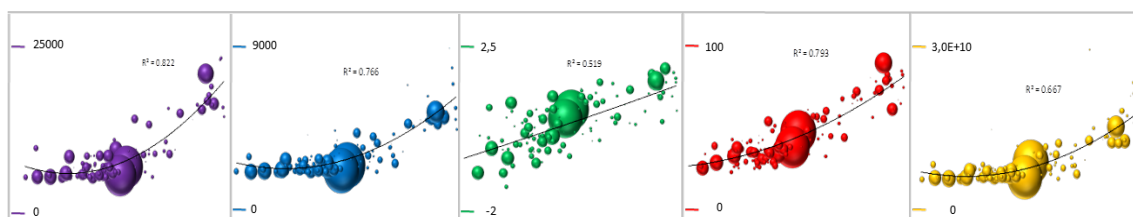


Legend

● IPRI vs GDP per capita * Gini (GDP-Gini)

● IPRI vs GDP per capita (GDP)

● IPRI vs Econ. Complexity (EC)

● IPRI vs  Global Entrepreneurship Index (GEI)

● IPRI vs Gross capital formation *per capita* (GKFpc)

**More People**

Figure 19b. IPRI components correlations with economic variables
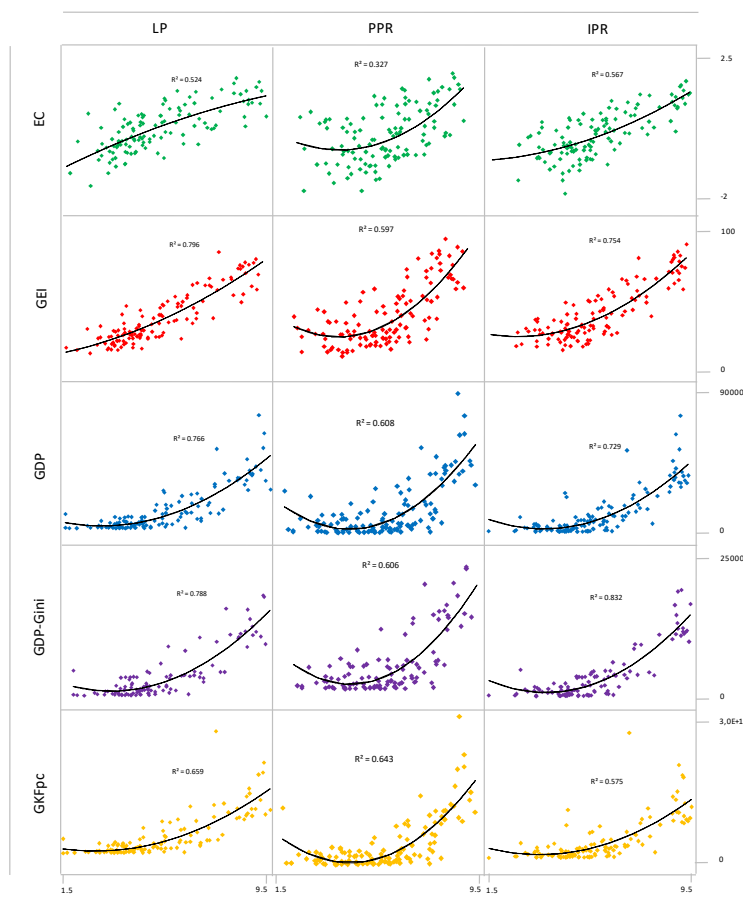


◆ IPRI Components vs Economic Complexity  (EC)

◆ IPRI Components vs Global Entrepreneurship Index (GEI)

◆ IPRI Components  vs GDP per capita (GDP)

◆ IPRI Components vs GDP per capita * Gini (GDP-Gini)

◆ IPRI Components  vs Gross capital formation per capita (GKFpc)

Figure 20: Average *per capita* Income by IPRI Quintiles
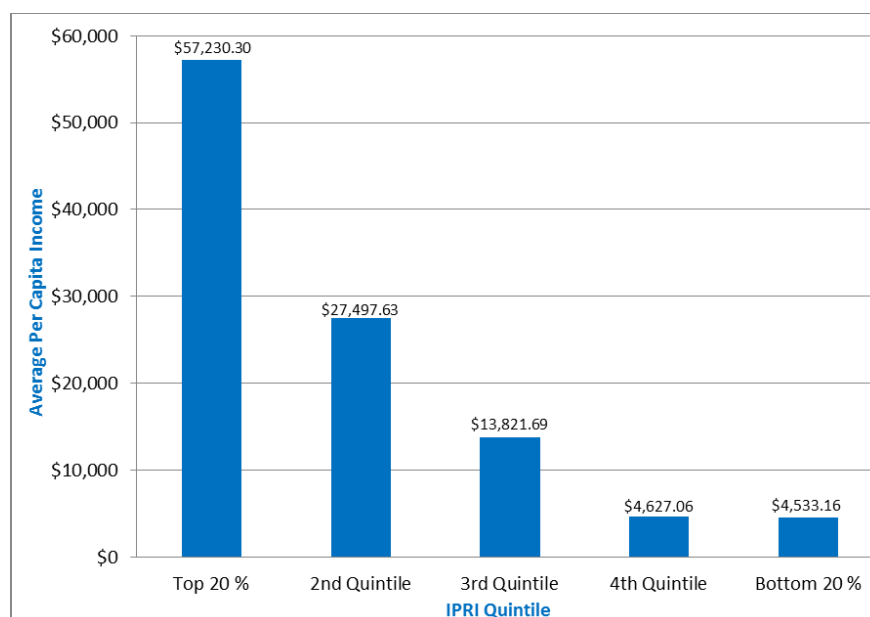


## VII.2. Liberties

Approaches such as human development, sustainable development, systemic competitiveness and the new institutional economics are valuable contributions to a development perspective that - following Heilbroner & Milberg[20] – exposes the explicit indissoluble links between the economy and the underlying social order, relativizing its position, and recognizing that while development is possible, it is far from inevitable and may even be a reversible process.

Today, the reference paradigm is the one summarized as 'development as freedom', based on capabilities and opportunities, not on results. Under this new approach political, environmental and cultural dimensions, as well as subjective assessments are added to the traditional dimensions – such as technology and socioeconomics. Development as the increase of capabilities and opportunities becomes indissoluble from democracy and the republican condition of citizenship, valuing human rights, environmental sustainability, technological advance, emotions and cultures.

Through this perspective, the person moves from being a passive agent of decision-making and information reception to a genuine agent of change. These agents will be more active to the extent that they gain access to data and technology, and enjoy the guarantees for the free exercise of their freedoms in a given legal framework: A rule of law in which freedom has the unavoidable counterpart of responsibility.

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[20] Heilbroner, R., & W. Milberg. 1998. *La crisis de visión en el pensamiento económico moderno*. Barcelona: Paidós

To understand the relevance of liberties for development, the following elements were evaluated with the IPRI and its components:

- Economic Freedom, using two indices: the Index of Economic Freedom (IEF) by The Heritage Foundation and the Economic Freedom of the World Index, EFW, by Fraser Institute.

  IEF documents the positive relationship between economic freedom and a variety of positive social and economic goals. The ideals of economic freedom are strongly associated with healthier societies, cleaner environments, greater *per capita* wealth, human development, democracy and poverty elimination. (http://www.heritage.org/index/about). It is composed of 10 economic freedoms, within 4 categories: [1] Rule of Law (property rights, freedom from corruption); [2] Limited Government (fiscal freedom, government spending); [3] Regulatory Efficiency (business freedom, labor freedom, monetary freedom); and [4] Open Markets (trade freedom, investment freedom, and financial freedom). The IEF considers every component equally important in achieving the positive benefits of economic freedom. Each freedom is weighted equally in determining country scores

  EFW measures the degree to which the policies and institutions of countries are supportive of economic freedom. In recent years, social scientists have focused on the identification and measurement of the impact of economic, political, legal, and cultural factors in the growth and development of economies. The EFW data set provides a comprehensive measure of the degree to which countries rely on voluntary exchange and market institutions to allocate resources. It has five dimensions: [1] Size of Government; [2] Legal System and Security of Property Rights; [3] Sound Money; [4] Freedom to Trade Internationally, and [5] Regulation. The EFW index covers 157 countries with data available for approximately 100 countries back to 1980. This data set enables scholars to analyze the impact of both cross-country differences in economic freedom and changes in that freedom across a time frame of more than three decades. (http://www.freetheworld.com/).

- Political Freedom, using the Political Rights dimension of the Freedom in the World Index, FW, by the U.S.-based non-governmental organization Freedom House.

  FW assesses the real-world rights and freedoms enjoyed by individuals, rather than governments or government performance per se. It is a result of a yearly survey that reports the degree of civil liberties and political rights in every nation and significant disputed territories around the world. It produces annual scores representing the levels of political rights and civil liberties in each state and territory, on a scale from 1 (most free) to 7 (least free). Depending on the ratings, the nations are then classified as "Free", "Partly Free", or "Not Free". (https://freedomhouse.org/report-types/freedom-world). It has two dimensions: Political Rights and Civil Liberties.

  In its Political Rights Dimension countries and territories with a rating of 1 enjoy a wide range of political rights, including free and fair elections. Candidates who are elected actually rule, political parties are competitive, the opposition plays an important role and enjoys real power, lastly, the interests of minority groups are well represented in politics and government. On the opposite, countries and territories with a rating of 7 have few or no political rights because of severe government oppression, sometimes in combination with civil war. They may also lack an authoritative and functioning central government and suffer from extreme violence or rule by regional warlords.

- Civil Freedom: using the Civil Liberties Dimension of the Freedom in the World Index by the U.S.-based non-governmental organization Freedom House.

  In the Civil Liberties Dimension countries and territories with a rating of 1 enjoy a wide range of civil liberties, including freedoms of expression, assembly, association, education, and religion; they have an established and generally fair legal system that ensures the rule of law (including an independent judiciary), allow free economic activity, and tend to strive for equality of opportunity for everyone, including women and minority groups. At the other end, countries and territories with a rating of 7 have few or no civil liberties. They allow virtually no freedom of expression or association, do not protect the rights of detainees and prisoners, and often control or dominate most economic activity

  The gap between political rights and civil liberties ratings is rarely more than two points. Politically oppressive states typically do not allow a well-developed civil society, for example, and it is difficult, if not impossible, to maintain political freedoms in the absence of civil liberties like press freedom and the rule of law.

- Absence of coercion: using The Human Freedom Index, HFI (by Cato, Fraser and Visio Institute. https://www.cato.org/human-freedom-index)

  HFI presents a broad measure of human freedom, understood as the absence of coercive constraint (based on the "negative" definition of freedom that prevents individuals from acting as they might wish), which includes economic freedom. It suggests that freedom plays an important role in human well-being, and offers opportunities for further research into the complex ways in which freedom influences, and can be influenced by, political regimes, economic development, and the whole range of indicators of human well-being. The index uses 76 distinct indicators gathered in two dimensions: personal (34) and economic (42) freedom, distributed in the following areas: [1] Rule of Law; [2] Security and Safety; [3] Movement; [4] Religion; [5] Association, Assembly, and Civil Society; [6] Expression; [7] Relationships; [8] Size of Government; [9] Legal System and Property Rights; [10] Access to Sound Money; [11] Freedom to Trade Internationally and [12] Regulation of Credit, Labor, and Business.

- Connectivity: using The Networked Readiness Index, NRI, by The World Economic Forum, INSEAD.

  NRI measures the propensity for countries to exploit the opportunities offered by information and communications technology (ICT). The report is regarded as the most authoritative and comprehensive assessment of how ICT impacts the competitiveness and well-being of nations (http://reports.weforum.org/global-information-technology-report-2015). It is a composite index made up of four main categories (sub-indexes), 10 subcategories (pillars), and 53 individual indicators, as follows: [1] Environment (Political and regulatory environment (9 indicators) and Business and innovation environment (9 indicators)); [2] Readiness (Infrastructure (4 indicators); Affordability (3 indicators) and Skills (4 indicators)); [3] Usage (Individual usage (7 indicators); Business usage (6 indicators) and Government usage (3 indicators)) and [4] Impact (Economic impacts (4 indicators) and Social impacts (4 indicators)).

We found significant, positive and important to strong correlations between IPRI and its components with previous indices (Table 10). The strongest Pearson's coefficient was with NRI, the closest fit with LP (0.881), followed by the IPRI itself (0.857), IPR (0.812) and PPR (0.678). The next closest score was the IEF, with good to strong correlations, then the HFI, EFW, FW-Civil Dimension and FW-Political Dimension. In all of these indices the highest correlations were with the LP component, followed by the IPRI itself, then IPR and finally the PPR component. PPR displays medium levels of correlations with HFI and FW. These results could be also seen in Figures 21a and 21b.

Political Freedom variables – Political Rights and Civil Liberties of the Freedom of the World Index by Freedom House are composed of numerical ratings running from 1-7[21], this way it could be considered a discrete item, therefore, it is not appropriate to evaluate correlations mathematically (Pearson's correlation) as they generate tremendous dispersions and a correlation bias. However, this does not prevent conjectures based on their behavior related to the IPRI. In Figures 21a and 21b, the dot cloud generated by combining both measurements can be seen. In that sense, without having a mathematical measure of its correlation, a general positive linear relationship can be observed between political rights and civil liberties with property rights.

| Table 10. Pearson's Correlation Coefficients | | | | |
|---|---|---|---|---|
| | Economic | | Abs. Coercion | Connectivity |
| | IEF | EFW | HFI | NRI |
| IPRI | 0.768 | 0.675 | 0.732 | 0.857 |
| LP | 0.812 | 0.722 | 0.792 | 0.881 |
| PPR | 0.633 | 0.576 | 0.499 | 0.678 |
| IPR | 0.669 | 0.565 | 0.708 | 0.812 |

Figure 21a. IPRI Correlations with Freedom measures (with population information)

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[21] These variables run in opposite direction of the IPRI. For this reason their direction were adjusted.
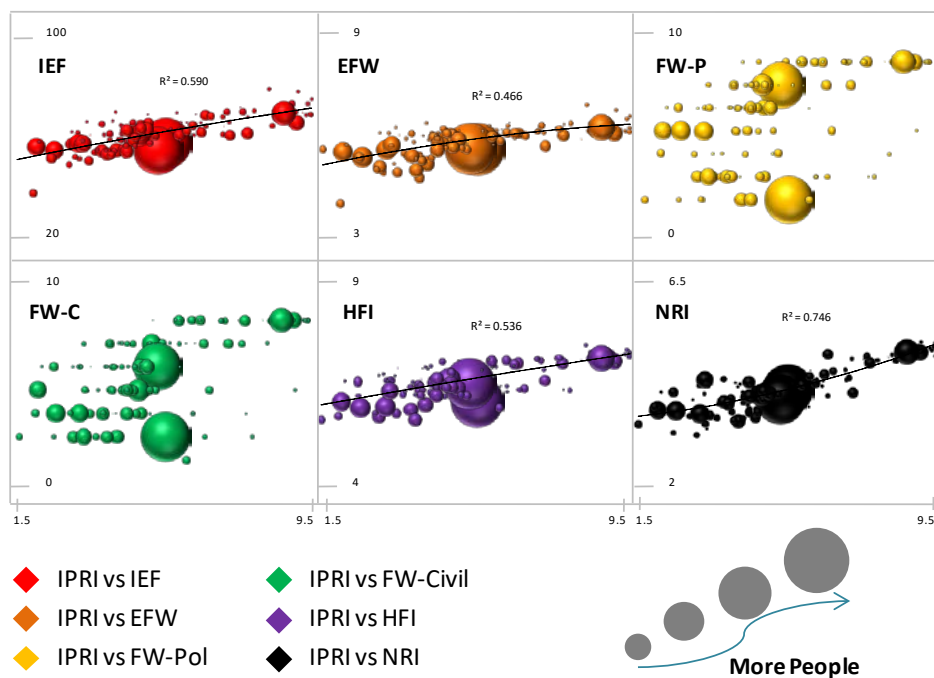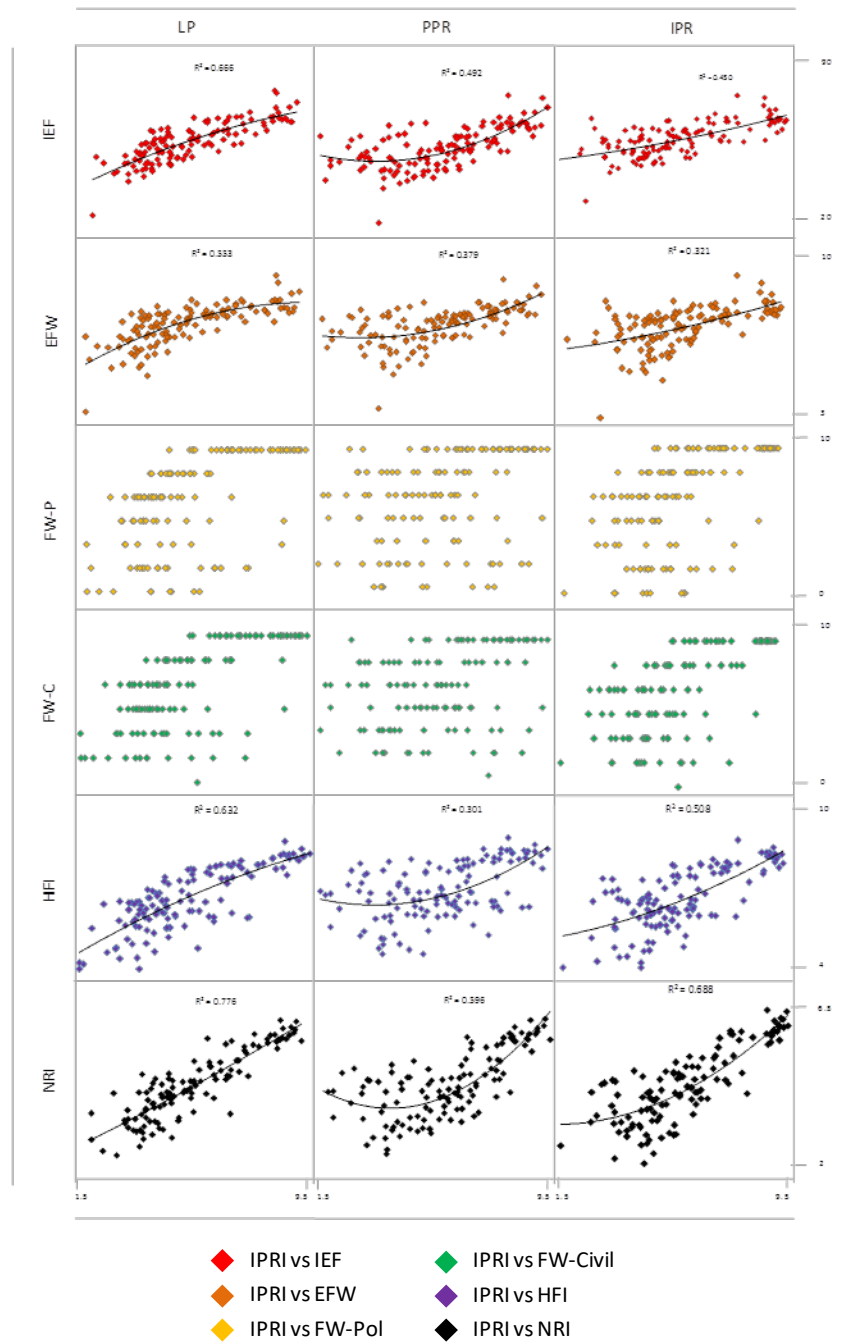
Figure 21b. IPRI components correlations with freedom indices

## VII.3. Human Capabilities

The pivotal element of the development equation is the people, and consequently their capabilities. For this dimension two elements were considered for evaluation:

- Current condition: using the Human Development Index (UNDP, http://hdr.undp.org/en/data) which has three dimensions: long and healthy life, being knowledgeable and a decent standard of living.

- Future potential: using the Global Index on Freedom of Education, which includes a set of data on international scale analyzing the protection and promotion of this fundamental human right, as well as policies in support of freedom of education in the national context and in other countries. The indicators focus on: freedom of choice for children's education (constitutional and legislative requirements, public schools, home schooling); public support for freedom of education (family vouchers, direct support for schools, teachers' wages, costs of structures and buildings etc.); NET (Net Enrolment Rate): the participation rate in a certain stage of children's and young people's education; Rate of students' participation in comprehensive schools (http://www.novaeterrae.eu/en/).

| | Table 11. Pearson's Correlation Coefficients | |
|---|---|---|
| | Current | Future |
| | HDI | GIFE |
| IPRI | 0.679 | 0.605 |
| LP | 0.738 | 0.590 |
| PPR | 0.477 | 0.477 |
| IPR | 0.638 | 0.610 |

Figure 22. IPRI Correlations with human capabilities variables
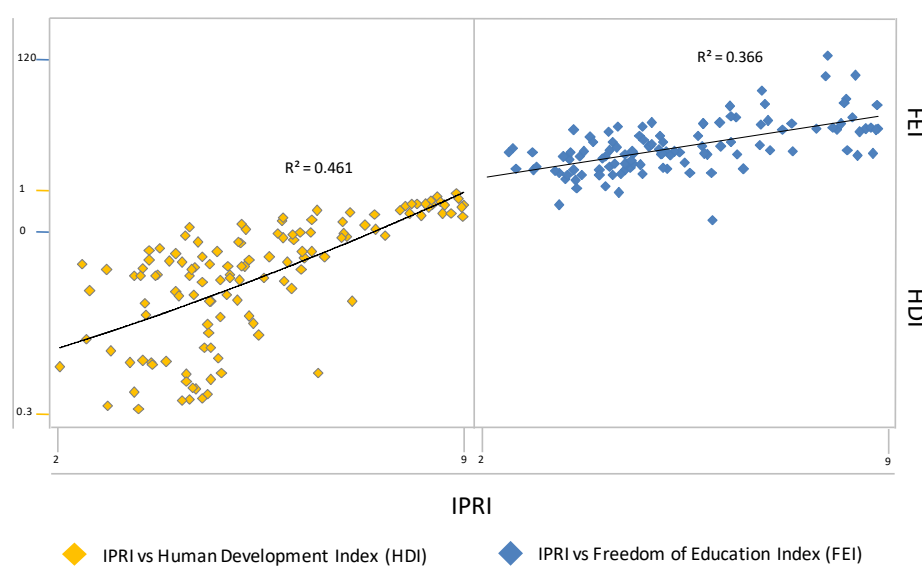
The correlations found were significant and positive, they ranged from medium to good fits (See Table 11). The HDI showed higher correlations than the GIFE; and while the first is higher for LP (0.738) and followed by IPRI (0.679) and IPR (0.638), the GIFE is higher for IPR (0.610), as creative capabilities will be enhanced by the enjoyment of freedoms and for guarantees on intellectual property rights, followed by IPRI (0.605) and LP (0.59). The best fit curve for the indices and the coefficient of determinations is shown in Figure 22.

## VII.4. Social Capital

Social capital has different definitions: it is understood as the network of relationships among people who live and work in a particular society, enabling that society to function effectively; or to undertake collective social action. Social capital is built upon trust, reciprocity, cooperation, assistance, support, interdependence, interaction, dialogue, involvement and participation (Jaffé, Levy-Carciente & Zanoni, 2007).[22] Given the importance of having people as the axis around which the development concept and policies should rotate the Social Capital sub-index of the Prosperity Index by Legatum (http://www.li.com) and a group of variables from the International Institute of Social Studies (http://www.indsocdev.org) were used to assess the relationship between social capital and the IPRI:

- Social Capital component of the Prosperity Index, by Legatum: this sub-index measures a country's performance in two areas: social cohesion and engagement, and community and family networks. Variables: perceptions of social support, volunteering rates, helping strangers, charitable donations, social trust, marriage and religious attendance.

- Civic activism: refers to the social norms, organizations, and practices which facilitate greater citizen involvement in public policies and decisions. These include access to civic associations, participation in the media, and the means to participate in civic activities such as nonviolent demonstrations or petitions.

- Intergroup cohesion: refers to relationships of cooperation and respect between identity groups in a society. When this closeness breaks down, the potential arises for conflict such as killings based on ethnicity, religion, or race, motivated killings, targeted assassinations and kidnappings, acts of terror such as public bombings or shootings, or riots involving grievous bodily harm to citizens, with concomitant effects upon growth and development.

- Interpersonal safety and trust: Interpersonal norms of trust and security exist to the extent that individuals in a society feel they can rely on those whom they have not met before. Where this is the case, the costs of social organization and collective action are reduced. Where these norms do not exist, or have been eroded over time, it becomes more difficult for individuals to form group associations, undertake an enterprise, and live safely and securely.

- Inclusion of minorities: measures levels of discrimination against vulnerable groups such as indigenous peoples, migrants, refugees, or lower caste groups. This measure focuses upon

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[22] Jaffé, K.; S. Levy-Carciente; W. Zanoni. 2007. "The Economic Limits of Trust: The Case of Latin-American Urban Informal Commerce Sector" *Journal of Developmental Entrepreneurship*, Vol. 12, Sep(3):339-35.

whether there is systemic bias among managers, administrators, and members of the community in the allocation of jobs, benefits, and other social and economic resources regarding particular social groups.

We evaluated their correlation with the IPRI and its components (see Table 12 and Figure 23) and the strongest correlations were found between Civic Activism and the IPR (0.8098) followed by the IPRI (0.8013) and the LP (0.7995). The Social Capital component of the Prosperity Index by Legatum showed good correlations with the IPRI (0.747), LP (0.711), PPR (0.694) and the IPR (0.685). Interpersonal Safety & Trust, Inclusion of Minorities and Intergroup Cohesion displayed good correlations (0.6-0.8), especially with LP and IPRI.

| | Table 12. Pearson's Correlation Coefficients | | | | |
|---|---|---|---|---|---|
| | | IPRI | LP | PPR | IPR |
| Social Capital | Social Capital component (Prosperity Index) | 0.7471 | 0.7108 | 0.6936 | 0.6854 |
| | Civic Activism | 0.8013 | 0.7995 | 0.6050 | 0.8098 |
| | Intergroup Cohesion | 0.5645 | 0.6312 | 0.3935 | 0.5233 |
| | Interpersonal Safety & Trust | 0.6555 | 0.7120 | 0.4976 | 0.5951 |
| | Inclusion of Minorities | 0.6347 | 0.6739 | 0.4449 | 0.6181 |

Figure 23. IPRI correlations with social capital

## VII.5. Research and Innovation

In a 'knowledge society' structures and processes of material and symbolic reproduction are so immersed in knowledge operations that information processing, symbolic analysis and expert systems take precedence over other factors like capital and labor. Hence, innovation is a key block in a knowledge society. Using the World Bank data for research and innovation (http://wdi.worldbank.org/) we ran correlations of the IPRI and its component with three items:

- Full time researches *per* million people: professionals engaged in the conception or creation of new knowledge, products, processes, methods, or systems and in the management of the projects concerned. It includes postgraduate PhD students (ISCED97 level 6) engaged in R&D (http://data.worldbank.org/indicator/SP.POP.SCIE.RD.P6).

- Research and development expenditure as % of GDP: Expenditures for R&D are current and capital expenditures (both public and private) on creative work undertaken systematically to increase knowledge, including knowledge of humanity, culture, and society, and the use of knowledge for new applications. R&D covers basic research, applied research, and experimental development (http://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS).

- Scientific and technical journal articles: Number of scientific and engineering articles published in the following fields: physics, biology, chemistry, mathematics, clinical medicine, biomedical research, engineering and technology, and earth and space sciences (http://data.worldbank.org/indicator/IP.JRN.ARTC.SC).

The number of researchers engaged in R&D had the highest correlation, it was with the IPR component (0.796), followed by the IPRI (0.761) and LP (0.752). Then comes the correlation between R&D expenditure and the IPR (0.758), followed by the IPRI (0.685) and LP (0.635). The PPR showed medium correlations with R&D expenditure. The number of published scientific papers showed positive but weak to moderate correlations.

| | | Table 13. Pearson's Correlation Coefficients | | | |
|---|---|---|---|---|---|
| | | IPRI | LP | PPR | IPR |
| Research & Innovation | Researchers in R&D (*per* million people) | 0.7607 | 0.7522 | 0.5528 | 0.796 |
| | Research & development expenditure (% of GDP) | 0.6851 | 0.6349 | 0.4948 | 0.7582 |
| | Scientific and technical journal articles | 0.2646 | 0.1929 | 0.2302 | 0.3164 |

Figure 24. IPRI Correlations with R&D variables



◆ IPRI vs Researchers in R&D (per million people)

◆ IPRI vs Research and development expenditure (% of GDP)
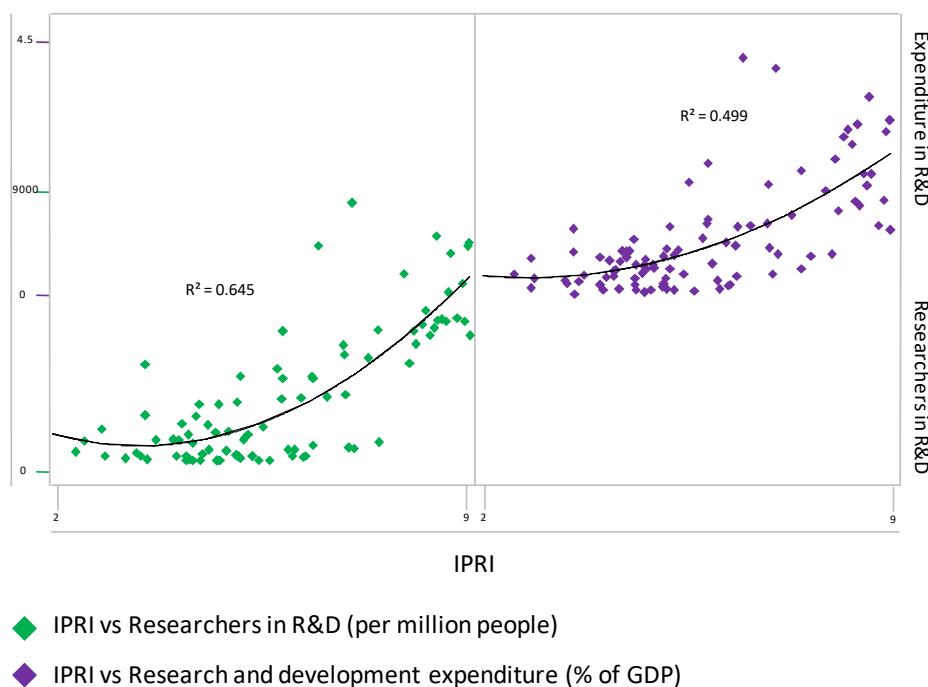
## VII.6. Ecological performance

The ecological environment is decisive for sustainable development. It is referenced in the recent Paris international climate change agreement dealing with greenhouse gases emissions mitigation, adaptation and finance starting in the year 2020. Given ecological performance relevance, we ran correlations of the IPRI with the Environmental Performance Index, developed by Yale University (EPI-Yale):

- The EPI-Yale provides a global view of environmental performance and country by country metrics to inform decision-making. It ranks country performance based on their response to high-priority environmental issues in two areas: protection of human health and protection of ecosystems (http://epi.yale.edu/country-rankings). See Table 14 & Fig. 25.

| Table 14. Pearson's Correlation Coefficient | |
|---|---|
| | EPI-Yale |
| IPRI | 0.5937 |
| LP | 0.6481 |
| PPR | 0.3952 |
| IPR | 0.5740 |

We found important positive correlations among the EPI and IPRI and its components[23] being the strongest with LP (0.648) and the lowest with PPR (0.395). These results may indicate that to the extent that a society has stronger property rights the more capacity it has to apply appropriate policies protecting health and the environment through the conservation and protection of the ecosystem.

Figure 25. IPRI Correlations with ecological measurements



$R^2 = 0.352$

IPRI

EPI

◆ IPRI vs Environmental Performance Index (EPI)

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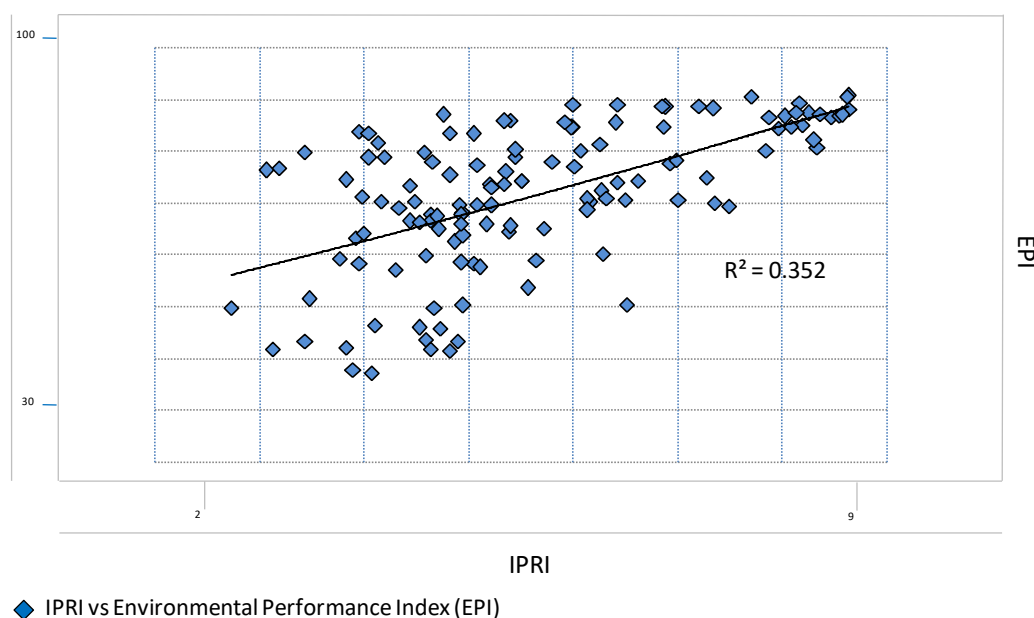
[23] Same result can be found at: http://marketmonetarist.com/2015/12/01/coase-was-right-the-one-graph-version/, following that well defined property rights are the best way to manage economic externalities.

## VIII. IPRI Cluster Analysis

Cluster analysis aims to group similar entities into clusters. It classifies individuals into groups as homogeneous as possible based on observed variables.

The cluster analysis was performed for all 127 countries according to their values in LP, PPR and IPR. Additionally, we included illustrative variables that do not influence the formation of the cluster but will bring an important contribution to describe them[24]. Those variables were the ones we used to calculate correlations (chapter VII), mainly to expose the conditions or features in the resulting clusters.

In order to seize the variability in the analysis -given the great differences among the countries in the IPRI- we used Ward's Method[25] with squared Euclidean distance that groups countries with minimal loss inertia.

In a first moment, a Principal Component Analysis (PCA) was applied with the aim of handling variables by factors, given the high correlation among them. The results of the PCA express that the three components of the IPRI (LP, PPR, IPR) define a dimension, that was called IPRI, which collects 85.90% of the inertia. The second and third factors - with inertias of 9.64% and 4.46% respectively - are the residue of the inertia. These entities do not contribute to the first factor inertia and are generally very close to the origin of the first factor. They could be subdivided into groups more associated to the PPR dimension –defining the second factor – and those more associated to LP and IPR defining the third factor.

Next, we used the mobile centers algorithm to show the inertia within groups and the criteria to decide the optimal number of classes or clusters (see Table 15).

Table 15. Cluster analysis

| Cluster | Inertia | Countries | Distance of Centroids to origin | Coordinates of centroids | | |
|---|---|---|---|---|---|---|
| | | | | Factor 1 | Factor 2 | Factor 3 |
| Inter-classes | 2.24463 | | | | | |
| Intra-classes | | | | | | |
| Class   1 /   3 | 0.42639 | 59 | 1.88387 | -1.36920 | -0.09265 | -0.02407 |
| Class   2 /   3 | 0.25030 | 43 | 0.18583 | 0.38237 | 0.19212 | 0.05211 |
| Class   3 /   3 | 0.07868 | 25 | 6.63714 | 2.57363 | -0.11178 | -0.03282 |

The analysis showed that the three clusters were sufficient to explain the grouping of countries, more specifically, where the observed inertia within each group does not exceed the inertia among groups. In this sense the clusters are formed as shown in Table 16 and illustrated in Figure 26.

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[24]We used the statistical software SPAD® which allows the inclusion of illustrative variables in the analysis.

[25]Ward's Method joins cases looking for minimizing the variance within each group, creating homogeneous groups. First, it calculates the media of all variables in each cluster, then the distance between each case and the cluster' media, that will be added. Subsequently, clusters are grouped in a way to minimize increases in the sum of distances inside each cluster.

Although the first factor contains 85.90% of inertia, which is enough to illustrate the formation of the clusters, Fig. 26 illustrates Factors 1 and 2 as well as the three clusters centroids (yellow). Cluster 1(red) displays countries located in the negative coordinates of the first factor includes countries with low values of the LP, PPR and IPR. Cluster 2 (green) includes countries placed very close to the origin, showing average values of the LP, PPR and IPR. Cluster 3 (blue) contains countries located in the positive coordinates of the first factor and its members are linked to high values of the LP, PPR and IPR. The second factor consists mostly of countries in Cluster 2, including those whose scores are very close to the average, including both neighboring countries between Cluster 2 and Cluster 1, and those neighboring Cluster 2 and Cluster 3. Cluster 1 and Cluster 3 are outright opposites and their individuals are not directly associated with each other.

It is important to emphasize that in comparing this year's clusters with those in the previous edition (IPRI 2016) we find a significant translation of most of the countries to an improved position (see also Fig. 16). Therefore, it is expected that the cluster's centroids will move to the right, as it has occurred in this IPRI edition. This situation explains the fact that some countries that in 2016-IPRI were in Cluster 3, now appear in Cluster 2, while showing similar or even improved scores, but with a lesser improvement than the average of the Cluster. Clear examples of this situation are: Chile, Czech Rep., Malta, Portugal and South Africa which last year belonged to Cluster 3 and this year belong to Cluster 2, all of these countries improved their IPRI scores.

Besides the clusters, Figure 26 also shows the contribution of each country explaining the inertia gathered by the factors, hence the bigger the dot size representing the country, the higher its contribution. Very close countries show how they are similar and how they differ as the distance increases between them.

In the central circle are those countries that have no-statistically significant contribution to the definition of the factors, and as it has already been mentioned that they are close to the average and are mostly members of Cluster 2. In addition, arrows represent each of the three dimensions of the IPRI, their definite direction indicates the direct relationship with the individuals, i.e., as countries are in the same direction of the vector, countries tend to have a closer relationships with this dimension; and as a country direction diverts from the vector, the relationship between the country decreases to point of being contrary to it. This can be exemplified with the case of Brunei Darussalam, which is totally opposite to the direction of vector PPR which coincides with its low score in this sub-index.

Subsequently, clusters composition using income, population, participation in economic and regional integration agreements and regional and development criteria are shown in Fig. 27a-27d, where font size represent the frequency of the groupings in the cluster.

The analysis of each cluster can describe the internal characteristics of the countries within it. In this regard Table 16 exhibits the features that are statistically significant[26] in each group. Additional statistics are shown in Table 17 and Appendix IV.

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[26]To be statistically significant the value must be less or equal -1.96 or greater or equal 1.96

## Table 16. Clusters' Members (Countries ordered alphabetically)

| Countries | | |
|---|---|---|
| Cluster 1 | Cluster 2 | Cluster 3 |
| ALBANIA | BAHREIN | AUSTRALIA |
| ALGERIA | BOTSWANA | AUSTRIA |
| ARGENTINA | BRAZIL | BELGIUM |
| ARMENIA | CHILE | CANADA |
| AZERBAIJAN | CHINA | DENMARK |
| BANGLADESH | COLOMBIA | ESTONIA |
| BENIN | COSTA RICA | FINLAND |
| BOLIVIA | CZECH REPUBLIC | FRANCE |
| BOSNIA AND HERZEGOVINA | GHANA | GERMANY |
| BRUNEI DARUSSALAM | GREECE | HONG KONG (SAR of China) |
| BULGARIA | GUATEMALA | ICELAND |
| BURUNDI | HUNGARY | IRELAND |
| CAMEROON | INDIA | JAPAN |
| CHAD | INDONESIA | LUXEMBURG |
| CONGO, DEM. REP. | ISRAEL | NETHERLANDS |
| CôTE D'IVOIRE | ITALY | NEW ZEALAND |
| CROATIA | JAMAICA | NORWAY |
| CYPRUS | JORDAN | QATAR |
| DOMINICAN REPUBLIC | KOREA, REP | SINGAPORE |
| ECUADOR | KUWAIT | SWEDEN |
| EGYPT | LITHUANIA | SWITZERLAND |
| EL SALVADOR | MALAYSIA | TAIWAN (China) |
| ETHIOPIA | MALTA | UNITED ARAB EMIRATES |
| GABON | MAURITIUS | UNITED KINGDOM (UK) |
| GEORGIA | MEXICO | UNITED STATES (USA) |
| HONDURAS | MOROCCO | |
| IRAN | OMAN | |
| KAZAKHSTAN | PANAMA | |
| KENYA | PERU | |
| LATVIA | PHILIPPINES | |
| LEBANON | POLAND | |
| LIBERIA | PORTUGAL | |
| MACEDONIA, FYR | RWANDA | |
| MADAGASCAR | SAUDI ARABIA | |
| MALAWI | SLOVAKIA | |
| MALI | SLOVENIA | |
| MAURITANIA | SOUTH AFRICA | |
| MOLDOVA | SPAIN | |
| MONTENEGRO | SRI. LANKA | |
| MOZAMBIQUE | THAILAND | |
| NEPAL | TRINIDAD AND TOBAGO | |
| NICARAGUA | UGANDA | |
| NIGERIA | URUGUAY | |
| PAKISTAN | | |
| PARAGUAY | | |
| ROMANIA | | |
| RUSSIA | | |
| SENEGAL | | |
| SERBIA | | |
| SIERRA LEONE | | |
| TANZANIA, UNITED REPUBLIC OF | | |
| TUNISIA | | |
| TURKEY | | |
| UKRAINE | | |
| VENEZUELA, BOLIVARIAN REPUBLIC OF | | |
| VIETNAM | | |
| YEMEN, REP. | | |
| ZAMBIA | | |
| ZIMBABWE | | |

Fig. 26. Clusters' members and Centroids. Factor 1 & Factor 2
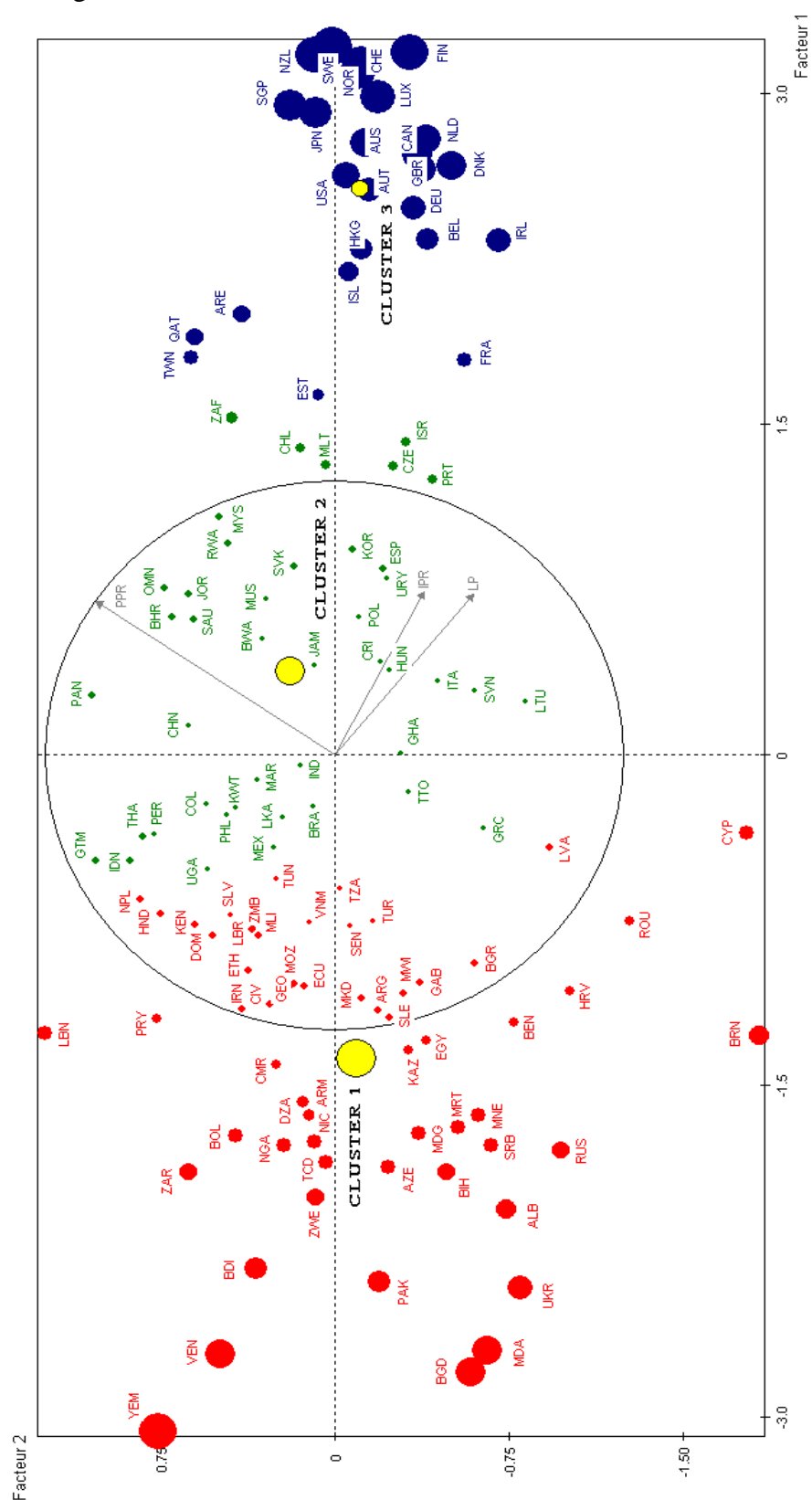
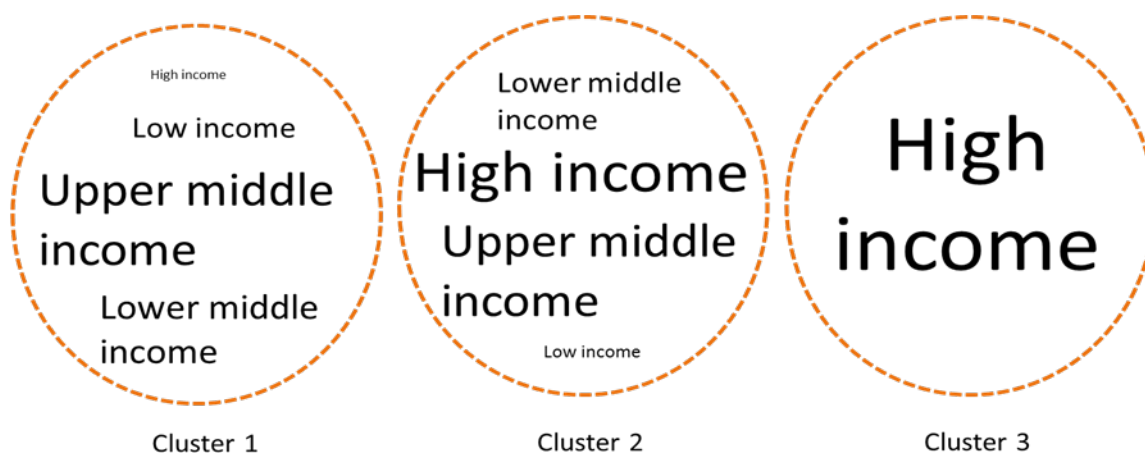Figure 27a. Clusters composition by Income classification



Figure 27b. Clusters composition by Regional and Development criteria



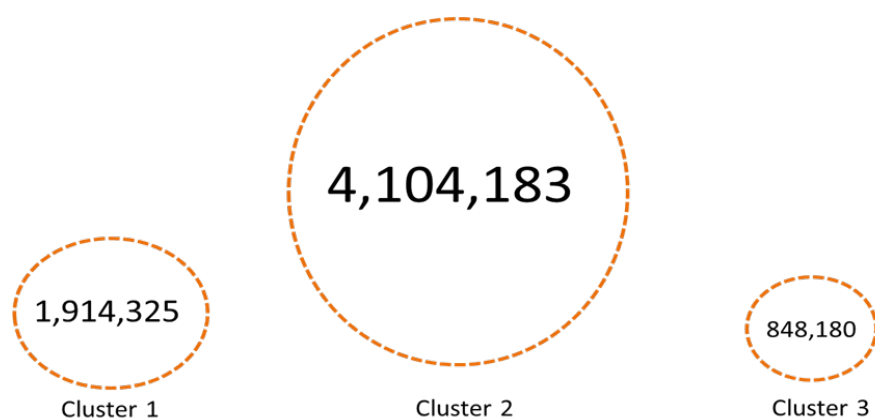Figure 27c. Clusters composition and Population weight (thousands)

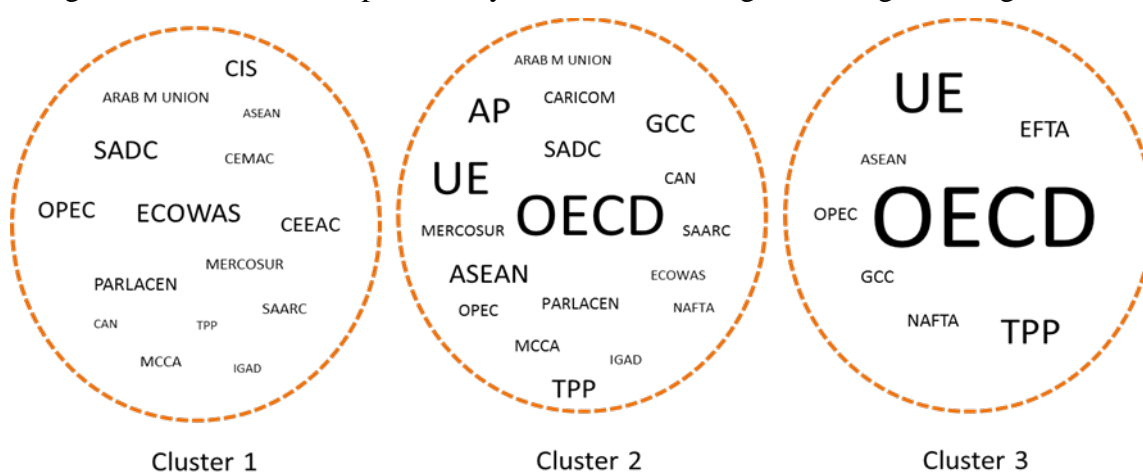Figure 27d. Clusters composition by Economic and Regional Integration Agreements



Table 16. Cluster statistics

| Cluster 1 | | | Cluster 2 | | | Cluster 3 | | |
|---|---|---|---|---|---|---|---|---|
| Characteristic Variables | Value-Test | Probability | Characteristic Variables | Value-Test | Probability | Characteristic Variables | Value-Test | Probability |
| Pob | -1.32 | 0.093 | PPR | 2.94 | 0.002 | GDP | 9.41 | 0.000 |
| IM | -3.15 | 0.001 | Pob | 1.94 | 0.026 | GKFpc | 8.99 | 0.000 |
| IC | -3.65 | 0.000 | HDI | 1.79 | 0.037 | GDPG | 8.79 | 0.000 |
| Gen | -3.75 | 0.000 | EF-F | 1.76 | 0.039 | GEI | 8.78 | 0.000 |
| E.R&D | -4.25 | 0.000 | EC | 1.72 | 0.043 | LP | 8.76 | 0.000 |
| R.I&D | -4.39 | 0.000 | IPR | 1.65 | 0.049 | IPRIGE | 8.63 | 0.000 |
| PR | -4.46 | 0.000 | IPRIGE | 1.60 | 0.055 | IPR | 8.50 | 0.000 |
| CL | -4.94 | 0.000 | EPI | 1.51 | 0.065 | NRI | 8.12 | 0.000 |
| IST | -4.94 | 0.000 | SC-L | 1.49 | 0.068 | CA | 8.08 | 0.000 |
| CA | -5.44 | 0.000 | FEI | 1.28 | 0.100 | PPR | 7.49 | 0.000 |
| FEI | -5.51 | 0.000 | PR | 1.27 | 0.103 | EF-H | 6.94 | 0.000 |
| EPI | -5.51 | 0.000 | EF-H | 1.11 | 0.133 | R.I&D | 6.83 | 0.000 |
| GKFpc | -5.74 | 0.000 | CL | 1.05 | 0.148 | SC-L | 6.77 | 0.000 |
| HFI | -5.91 | 0.000 | HFI | 0.84 | 0.199 | HFI | 6.38 | 0.000 |
| GDPG | -5.91 | 0.000 | LP | 0.78 | 0.218 | EC | 6.05 | 0.000 |
| GDP | -6.06 | 0.000 | Gen | 0.50 | 0.309 | E.R&D | 5.97 | 0.000 |
| EF-F | -6.14 | 0.000 | NRI | 0.39 | 0.349 | HDI | 5.83 | 0.000 |
| HDI | -6.29 | 0.000 | IST | 0.19 | 0.425 | IM | 5.82 | 0.000 |
| EC | -6.30 | 0.000 | GEI | -0.17 | 0.434 | IST | 5.80 | 0.000 |
| EF-H | -6.61 | 0.000 | IC | -0.54 | 0.293 | EF-F | 5.61 | 0.000 |
| SC-L | -6.79 | 0.000 | GDPG | -0.71 | 0.239 | FEI | 5.45 | 0.000 |
| GEI | -6.89 | 0.000 | E.R&D | -1.09 | 0.137 | IC | 5.19 | 0.000 |
| NRI | -7.03 | 0.000 | CA | -1.17 | 0.120 | EPI | 5.18 | 0.000 |
| LP | -7.72 | 0.000 | GDP | -1.42 | 0.077 | CL | 4.95 | 0.000 |
| IPR | -8.34 | 0.000 | GKFpc | -1.44 | 0.075 | Gen | 4.12 | 0.000 |
| IPRIGE | -8.38 | 0.000 | IM | -1.65 | 0.050 | PR | 4.08 | 0.000 |
| PPR | -8.76 | 0.000 | R.I&D | -1.74 | 0.041 | Pob | -0.65 | 0.257 |

Statistically significant only if Value-Test ≥ |1.96|

Table 17. Illustrative variables. Averages by Clusters

| | Cluster 1 | Cluster 2 | Cluster 3 |
|---|---|---|---|
| Total Countries | 59 | 43 | 25 |
| Total Population (Thousand) | 1,914,325.8 | 4,104,183.7 | 848,180.4 |
| Average IPRI | 4.37 | 5.97 | 8.04 |
| Average LP | 3.83 | 5.35 | 8.04 |
| Average PPR | 5.09 | 6.72 | 8.06 |
| Average IPR | 4.19 | 5.84 | 8.02 |
| Average Gen | 6.61 | 7.58 | 9.16 |
| Average IPRIGE | 5.69 | 7.47 | 9.90 |
| Average GDP | 4,978.8 | 13,298.5 | 53,029.5 |
| Average GDP-Gini | 154,640.3 | 430,190.6 | 1,601,494.8 |
| Average GKFpc | 1,132,703,884.7 | 2,901,979,289.9 | 11,851,455,269.0 |
| Average EC | -0.34 | 0.43 | 1.32 |
| Average GEI | 22.00 | 34.49 | 65.09 |
| Average EF-H | 57.44 | 65.23 | 76.31 |
| Average EF-F | 6.48 | 7.15 | 7.81 |
| Average PR | 4.97 | 6.94 | 8.87 |
| Average CL | 5.17 | 6.90 | 9.07 |
| Average HFI | 6.48 | 7.17 | 8.24 |
| Average NRI | 3.55 | 4.26 | 5.53 |
| Average FEI | 50.96 | 59.21 | 69.37 |
| Average HDI | 0.64 | 0.76 | 0.90 |
| Average SC-L | 46.57 | 52.77 | 60.55 |
| Average CA | 0.49 | 0.52 | 0.60 |
| Average IC | 0.65 | 0.68 | 0.76 |
| Average IST | 0.41 | 0.47 | 0.60 |
| Average IM | 0.45 | 0.47 | 0.56 |
| Average E.R&D | 0.46 | 0.90 | 2.08 |
| Average R.I&D | 714.82 | 1,548.15 | 4,693.75 |
| Average EPI | 64.2 | 74.0 | 84.7 |

Table 18. Regional Integration Agreements and Cluster

| Regional Integration Agreements | | Total | Cluster 1 | % | Cluster 2 | % | Cluster 3 | % |
|---|---|---|---|---|---|---|---|---|
| OECD | Organisation for Economic Cooperation and Development | 35 | 2 | 5.71 | 13 | 37.14 | 20 | 57.14 |
| EU | European Union | 28 | 5 | 17.86 | 11 | 39.29 | 12 | 42.86 |
| SADC | Southern African Development Community | 10 | 7 | 70.00 | 3 | 30.00 | | |
| ECOWAS | Economic Community Of West African States | 8 | 7 | 87.50 | 1 | 12.50 | | |
| ASEAN | Association of Southeast Asian Nations | 7 | 2 | 28.57 | 4 | 57.14 | 1 | 14.29 |
| PARLACEN | Central American Parliament | 6 | 4 | 66.67 | 2 | 33.33 | | |
| GCC | Gulf Cooperation Council | 6 | | | 4 | 66.67 | 2 | 33.33 |
| AP | Pacific Alliance | 6 | | | 6 | 100.00 | | |
| MERCOSUR | Southern Common Market | 5 | 3 | 60.00 | 2 | 40.00 | | |
| SAARC | South Asian Association for Regional Cooperation | 5 | 3 | 60.00 | 2 | 40.00 | | |
| CEMAC | Central African Economic and Monetary Community | 3 | 3 | 100.00 | | | | |
| MCCA | Central American Common Market | 5 | 3 | 60.00 | 2 | 40.00 | | |
| CIS | Commonwealth of Independent States | 6 | 6 | 100.00 | | | | |
| ARAB M UNION | Arab Mahgreb Union | 4 | 3 | 75.00 | 1 | 25.00 | | |
| CARICOM | Caribbean Community | 2 | | | 2 | 100.00 | | |
| CAN | Andean Community | 4 | 2 | 50.00 | 2 | 50.00 | | |
| EFTA | European Free Trade Association | 3 | | | | | 3 | 100.00 |
| IGAD | Intergovernmental Authority on Development | 3 | 2 | 66.67 | 1 | 33.33 | | |
| NAFTA | North American Free Trade Agreement | 3 | | | 1 | 33.33 | 2 | 66.67 |
| OPEC | Organization of the Petroleum Exporting Countries | 10 | 6 | 60.00 | 2 | 20.00 | 2 | 20.00 |
| CEEAC | La Communauté Economique des Etats de l'Afrique Centrale | 6 | 5 | 83.33 | 1 | 16.67 | | |
| TPP | Trans-Pacific Partnership | 12 | 2 | 16.67 | 4 | 33.33 | 6 | 50.00 |

## VIII.1. Cluster Description

### Cluster 1

Cluster 1 is composed of 59 countries with a population of more than 1.9 billion people. The country closest to its centroid is Algeria, followed by Egypt, Macedonia, Kazakhstan and Argentina. Cyprus is by far the most remote country of the Cluster, followed by Yemen, Brunei Darussalam, Bangladesh, Moldova and Venezuela.

A close look at Cluster 1 and the country coordinates reveal that Tunisia and Tanzania are the closest to the Cluster 2 Centroid. Looking simultaneously to Cluster 1 and Cluster 2, the closest countries are Tunisia (Cluster 1) and Mexico (Cluster 2), which signifies similarity in conditions (see Fig. 26).

Countries in Cluster 1 are statistically significant for LP, PPR and IPR components with low scores in each category. The same is true for the Gender component and the IPRI-GE. Cluster 1 countries also show low levels in all the dimensions we analyzed, that is, they show poor performances in Economic outcomes, Human Capabilities, Social Capital, Research and Innovation, Ecological Performance and Liberties. We may hypothesize that this is the result of the lack of policy to improve key elements such as entrepreneurship, social opportunities, levels of liberty, social capital, or research and development.

Under the regional and development classifications of the IMF and the income groupings of the World Bank, the Sub-Saharan Africa group and the Upper-Middle-Income, Lower-Middle-Income and Low-Income groups are highly represented in this cluster.

The Southern African Development Community (7/10 members) and the Economic Community of West African States (7/8 members) have most of their members in this cluster; followed by Organization of the Petroleum Exporting (6/10 members) and the Commonwealth of Independent States (all members).

### Cluster 2

Cluster 2 is composed of 43 countries with a population of more than 4.1 billion people. The country closest to its centroid is Jamaica, followed by Poland, Morocco, Saudi Arabia and China. South Africa is the farthest country from the centroid, followed by Israel, Guatemala, Indonesia and Greece. It is important to note that the most populous countries in the world, China and India, are included in this cluster, both very close to its centroid. While Figure 26 illustrates that Brazil is the country closest to the centroid of Cluster 1. Those closest to Cluster 3 are Israel, Chile, Malta and Czech Republic. Chile (Cluster 2) and Estonia (Cluster 3) are the closest countries between the clusters.

As Cluster 2 is very near to the origin of the factors axes (the distance of the first factor to the centroid is 0.38237), this gives rise to non-significant results for most of the variables, as most of the results are very close to average values.

Under the regional and development criteria of the IMF, Latin America and the Caribbean, and Advanced economies are highly represented in this cluster; whereas by the income criteria of the World Bank, the High-Income and Upper-Middle-Income countries exhibit the highest frequency in the cluster. Following the perspective that focuses on economic and regional integration agreements, we can see that the OECD (13/35 members) and the European Union

(with 11/28 members) have the highest frequency in Cluster 2. At a lesser frequency we find countries of the Pacific Alliance (all members).

## Cluster 3

Cluster 3 is composed of 25 countries with a total a population of more than 848 million people. The country closest to its centroid is Austria, followed by Australia, Canada, United Kingdom and the Netherlands. The farthest country of the group is Taiwan, followed by Qatar, France, Estonia and the United Arab Emirates. Estonia is the closest country to Cluster 2.

Compared to Cluster 1, countries belonging to Cluster 3 exhibit opposite results: all the variables are significant, but with positive and high values, showing good performances in Economic outcomes, Human Capabilities, Liberties, Social Capital, Research and Innovation, and Ecological performance, with positive results in human development, liberties and opportunities for their citizens.

Using the regional and development criteria of the IMF, the Advanced Economies group is highly represented in this cluster. By the Income criteria of the World Bank, the High-Income group in the only one represented in this cluster. Looking at economic and regional integration agreements, the OECD (20/35 members) and the European Union (12/28 members) are highly represented in Cluster 3, followed by the Trans-Pacific Partnership (6/12 members).

When speaking on economic and regional integration agreements, the following should be noted: Of the 127 countries included in the IPRI-2017 selection, there are 13 that do not belong to any of the agreements chosen, 58 that belong to only one agreement, 50 countries that are members of two of them, and there are 5 countries that are members of three integration agreements, and one that is part of 4 of them. Also, there is a great disparity in the number of countries that are part of the agreements, some with many members (OECD has 35 members and EU has 28 members), others with just a few.

The Organization for Economic Co-operation and Development, European Union, Association of Southeast Asian Nations, Organization of the Petroleum Exporting Countries and the Trans-Pacific Partnership have members in the three clusters. The members of The Central African Economic and Monetary Community, Pacific Alliance, Commonwealth of Independent States, Caribbean Community and European Free Trade Association, belongs only to one cluster. The rest of the agreements have members in two clusters in different proportions.

The data suggests that most of the chosen integration agreements demonstrate some level of heterogeneity in terms of the strength of the property right systems among their members. In presence of homogeneity it would be easier for an integration agreement to promote common policies to enhance the strength of property rights. Heterogeneity could also be seen as an advantage, as the policies could be targeted to specific members of the agreement.

On the other hand, the integration agreements showing members in just one cluster reveal homogeneity amongst their countries' property right systems. Even those agreements participating in two clusters show members in cluster boundaries and could be seen as a possible transition from one cluster to the other.

In conclusion of the cluster analysis we find that:

- Each cluster represents more than a grouping by variables directly associated with property rights; they are groups with common characteristics within them and with different features

among clusters, which confirms the consistency of the IPRI, and the relevance of property right systems influencing societies.

- Cluster 1 and Cluster 3 are two extreme poles in terms of the performance of their economies, human capabilities, social capital, research and innovation, ecological performance, their institutional stability, as well as their IPRI scores.

- Cluster 2 statistical values reflected its intermediate position and depending on the decisions taken in the present and near future of each country, will be inclined to one of the two polar classes. Those countries that keep their position very close to Cluster 1 should review their policies regarding property rights, as well as other dimensions to improve their economic performance and well-being of their citizens.

- Countries in Cluster 1 should particularly focus efforts on strengthening their legal and political environment to protect physical and intellectual property rights, which are still weak, in order to improve the quality of life in their societies.

- Countries in the boundaries between two clusters have to make special efforts to mind the gap, which will place them in a higher level.

- The displacement of cluster centroids between the 2016 and 2017 editions demonstrates the importance of each country to have a long term view property right reform policies, that is, they must be able to continue reaching higher levels of property right protection, to avoid being left behind in the near future by world progress in this matter.

## IX.    Final Remarks

The methodology of the 11th edition of the International Property Rights Index is consistent with previous editions, revealing a proper structure for the index. In this sense, its follow-up in years ahead is crucial to monitor the performance of property rights systems and their relationship to prosperity within countries, regionally, and globally.

Results suggest that countries with high IPRI scores and its components also show high income and high development levels, indicating the positive relationship between property rights regime and wellbeing.

In this edition, we included a range of dimensions to be contrasted with property rights. Our results show that the IPRI is strongly associated with economic opportunities and liberties within countries, as well as their social cohesion, human capabilities, innovative research and the ecosystem.

Each of these dimensions was evaluated using different items: production (*per capita* level adjusted by inequality and composition), investment, entrepreneurship ecosystem, economic freedom, political rights, civil liberties, absence of coercion, propensity to connectivity, human development (current condition and future potential), freedom of education, minority group inclusion, civic activism, intergroup cohesion, interpersonal safety and trust, social capital, number of researchers, number of papers published, expenses in R&D and environmental performance. All the items showed a strong positive association with the IPRI and its components.

This way, IPRI results can be used as guidelines for policy makers in different countries - as in multilateral or integration agreements, to which they belong - to enhance their policies aimed to foster development, defined as a multidimensional and synergic term.

IPRI-2017 includes 127 countries with an average score of 5.6336, showing an increase of 0.1877 points (3.45%) compared to 2016. This edition includes three countries (Brunei Darussalam, Democratic Rep. of Congo and Rep/ of Yemen) that were not in the IPRI-2016, and four countries had to be excluded (Guyana, Haiti, Myanmar and Swaziland) due to the absence of enough information.

Country performance is quite dissimilar: we find countries with very high scores and others with very low scores. Once a country attains one of the top positions it mostly keeps it. We are glad to highlight five countries with an improvement over 0.5: Spain (0.57), Israel (0.56), Sweden (0.51), Ethiopia (0.51) and Lebanon (0.50). However, as some countries improve, others may show a setback. This is the case of Cyprus (-0.6743), that this year shows the biggest recoil mainly as a result of a PPR decline (-1.8974).

IPRI-2017 keeps the calculations of IPRI-GE and IPRI-POP given the importance of showing the impact of gender equality and countries' demographic weight in analyzing property rights systems.

IPRI-GE was calculated for a total of 123 countries and 2017 average score is 7.44 showing a sustained improvement (2016=6.933; 2015= 6.76). This despite the GE score of 7.118 is lower than in former two years (2016=7.466; 2015=7.39), meaning that gender equality is deteriorating as an average, while property rights protection improves.

IPRI-POP was calculated for the 127 countries, the world average of 5.522 is an improvement compared to 2016 (5.45). This is due to the fact that 68% of world population lives in 66 countries with an IPRI between 4.5 and 6.4, insisting on the importance of fostering property rights systems in densely populated countries.

IPRI-2017 also included a cluster analysis, in order to gather countries in groups by their homogeneity. The 127 countries were classified according to their values in the IPRI and its three components in three clusters. The analysis of clusters' centroids and the countries by the boundaries between groups, provides important information about their characteristics and challenges. Cluster analysis also confirmed the consistency of the IPRI, since the assembled countries exhibited a high degree of homogeneity, showing the relevance of property rights systems in shaping societies.

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*XI.        Appendages*

*XI.1. Appendix I. Data Source. IPRI 2017*

| IPRI-2017 | Data | Original Scale | Year | Source | Link | bitly |
|---|---|---|---|---|---|---|
| **SUBINDEX: Legal and Political Environment (LP)** | Judicial Independence | [1-7]\|best) | 2016-2017 | The Global Competitiveness Index Historical Dataset © 2007-2017 World Economic Forum | http://reports.weforum.org/global-competitiveness-index/downloads/ | http://bit.ly/2IHs5Mn |
| | Rule Law | [(-2,5) - (2,5)]best | 2015 | The Worldwide Governance Indicators | http://info.worldbank.org/governance/wgi/index.aspx#home | http://bit.ly/1rwwuAb |
| | Political Stability | [(-2,5) - (2,5)]best | 2015 | The Worldwide Governance Indicators | http://info.worldbank.org/governance/wgi/index.aspx#home | http://bit.ly/1rwwuAb |
| | Control Corruption | [(-2,5) - (2,5)]best | 2015 | The Worldwide Governance Indicators | http://info.worldbank.org/governance/wgi/index.aspx#home | http://bit.ly/1rwwuAb |
| **SUBINDEX: Physical Property Rights (PPR)** | Property Rights | [1-7]\|best) | 2016-2017 | The Global Competitiveness Index Historical Dataset © 2007-2016 World Economic Forum | http://reports.weforum.org/global-competitiveness-index/downloads/ | http://bit.ly/2IHs5Mn |
| | Registering Property | 1-infinite Worst | 2017 | World Bank Group. Doing Business | http://www.doingbusiness.org/custom-query | http://bit.ly/2mm9poK |
| | Ease of Access to Loans | [1-7]\|best) | 2016-2017 | The Global Competitiveness Index Historical Dataset © 2007-2016 World Economic Forum | http://reports.weforum.org/global-competitiveness-index/downloads/ | http://bit.ly/2IHs5Mn |
| **SUBINDEX: Intellectual Property Rights (IPR)** | Intellectual Property Protection | [1-7]\|best) | 2016-2017 | The Global Competitiveness Index Historical Dataset © 2007-2016 World Economic Forum | http://reports.weforum.org/global-competitiveness-index/downloads/ | http://bit.ly/2IHs5Mn |
| | Patent Protection | [0-5]\|best) | 2010 | Ginarte-Park (Patent Protection, 1960-2010) International Patent Protection: 1960-2005, Research Policy, Vol. 37, Issue 4, 2008, pp. 761-766. Data | http://nw08.american.edu/~wgp/#PR | http://bit.ly/2mlYH1J |
| | Copyright Piracy Level | [0-100%]Worst | 2015 | BSA Global Software Survey 2016 | http://globalstudy.bsa.org/2016/downloads/studies/BSA_GSS_US.pdf | http://bit.ly/2m36pva |
| **IPRI-POPULATION** | Population | Thousands | 2015 | United Nations. Population Division. World Population Prospects: The 2015 Revision. | http://esa.un.org/unpd/wpp/Download/Standard/Population/ | http://bit.ly/1K5abxg |

## XI.1. Appendix II. Groups conformation. IPRI 2017

| Class | Group | # | Countries |
|---|---|---|---|
| **IPRI Regional Groups** | A | 27 | BENIN;BOTSWANA;BURUNDI;CAMEROON;CHAD;CONGO, DEM. REP.;CôTE D'IVOIRE;ETHIOPIA;GABON;GHANA; KENYA;LIBERIA;MADAGASCAR; MOZAMBIQUE;NIGERIA; RWANDA; SENEGAL;SIERRA LEONE;SOUTH AFRICA;TANZANIA, UNITED REPUBLIC OF;UGANDA;ZAMBIA;ZIMBABWE. |
| | AO | 19 | AUSTRALIA;BANGLADESH;BRUNEI DARUSSALAM;CHINA;HONG KONG (SAR of China);INDIA;INDONESIA;JAPAN;KOREA, REP;MALAYSIA;NEPAL; NEW ZEALAND; PAKISTAN; PHILIPPINES; SINGAPORE; SRI. LANKA;TAIWAN (China);THAILAND;VIETNAM. |
| | CEECA | 25 | REPUBLIC;ESTONIA;GEORGIA;HUNGARY;KAZAKHSTAN;LATVIA;LITHUANIA;MACEDONIA, FYR;MOLDOVA;MONTENEGRO;POLAND; ROMANIA; RUSSIA; SERBIA; SLOVAKIA; SLOVENIA; TURKEY;UKRAINE. |
| | LAC | 20 | ARGENTINA;BOLIVIA;BRAZIL;CHILE;COLOMBIA;COSTA RICA;DOMINICAN REPUBLIC;ECUADOR;EL SALVADOR; GUATEMALA; HONDURAS; JAMAICA; MEXICO;NICARAGUA; PANAMA; PARAGUAY; PERU; TRINIDAD AND TOBAGO; URUGUAY;VENEZUELA, BOLIVARIAN REPUBLIC OF. |
| | MENA | 15 | ALGERIA;BAHREIN;EGYPT;IRAN;ISRAEL;JORDAN;KUWAIT;LEBANON;MOROCCO;OMAN;QATAR;SAUDI ARABIA;TUNISIA;UNITED ARAB EMIRATES;YEMEN, REP. |
| | NA | 2 | CANADA;UNITED STATES (USA). |
| | WE | 19 | AUSTRIA;BELGIUM;DENMARK;FINLAND;FRANCE;GERMANY;GREECE;ICELAND;IRELAND;ITALY;LUXEMBURG;MALTA;NETHERLANDS;NORWAY;PORTUGAL;SPAIN;SWEDEN;SWITZERLAND; UNITED KINGDOM (UK). |
| **Prior 2016 IPRI Groups** | EUROPEAN UNION | 28 | AUSTRIA;BELGIUM;BULGARIA;CROATIA;CYPRUS;CZECH REPUBLIC;DENMARK;ESTONIA;FINLAND;FRANCE;GERMANY;GREECE;HUNGARY; IRELAND; ITALY; LATVIA; LITHUANIA; LUXEMBURG; MALTA; NETHERLANDS; POLAND;PORTUGAL ;ROMANIA; SLOVAKIA;SLOVENIA;SPAIN;SWEDEN;UNITED KINGDOM (UK). |
| | REST OF EUROPE | 14 | ALBANIA;ARMENIA;BOSNIA AND HERZEGOVINA;GEORGIA;ICELAND;MACEDONIA, FYR;MOLDOVA;MONTENEGRO;NORWAY;RUSSIA;SERBIA;SWITZERLAND;TURKEY;UKRAINE. |
| | AFRICA | 31 | ALGERIA;BENIN;BOTSWANA;BURUNDI;CAMEROON;CHAD;CONGO, DEM. REP.;CôTE D'IVOIRE;EGYPT;ETHIOPIA;GABON;GHANA;KENYA;LIBERIA; MADAGASCAR; MALAWI; MALI; MAURITANIA; MAURITIUS; MOROCCO; MOZAMBIQUE;NIGERIA;RWANDA;SENEGAL; SIERRA LEONE;SOUTH AFRICA;TANZANIA, UNITED REPUBLIC OF TUNISIA; UGANDA; ZAMBIA; ZIMBABWE. |
| | NORTH AMERICA | 3 | CANADA;MEXICO;UNITED STATES (USA). |
| | CENTRAL AMERICA&CARIB | 9 | COSTA RICA;DOMINICAN REPUBLIC;EL SALVADOR;GUATEMALA;HONDURAS;JAMAICA;NICARAGUA;PANAMA;TRINIDAD AND TOBAGO. |
| | SOUTH AMERICA | 10 | ARGENTINA;BOLIVIA;BRAZIL;CHILE;COLOMBIA;ECUADOR;PARAGUAY;PERU;URUGUAY; VENEZUELA, BOLIVARIAN REPUBLIC OF. |
| | ASIA | 30 | AZERBAIJAN;BAHREIN;BANGLADESH;BRUNEI DARUSSALAM;CHINA;HONG KONG (SAR of China);INDIA;INDONESIA;IRAN;ISRAEL;JAPAN;JORDAN;KAZAKHSTAN;KOREA, REP; KUWAIT; LEBANON; MALAYSIA; NEPAL; OMAN; PAKISTAN;PHILIPPINES;QATAR;SAUDI ARABIA;SINGAPORE;SRI. LANKA;TAIWAN (China);THAILAND;UNITED ARAB EMIRATES;VIETNAM;YEMEN, |
| | OCEANIA | 2 | AUSTRALIA;NEW ZEALAND. |
| **Income Classification** | High income | 49 | AUSTRALIA;AUSTRIA;BAHREIN;BELGIUM;BRUNEI DARUSSALAM;CANADA;CHILE;CROATIA;CYPRUS;CZECH REPUBLIC;DENMARK;ESTONIA;FINLAND;FRANCE;GERMANY;GREECE;HONG KONG (SAR of China);HUNGARY;ICELAND; ISRAEL;ITALY;JAPAN;KOREA, REP;KUWAIT;LATVIA;LITHUANIA;LUXEMBURG;MALTA; NETHERLANDS;NEW ZEALAND; NORWAY; OMAN; POLAND; PORTUGAL; QATAR; SAUDI ARABIA; SINGAPORE; SLOVAKIA; SLOVENIA; SPAIN;SWEDEN;SWITZERLAND;TAIWAN (China);TRINIDAD AND TOBAGO;UNITED ARAB EMIRATES; UNITED KINGDOM (UK);UNITED STATES (USA);URUGUAY. |
| | Low income | 17 | BENIN;BURUNDI;CHAD;CONGO, DEM. REP.;ETHIOPIA;LIBERIA;MADAGASCAR;MALAWI;MALI;MOZAMBIQUE;NEPAL;RWANDA;SENEGAL;SIERRA LEONE;TANZANIA, UNITED REPUBLIC OF;UGANDA;ZIMBABWE. |
| | Lower middle income | 26 | ARMENIA;BANGLADESH;BOLIVIA;CAMEROON;CôTE D'IVOIRE;EGYPT;EL SALVADOR;GHANA;GUATEMALA;HONDURAS;INDIA;INDONESIA;KENYA;MAURITANIA; MOLDOVA;MOROCCO; NICARAGUA;NIGERIA; PAKISTAN; PHILIPPINES; SRI LANKA; TUNISIA;UKRAINE;VIETNAM;YEMEN, REP.;ZAMBIA. |
| | Upper middle income | 35 | ALBANIA;ALGERIA;ARGENTINA;AZERBAIJAN;BOSNIA AND HERZEGOVINA;BOTSWANA;BRAZIL;BULGARIA;CHINA;COLOMBIA;COSTA RICA;DOMINICAN REPUBLIC; ECUADOR;GABON; GEORGIA;IRAN;JAMAICA; JORDAN; KAZAKHSTAN ;LEBANON; MACEDONIA, FYR;MALAYSIA; MAURITIUS; MEXICO; MONTENEGRO; PANAMA;PARAGUAY;PERU; ROMANIA;RUSSIA;SERBIA; SOUTH AFRICA;THAILAND;TURKEY;VENEZUELA, BOLIVARIAN REPUBLIC OF. |
| **Region Classification** | Advanced economies | 36 | AUSTRALIA;AUSTRIA;BELGIUM;CANADA;CYPRUS;CZECH REPUBLIC;DENMARK;ESTONIA;FINLAND;FRANCE;GERMANY;GREECE;HONG KONG (SAR of China) ;ICELAND; IRELAND; ISRAEL; ITALY; JAPAN; KOREA, REP;LATVIA;LITHUANIA;LUXEMBURG;MALTA;NETHERLANDS;NEW ZEALAND; NORWAY;PORTUGAL; SINGAPORE;SLOVAKIA; SLOVENIA; SPAIN; SWEDEN; SWITZERLAND; TAIWAN (China);UNITED KINGDOM (UK);UNITED STATES (USA). |
| | Commonwealth of Indepe | 7 | ARMENIA;AZERBAIJAN;GEORGIA;KAZAKHSTAN;MOLDOVA;RUSSIA;UKRAINE. |
| | Emerging and Developing | 11 | BANGLADESH;BRUNEI DARUSSALAM;CHINA;INDIA;INDONESIA;MALAYSIA;NEPAL;PHILIPPINES;SRI. LANKA;THAILAND;VIETNAM. |
| | Emerging and Developing | 11 | ALBANIA;BOSNIA AND HERZEGOVINA;BULGARIA;CROATIA;HUNGARY;MACEDONIA, FYR;MONTENEGRO;POLAND;ROMANIA;SERBIA;TURKEY. |
| | Latin America and the Cari | 20 | ARGENTINA;BOLIVIA;BRAZIL;CHILE;COLOMBIA;COSTA RICA;DOMINICAN REPUBLIC;ECUADOR; EL SALVADOR; GUATEMALA; HONDURAS; JAMAICA;MEXICO;NICARAGUA; PANAMA; PARAGUAY; PERU; TRINIDAD AND TOBAGO;URUGUAY;VENEZUELA, BOLIVARIAN REPUBLIC OF. |
| | Middle East, North Africa, | 16 | ALGERIA;BAHREIN;EGYPT;IRAN;JORDAN;KUWAIT;LEBANON;MAURITANIA;MOROCCO;OMAN;PAKISTAN;QATAR;SAUDI ARABIA;TUNISIA;UNITED ARAB EMIRATES;YEMEN, REP. |
| | Sub-Saharan Africa | 26 | BENIN;BOTSWANA;BURUNDI;CAMEROON;CHAD;CONGO, DEM. REP.;CôTE D'IVOIRE;ETHIOPIA;GABON;GHANA;KENYA;LIBERIA;MADAGASCAR;MALAWI;MALI;MAURITIUS; MOZAMBIQUE;NIGERIA;RWANDA;SENEGAL;SIERRA LEONE;SOUTH AFRICA;TANZANIA, UNITED REPUBLIC OF;UGANDA;ZAMBIA;ZIMBABWE. |
| **Regional Integration Agreements** | OECD | 35 | AUSTRALIA;AUSTRIA;BELGIUM;CANADA;CHILE;CZECH REPUBLIC;DENMARK;ESTONIA;FINLAND;FRANCE;GERMANY;GREECE;HUNGARY;ICELAND;IRELAND;ISRAEL;ITALY;JAPAN;KOREA, REP;LATVIA;LUXEMBURG;MEXICO;NETHERLANDS;NEW ZEALAND;NORWAY;POLAND;PORTUGAL;SLOVAKIA;SLOVENIA;SPAIN;SWEDEN;SWITZERLAND;TURKEY;UNITED KINGDOM (UK);UNITED STATES (USA). |
| | EU | 28 | AUSTRIA;BELGIUM;BULGARIA;CROATIA;CYPRUS;CZECH REPUBLIC;DENMARK;ESTONIA;FINLAND;FRANCE;GERMANY;GREECE;HUNGARY;IRELAND;ITALY; LATVIA; LITHUANIA ;LUXEMBURG; MALTA;NETHERLANDS; POLAND; PORTUGAL; ROMANIA; SLOVAKIA;SLOVENIA; SPAIN;SWEDEN;UNITED KINGDOM (UK). |
| | SADC | 10 | BOTSWANA;CONGO, DEM. REP.;MADAGASCAR;MALAWI;MAURITIUS;MOZAMBIQUE;SOUTH AFRICA;TANZANIA, UNITED REPUBLIC OF;ZAMBIA;ZIMBABWE. |
| | ECOWAS | 8 | BENIN;CôTE D'IVOIRE;GHANA;LIBERIA;MALI;NIGERIA;SENEGAL;SIERRA LEONE. |
| | ASEAN | 7 | BRUNEI DARUSSALAM;INDONESIA;MALAYSIA;PHILIPPINES;SINGAPORE;THAILAND;VIETNAM. |
| | PARLACEN | 6 | DOMINICAN REPUBLIC;EL SALVADOR;GUATEMALA;HONDURAS;NICARAGUA;PANAMA. |
| | GCC | 6 | BAHREIN;KUWAIT;OMAN;QATAR;SAUDI ARABIA;UNITED ARAB EMIRATES. |
| | AP | 6 | CHILE;COLOMBIA;COSTA RICA;MEXICO;PANAMA;PERU. |
| | MERCOSUR | 5 | ARGENTINA;BRAZIL;PARAGUAY;URUGUAY;VENEZUELA, BOLIVARIAN REPUBLIC OF. |
| | SAARC | 5 | BANGLADESH;INDIA;NEPAL;PAKISTAN;SRI. LANKA. |
| | CEMAC | 3 | CAMEROON;CHAD;GABON. |
| | MCCA | 5 | COSTA RICA;EL SALVADOR;GUATEMALA;HONDURAS;NICARAGUA. |
| | CIS | 6 | ARMENIA;AZERBAIJAN;KAZAKHSTAN;MOLDOVA;RUSSIA;UKRAINE. |
| | ARAB M UNION | 4 | ALGERIA;MAURITANIA;MOROCCO;TUNISIA. |
| | CARICOM | 2 | JAMAICA;TRINIDAD AND TOBAGO. |
| | CAN | 4 | BOLIVIA;COLOMBIA;ECUADOR;PERU. |
| | EFTA | 3 | ICELAND;NORWAY;SWITZERLAND. |
| | IGAD | 3 | ETHIOPIA;KENYA;UGANDA. |
| | NAFTA | 3 | CANADA;MEXICO;UNITED STATES (USA). |
| | OPEP | 10 | ALGERIA;ECUADOR;GABON;IRAN;KUWAIT;NIGERIA;QATAR;SAUDI ARABIA;UNITED ARAB EMIRATES;VENEZUELA, BOLIVARIAN REPUBLIC OF. |
| | CEEAC | 6 | BURUNDI;CAMEROON;CHAD;CONGO, DEM. REP.;GABON;RWANDA. |
| | TPP | 12 | AUSTRALIA;BRUNEI DARUSSALAM;CANADA;CHILE;JAPAN;MALAYSIA;MEXICO;NEW ZEALAND;PERU;SINGAPORE;UNITED STATES (USA);VIETNAM. |

### *XI.1. Appendix III. GE Data Source. IPRI 2017*

| | Data | Original Scale | Year | Countries # | Source | Link | Key statistical concept |
|---|---|---|---|---|---|---|---|
| **Women´s Access to Bank Loans** | Access to financial services | 0 (Best) 0.5 (Average) 1 (Worst) | 2014 | 160 | OCDE GID-DB | http://www.genderindex.org/ | Measures whether women and men have equal access to financial services |
| **Women´s Access to Land Ownership** | Secure access to land | 0 (Best) 0.5 (Average) 1 (Worst) | 2014 | 160 | OCDE GID-DB | http://www.genderindex.org/ | Measures whether women and men have equal and secure access to land use, control and ownership |
| **Women´s Access to Property Other than land** | Secure access to non-land assets | 0 (Best) 0.5 (Average) 1 (Worst) | 2014 | 160 | OCDE GID-DB | http://www.genderindex.org/ | Measures whether women and men have equal and secure access to non-land assets use, control and ownership |
| **Inheritance Practices** | Inheritance: Widows | 0 (Best) 0.5 (Average) 1 (Worst) | 2014 | 160 | OCDE GID-DB | http://www.genderindex.org/ | Measures whether widows and widowers have equal inheritance rights |
| | Inheritance: Daughters | 0 (Best) 0.5 (Average) 1 (Worst) | 2014 | 160 | OCDE GID-DB | http://www.genderindex.org/ | Measures whether daughters and sons have equal inheritance rights |
| **Women Social Rights** | Parental authority: In marriage | 0 (Best) 0.5 (Average) 1 (Worst) | 2014 | 160 | OCDE GID-DB | http://www.genderindex.org/ | Measures whether women and men have the same right to be the legal guardian of a child during marriage |
| | Parental authority: After divorce | 0 (Best) 0.5 (Average) 1 (Worst) | 2014 | 160 | OCDE GID-DB | http://www.genderindex.org/ | Measures whether women and men have the same right to be the legal guardian of and have custody rights over a child after divorce |
| | Female genital mutilation | 0 (Best) 0.5 (Average) 1 (Worst) | 2014 | 160 | OCDE GID-DB | http://www.genderindex.org/ | Measures the prevalence of female genital mutilation. |
| | Access to public space | 0 (Best) 0.5 (Average) 1 (Worst) | 2014 | 160 | OCDE GID-DB | http://www.genderindex.org/ | Measures whether women face restrictions on their freedom of movement and access to public space |
| | Son preference in education | 0 (Best) 0.5 (Average) 1 (Worst) | 2014 | 160 | OCDE GID-DB | http://www.genderindex.org/ | Percentage of people agreeing that university is more important for boys than for girls |

## XI.1. Appendix IV. Correlations data sources

| Dimention | Variable / Index | Source | Link |
|---|---|---|---|
| Economic outcomes | GDP per capita (constant 2010 US$) | World Development Indicators. World Bank | http://data.worldbank.org/indicator/NY.GDP.PCAP.KD |
| | GDP per capita (constant 2010 US$) * GINI (*) | UNDP, UNO | http://report.hdr.undp.org/ |
| | Gross capital formation (current US$) | World Development Indicators. World Bank | http://data.worldbank.org/indicator/NE.GDI.TOTL.CD |
| | Gross capital formation (current US$) + Per Capita (*) | UNO | http://esa.un.org/unpd/wpp/Download/Standard/Population/ |
| | Economic Complexity | The Observatory of Economic Complexity | http://atlas.media.mit.edu/en/rankings/country/ |
| | Global Entrepreneurship Index | The Global Entrepreneurship and Development Institute | http://thegedi.org/global-entrepreneurship-and-development-index/ |
| Liberties | Index of Economic Freedom (Heritage) | The Heritage Foundation | http://www.heritage.org/index/about |
| | Economic Freedom of the World (Fraser) | Fraser Institute | http://www.freetheworld.com/ |
| | Political Rights-Freedom in the World | Freedom House | https://freedomhouse.org/report-types/freedom-world |
| | Civil Liberties-Freedom in the World | Freedom House | https://freedomhouse.org/report-types/freedom-world |
| | Human Freedom Index | CATO Inst., Fraser Inst., Liberals Inst. at Friedrich Naumann Foundation | https://www.cato.org/human-freedom-index |
| | The Networked Readiness Index (NRI) | The World Economic Forum, INSEAD | http://reports.weforum.org/global-information-technology-report-2015 |
| Human Capabilities | Freedom of Education Index | Foundation Novae Terrae | http://www.novaeterrae.eu/en/documents/847-freedom-of-education-index-research.html |
| | Human Development Index (HDI) | UNDP, UNO | http://report.hdr.undp.org/ |
| Social Capital | The Legatum Prosperity Index: Social Capital Component | Legatum Institute Foundation | http://www.prosperity.com/#/ |
| | Indices of Social Development: Civic Activism | International Institute of Social Studies | http://www.indsocdev.org/data-access.html |
| | Indices of Social Development: Intergroup Cohesion | International Institute of Social Studies | http://www.indsocdev.org/data-access.html |
| | Indices of Social Development: Interpersonal Safety and Trust | International Institute of Social Studies | http://www.indsocdev.org/data-access.html |
| | Indices of Social Development: Inclusion of Minorities | International Institute of Social Studies | http://www.indsocdev.org/data-access.html |
| Research and Innovation | Research and development expenditure (% of GDP) | World Development Indicators. World Bank | http://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS |
| | Scientific and technical journal articles | World Development Indicators. World Bank | http://data.worldbank.org/indicator/IP.JRN.ARTC.SC |
| | Researchers in R&D (per million people) | World Development Indicators. World Bank | http://data.worldbank.org/indicator/SP.POP.SCIE.RD.P6 |
| Ecological performance | Environmental Performance Index (EPI) | Yale University | http://epi.yale.edu/country-rankings |

## XI.1. Appendix V. Cluster Information. IPRI 2017

| Country | Accr. | Cluster | Distance to Centroid | Country | Accr. | Cluster | Distance to Centroid | Country | Accr. | Cluster | Distance to Centroid |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ALGERIA | DZA | 1 | 0.09854 | JAMAICA | JAM | 2 | 0.06101 | AUSTRIA | AUT | 3 | 0.01955 |
| EGYPT | EGY | 1 | 0.09943 | POLAND | POL | 2 | 0.16111 | AUSTRALIA | AUS | 3 | 0.04364 |
| MACEDONIA, FYR | MKD | 1 | 0.12457 | MOROCCO | MAR | 2 | 0.26925 | CANADA | CAN | 3 | 0.08292 |
| KAZAKHSTAN | KAZ | 1 | 0.13185 | SAUDI ARABIA | SAU | 2 | 0.27645 | UNITED KINGDOM (UK) | GBR | 3 | 0.12310 |
| ARGENTINA | ARG | 1 | 0.13462 | CHINA | CHN | 2 | 0.28042 | NETHERLANDS | NLD | 3 | 0.13928 |
| MALAWI | MWI | 1 | 0.15211 | HUNGARY | HUN | 2 | 0.30655 | GERMANY | DEU | 3 | 0.14022 |
| NICARAGUA | NIC | 1 | 0.17978 | INDIA | IND | 2 | 0.31421 | DENMARK | DNK | 3 | 0.16399 |
| CôTE D'IVOIRE | CIV | 1 | 0.21030 | JORDAN | JOR | 2 | 0.33305 | LUXEMBURG | LUX | 3 | 0.18074 |
| MADAGASCAR | MDG | 1 | 0.21554 | BAHREIN | BHR | 2 | 0.33374 | HONG KONG (SAR of China) | HKG | 3 | 0.21415 |
| CAMEROON | CMR | 1 | 0.22904 | GHANA | GHA | 2 | 0.36668 | JAPAN | JPN | 3 | 0.23466 |
| SIERRA LEONE | SLE | 1 | 0.25763 | SPAIN | ESP | 2 | 0.43791 | SINGAPORE | SGP | 3 | 0.24417 |
| GABON | GAB | 1 | 0.26455 | SLOVAKIA | SVK | 2 | 0.45346 | UNITED STATES (USA) | USA | 3 | 0.29460 |
| IRAN | IRN | 1 | 0.29259 | RWANDA | RWA | 2 | 0.46295 | NORWAY | NOR | 3 | 0.30984 |
| NIGERIA | NGA | 1 | 0.29298 | COSTA RICA | CRI | 2 | 0.46573 | SWITZERLAND | CHE | 3 | 0.33432 |
| MOZAMBIQUE | MOZ | 1 | 0.31060 | KOREA, REP | KOR | 2 | 0.47687 | BELGIUM | BEL | 3 | 0.34127 |
| AZERBAIJAN | AZE | 1 | 0.36227 | BRAZIL | BRA | 2 | 0.48810 | ICELAND | ISL | 3 | 0.40771 |
| ETHIOPIA | ETH | 1 | 0.37496 | SRI LANKA | LKA | 2 | 0.53893 | IRELAND | IRL | 3 | 0.41870 |
| BOLIVIA | BOL | 1 | 0.39367 | PHILIPPINES | PHL | 2 | 0.57048 | FINLAND | FIN | 3 | 0.42816 |
| SENEGAL | SEN | 1 | 0.40808 | MALAYSIA | MYS | 2 | 0.58999 | SWEDEN | SWE | 3 | 0.43944 |
| ZIMBABWE | ZWE | 1 | 0.43079 | TRINIDAD AND TOBAGO | TTO | 2 | 0.62556 | NEW ZEALAND | NZL | 3 | 0.57616 |
| MAURITANIA | MRT | 1 | 0.44540 | MAURITIUS | MUS | 2 | 0.67967 | UNITED ARAB EMIRATES | ARE | 3 | 0.58434 |
| VIETNAM | VNM | 1 | 0.44761 | SLOVENIA | SVN | 2 | 0.68060 | ESTONIA | EST | 3 | 1.02546 |
| ARMENIA | ARM | 1 | 0.47717 | ITALY | ITA | 2 | 0.70883 | FRANCE | FRA | 3 | 1.05194 |
| ECUADOR | ECU | 1 | 0.47916 | COLOMBIA | COL | 2 | 0.73913 | QATAR | QAT | 3 | 1.07482 |
| CHAD | TCD | 1 | 0.50220 | PANAMA | PAN | 2 | 0.74159 | TAIWAN (China) | TWN | 3 | 1.11952 |
| BULGARIA | BGR | 1 | 0.51444 | KUWAIT | KWT | 2 | 0.79054 |  |  |  |  |
| BOSNIA AND HERZEGOVINA | BIH | 1 | 0.52027 | OMAN | OMN | 2 | 0.79819 |  |  |  |  |
| LIBERIA | LBR | 1 | 0.58755 | BOTSWANA | BWA | 2 | 0.88479 |  |  |  |  |
| BENIN | BEN | 1 | 0.59493 | PERU | PER | 2 | 0.90140 |  |  |  |  |
| TURKEY | TUR | 1 | 0.68403 | MALTA | MLT | 2 | 0.97623 |  |  |  |  |
| DOMINICAN REPUBLIC | DOM | 1 | 0.68898 | THAILAND | THA | 2 | 1.02020 |  |  |  |  |
| TANZANIA, UNITED REP OF | TZA | 1 | 0.69720 | UGANDA | UGA | 2 | 1.03081 |  |  |  |  |
| EL SALVADOR | SLV | 1 | 0.72941 | LITHUANIA | LTU | 2 | 1.05038 |  |  |  |  |
| SERBIA | SRB | 1 | 0.73789 | URUGUAY | URY | 2 | 1.11271 |  |  |  |  |
| PARAGUAY | PRY | 1 | 0.78627 | PORTUGAL | PRT | 2 | 1.13228 |  |  |  |  |
| MALI | MLI | 1 | 0.78686 | MEXICO | MEX | 2 | 1.13246 |  |  |  |  |
| TUNISIA | TUN | 1 | 0.78750 | CZECH REPUBLIC | CZE | 2 | 1.13569 |  |  |  |  |
| ZAMBIA | ZMB | 1 | 0.82062 | CHILE | CHL | 2 | 1.16824 |  |  |  |  |
| KENYA | KEN | 1 | 0.86278 | GREECE | GRC | 2 | 1.31937 |  |  |  |  |
| MONTENEGRO | MNE | 1 | 0.89860 | INDONESIA | IDN | 2 | 1.35314 |  |  |  |  |
| CROATIA | HRV | 1 | 0.95445 | GUATEMALA | GTM | 2 | 1.45076 |  |  |  |  |
| PAKISTAN | PAK | 1 | 1.03833 | ISRAEL | ISR | 2 | 1.49244 |  |  |  |  |
| ALBANIA | ALB | 1 | 1.09547 | SOUTH AFRICA | ZAF | 2 | 1.67632 |  |  |  |  |
| HONDURAS | HND | 1 | 1.15736 |  |  |  |  |  |  |  |  |
| BURUNDI | BDI | 1 | 1.18120 |  |  |  |  |  |  |  |  |
| RUSSIA | RUS | 1 | 1.24571 |  |  |  |  |  |  |  |  |
| CONGO, DEM. REP. | ZAR | 1 | 1.29631 |  |  |  |  |  |  |  |  |
| NEPAL | NPL | 1 | 1.41795 |  |  |  |  |  |  |  |  |
| GEORGIA | GEO | 1 | 1.46522 |  |  |  |  |  |  |  |  |
| LATVIA | LVA | 1 | 1.64470 |  |  |  |  |  |  |  |  |
| ROMANIA | ROU | 1 | 1.82616 |  |  |  |  |  |  |  |  |
| LEBANON | LBN | 1 | 1.85203 |  |  |  |  |  |  |  |  |
| UKRAINE | UKR | 1 | 2.07395 |  |  |  |  |  |  |  |  |
| VENEZUELA, BOLIVARIAN REP OF | VEN | 1 | 2.17183 |  |  |  |  |  |  |  |  |
| MOLDOVA | MDA | 1 | 2.23803 |  |  |  |  |  |  |  |  |
| BANGLADESH | BGD | 1 | 2.41659 |  |  |  |  |  |  |  |  |
| BRUNEI DARUSSALAM | BRN | 1 | 3.43039 |  |  |  |  |  |  |  |  |
| YEMEN, REP. | YEM | 1 | 3.72530 |  |  |  |  |  |  |  |  |
| CYPRUS | CYP | 1 | 3.90764 |  |  |  |  |  |  |  |  |