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Economic Regime and Innovative Entrepreneurship Potential in Global Perspective: Suppression Index

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Abstract

This paper uses data collected in the World Bank's 'Knowledge for Development' database to develop an index providing a quick assessment of the extent to which the economic regime undercuts the utilization of a country's potential in terms of the quality of human capital, attained level of development of information and communication technologies together with the attained level of density of networks critical to stimulating and disseminating knowledge with practical applications. The international rankings or more exactly of scores that national economies get for attained level in each of these three pillars sheds light on the economy's relative potential that can be tapped provided there are no serious constraints to entrepreneurial activity imposed by the economic regime. The suppression of a country's potential for 'creative destruction' takes place if the score assessing country's innovative and entrepreneurial potential exceeds that of an economic regime. The proposed index of suppression is the ratio of the difference between scores for potential and economic regime's scores to their sum. It measures the extent to which the economic regime does not allow for capitalizing on its knowledge potential. Calculations of suppression indices for 140 countries represented in the database for years 1995, 2000 and 2012 have produced no surprises. Failed states and authoritarian regimes were among those with economic regimes suppressing accumulated potential: their economic systems fail to capitalize on their knowledge potential. The implementation of this analysis to former centrally planned economies also demonstrated the usefulness of the "suppression analysis" for tracing progress in transitioning towards economic regimes encouraging private sector development and innovativeness.

Key terms: innovation, entrepreneurship; knowledge intensity; innovation; comparative economic systems; transition from central planning; economic incentives; diffusion of technology;

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Economic Regime and Innovative Entrepreneurship Potential in Global Perspective: Suppression Index

by

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Introduction

While there seems to be consensus about ingredients of successful development strategies and institutions fostering efficiency, there is lack of clarity about what institutional economic arrangements match best attained level of economic development. Although a number of international surveys provide data allowing an assessment of the quality of governance and investment climate, an assessment at which level a given dimension of governance impedes development is not straightforward. Think-tanks as well as international organizations, most notably the World Bank, regularly publish surveys comparing various dimensions of governance across countries, determinants of their competitiveness as well as various barriers to doing business faced by private sector actors worldwide. They all show huge differences amongst national economies usually strongly linked with the level of economic development. Indeed, the quality of economic governance is positively correlated with the achieved level of economic development, but would improvements in the quality had any discernible impact on performance? While the working assumption is that they would, countries have different institutional bottlenecks and what may boost performance under one set of circumstances would not necessarily work under other set.

To authors' knowledge, only annual publications of the Geneva-based World Economic Forum rank competitiveness of national economies taking into account the relevance of various institutions depending on the achieved level of economic development. For instance, institutions supporting innovation are assigned much larger weight for highly developed than for least developed countries. Its underlying theoretical premise is that both the level of economic development and the distance of a country from the world's technology frontier shapes country's competitiveness. Indeed, a poor country does not need an elaborate framework of institutions to be competitive in global markets. At a very minimum, it needs an economic regime that would on the one hand assure stability, both political and macroeconomic, and, on the other hand, put effectively country's resources to a productive use. Countries at the top in terms of economic development also have superior institutions encouraging innovation and efficiency in the use of production factors. But there are exceptions, which go beyond economies affected by the resource curse.[1]

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[1] For instance, countries deriving their high incomes from natural resource exports tend to rank much lower in terms of the quality of economic governance. Because of enormous revenues from a source other than the firms and individuals themselves, the size and depth of tax base is of no relevance. And neither is the economic regime to stimulate economic activity. This has been called the resource curse (see Auty, 1993).

The World Bank's Knowledge 4 Development (K4D) database seems to be particularly suitable to answer the question about the impact of an economic regime on innovation or, more generally, entrepreneurship. Developed, as an offspring of research on the development of strategies of transition to a knowledge-based economy, it contains grades of national economies in terms of (1) the quality of their economic governance, (2) education, (3) cyber-development, and (4) innovation supporting networks. The average of grades on the above four dimensions yields the Knowledge Economy Index, which gives an indication of the extent to which a national economy is capable of using knowledge for development.

It is conjectured that the utilization of education and broadly conceived information capacities together with generation of innovation depends on the economic regime. We propose to use the database to examine relationship between economic governance and knowledge intensity, which is an average of scores on the remaining three pillars. Economic regime may provide incentives or disincentives to tap the country's accumulated potential in education, cyber-development and innovation structures. The level of education or the state of telecommunication and computer infrastructure can be compared to production capacities: but their utilization will depend on the extent to which there exists "… the set of rules and institutions that provide the incentives for entrepreneurs to work unceasingly for the creation, utilization, and dissemination of new products and productive techniques" (Baumol et al. 2007: 2).

In the "K4D" database, these sets of rules and institutions refer not to all entrepreneurs but only to innovative entrepreneurs. Economic regimes shielding domestic economy from competition from imports; erecting barriers to entry to doing business; failing to protect and enforce private property rights; seizing arbitrarily private property; and imposing onerous regulatory and tax burdens also suppress entrepreneurship understood in Schumpeterian sense of "creative destruction." It will hamper developing technologies to provide goods and services at lower cost or to develop new products and services.

In order to assess—using the data collected in the K4D database—whether an economic regime produces 'suppressing effect,' that is, it is incapable of capitalizing on knowledge potential, we construct a suppression index of entrepreneurial potential. It is built around the difference in scores between knowledge intensity and economic regime: since suppressing effect takes place only if the former is larger than the latter, negative values suggest that the economic regime is not a constraint. For the positive values, it denotes the extent to which the economic regime subdues the entrepreneurial/innovation potential of an economy: the higher the value, the more the economic regime prevents actors from tapping this potential. It represents the inability of a country to capitalize on its research and education potential.

The index recognizes that larger 'knowledge' potentials require higher quality institutional arrangements whereas poorer countries can develop with much less sophisticated institutions. This is clearly in line with multiplicity of successful development strategies provided that these strategies meet some well-documented requirements. Their implication is that variety of economic regimes can be used to implement these strategies. This is also in line with Acemonglu's and Robinson's (2012) discussion of political arrangements impeding or supporting sustainable economic growth. They argue that only democratic inclusive institutions can assure sustainable growth of economies which are already on world technological frontier whereas inclusiveness is not a condition necessary for catching up.

The remainder of this note is organized as follows. The first section briefly discusses the methodology underpinning the World Bank's "K4D" (Knowledge 4 Development) database. The second section introduces the concept of a suppression index and applies it to the analysis of around 140 countries

present in the database to test its usefulness. The third section applies the "suppression analysis" to a group of countries that stood out in 1995 in terms of high values of the suppression index and traces their evolution over time. The fourth section concludes.

1. Review of the '"K4D"' database

The World Bank's '"K4D"' database, an offspring of research on the development of strategies of transition to a knowledge-based economy,[2] does not address the issue of a country's potential for absorbing and generating innovation. But it provides information allowing for an assessment of the capacity of an economic regime to capitalize on accumulated knowledge potential. The objective of this section is to show how this task could be accomplished.

Considering that many questions about mass flourishing, to borrow an apt term from Edmund Phelps (2013), of innovation remain unanswered, it would be naïve to expect the "K4D" database to cover all dimensions deemed relevant. Yet, some omissions are unfortunate: Missing are indicators of the extent to which individuals are empowered to express creativity and exploration for their own sake would help capture potential innovative spirit in society. As Christine Lagarde succinctly pointed out in a June 6 speech at the London School of Economics: "fundamentally, there are no shortcuts to a vibrant economy—it must be built up from the bottom up, from the empowerment of every single individual," adding that "we must do whatever we can to help people help themselves, to let people lift themselves up—through enabling policies, enabling institutions, and enabling modes of international cooperation."[3] In other words, people will have greater chances of flourishing if more is done to empower individuals, national institutions, and the multilateral framework. A practical problem is the construction of indicators that would capture aspects of economic freedoms, quality of administration, etc., which are relevant to innovative entrepreneurship.

These comments notwithstanding, the "K4D" contains valuable information assessing country's economic regime and achieved level in education, R&D networks, and technical infrastructure. A more detailed examination of the database built around the objective of providing inputs to the development of a transition strategy to knowledge economy shows that this is all about structural economic reforms designed to put country's available assets to the best use. Wording may be different but economic meaning is the same. If one replaces 'knowledge' with 'resources' in the statement: "Making effective use of knowledge in any country requires developing appropriate policies, institutions, investments, and coordination across the above four functional areas,"[4] this turns it into a praiseworthy objective of any economic reform.

According to the authors of the "K4D" database, the economic regime that helps accomplish this objective has to have the following traits: it has to be open, i.e., assure integration into global markets for goods thanks to liberal foreign trade regime; it should not overburden the private sector with excessive regulations; and it should be based on the rule of law. By the same token, the benchmarks for the 'best' economic regime are straightforward: liberal external economic regime; minimum harassment cost of

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[2]For a detailed description of the methodology of the project and major variables covered in the survey, go to http://web.worldbank.org/WBSITE/EXTERNAL/WBI/WBIPROGRAMS/KFDLP/0,,menuPK:461235~pagePK:64156143~piPK:64154155~theSitePK:461198,00.html

[3] Remarks at the 2014 Amartya Sen Lecture as reported in the *IMF Views and News*, Issue No. 9 - June 11, 2014.

[4] Copied from the website above.

doing business; and de-politicization of public-private interface, that is, rule of law. This does not cover all ingredients that can be extricated from an empirical examination of the experience of success economic stories but it captures the most important ones: low regulatory burden, openness, and the rule of law.[5]

Peculiar features of "K4D" approach prop up in factors determining the potential for innovation and mass flourishing, to paraphrase Phelps (2013), of entrepreneurship. These factors, referred to—together with the discussed above economic regime (***Economic Incentive Regime--EIR***)—as pillars helping articulate knowledge strategy, include:

- ✓ ***Education (EDU)***: the quality of human capital measured in terms of education and skills;
- ✓ ***Innovation (INNO):*** networks supporting absorption, creation and dissemination of knowledge and new technologies; and
- ✓ ***Information and Communication Technologies*** (***ICT***): these are critical to effective communication, dissemination and processing of information.

Four pillars are defined in terms of the following variables. The EIR is defined in terms of three variables: Tariff and Non-tariff Barriers; Regulatory Quality and Rule of Law. Tariffs and Non-tariff Barriers are derived from the data available in the WTO whereas the remaining two come from the World Bank's annual surveys of governance in almost 200 countries and territories. The INNO is a simple average of scores on three variables: total royalty payments and receipts; patent applications granted by the U.S. Trademark and Patent Office; and articles published in scientific and technical journals. These data are available as weighted or not weighted by population. The EDU pillar is a normalized index based on three variables: adult literacy rate, secondary enrollment, and tertiary enrollment. ICT score is also based on average values of normalized scores of three variables: telephone penetration; computer density; and internet penetration—all per 1,000 people. Scores for each pillar are normalized with values between 0 and 10: 10 being the best and 0 the worst.

There is an important conceptual difference between the above pillars and the Economic Incentive Regime (EIR), on the other hand. While the former provide information about the potential, the latter informs about the extent to which this knowledge/entrepreneurship potential can be activated. Put differently, high quality of human capital together with advanced ICT alone will do little to tap this potential without an economic regime allowing easy access to imported goods and services, trouble-free entry and exit, and protecting private property and assuring low cost of doing business in a country.

The database encompasses 148 structural and qualitative variables for 146 countries. They measures their scores along these four pillars or dimensions relative to each other by normalizing variables on a scale of 0 to 10. The average score for four pillars is defined as a country's overall Knowledge Economy Index (KEI). The authors recognize the difference amongst four fundamental pillars and uniqueness of the EIR and introduce, simply, a Knowledge Index (KI) limited to the average of scores for three pillars excluding the EIR.

[5] Ingredients of economic success over the last six decades or so are empirically well-documented. According to a study (CG&D 2008), 13 countries worldwide that succeeded in generating average growth rates of 7 percent a year of more for 25 years or longer over 1950-2005: (a) relied on access to world markets; (b) maintained macroeconomic stability; (c) generated high rates of saving and investment; (d) relied on competitive markets to allocate resources; and (e) had well-functioning administration.

In a nutshell, the database allows for cross-country comparisons, which, in turn, may identify weak points in a country's economic regime and developmental potential. These are necessary components of a diagnosis of the potential of a country, which, in turn, is needed if one wants to design a strategy to exploit a country's entrepreneurial capacity.

2. EIR as an impediment to liberating the economy's entrepreneurial potential: suppression index

More importantly, and the objective of this note is to show it, the data collected and processed in the "K4D" database allow for an assessment of the extent to which the economic regime or EIR stifles entrepreneurship and innovativeness of businesses. Note first that three pillars—INNO, EDU, and ICT—are to a certain extent interrelated, while the EIR stands apart. Low levels of education are not likely to be accompanied by high penetration rates of the ICT or high scores for INNO pillars. These can be improved only over time and with a considerable expenditure of resources. They are the product of economic development accumulated over time. A more developed country is likely to score higher on these three pillars than a poorer one. As we shall see below, there may be minor exceptions to this general pattern that deserve a closer examination.

But this type of restraints, related to resources and time constraint, does not apply to the EIR. Countries can copy institutional arrangements of higher developed economies thus recognizing that institutional structures explain to some extent successes and failures in growth performance. Institutional reforms cannot be implemented with the stroke of a pen for both political and frequently technical reasons. But these reasons notwithstanding, structural reforms can be introduced faster than the implementation of measures raising the values of variables determining the scores of other three pillars. Since institutions explain the paths of economic development,[6] countries facing the crisis may become motivated to launch serious structural economic reforms.

The "K4D" database makes possible identifying these situations as this will result in the increase of discrepancies between country's scores of the EIR and those for other pillars. The central proposition here is that the differences between the KI (knowledge intensity index equal to an average of scores for three remaining pillars) matter. Note that leaving aside the INNO pillar measuring R&D output (royalties balance, patents, and published scholarly articles) two other pillars measure capacity to be utilized, i.e., stock of human capital (level of education) and communication infrastructure. The central argument here is that the EIR is critical to tapping this potential. Low quality of the EIR relative to the KI impacts negatively overall economic performance. Weak protection of property rights, barriers to foreign trade, and invasive regulations do not encourage start-ups or longer term economic contracts. The interpretation of the positive difference is straightforward: countries scoring higher on 'knowledge infrastructural' dimensions as captured by KI (Knowledge Index) than on the EIR have economic regimes not allowing them for the full use of their accumulated potential. Put differently, the EIR suppresses social productive forces as long

[6] For the most entertaining recent analysis covering many countries from all continents across the globe over the last millennium, see Acemonglu and Robbinson (2012)

as KI > EIR. To use a sport analogy, the positive difference between KI an EIR is analogous to forcing an athlete to compete with chains on her legs or hands.[7]

Calculations of KI – EIR for the data in 1995, 2000 and 2012 lead to the following three general observations (see Table 1). First, although the average scores of EIR and KI differed, the differences were small and falling. The average, although still in the negative territory indicating the prevalence of suppression world-wide, fell from -0.50 in 1995 to -0.04 in 2012. They also changed direction as in 2012, the score for EIR was slightly higher than for KI in contrast to respective values in 1995 and 2000.

Second, frequencies for countries with the values of (KI-EIR) below -1, between -1 and 1, above 1 remained roughly stable with a caveat: the number of countries with these values above unity fell. This suggests that the number of countries with 'shackles' on their creative potential, fell significantly in 1995-2012. As we shall see below, the number of countries with (EIR-KI) above 2 and below -2 varied considerably in 1995, 2000, and 2012.

Third and last, neither minimum nor maximum and average values of (KI-EIR) in 1995, 2000 and 2012 point to any systemic differences in rankings or grading of countries in terms of EIR and KI. To the contrary, variation in EIR and KI scores remained remarkably stable across three surveys with the values of variation coefficient slightly higher for EIR (at around 0.55) than KI scores (0.41 in 1995 and 0.5 in 2000 and 2012). And not surprisingly both scores are positively highly correlated.[8] For values of KI exceeding KI, there are, however, 'gaps' in quality between institutions and potential for knowledge-intensive development (Table 1).

Table 1: Average, minimum and maximum values of KI - EIR differences and countries' frequencies in 1995, 2000 and 2012

Number of countries with the value of KI-EIR difference equal to	**1995**	**2000**	**2012**
more than 1	39	29	26
Less than 1 and more than -1	78	82	86
Less than -1	26	30	31
Values of the KI-EIR difference	**1995**	**2000**	**2012**
Max	5.70	4.99	5.05
Min	-2.11	-2.98	-3.66
Average	-0.50	-0.12	-0.04
Average scores	**1995**	**2000**	**2012**
KI (Knowledge Index)	5.53	5.14	5.09
EIR (Economic Institutional Regime	5.03	5.08	5.10
KI – EIR	0.50	0.06	-0.01

Source: Own calculations from data derived from the World Bank database "Knowledge 4 Development" available at the website http://info.worldbank.org/etools/kam2/KAM_page5.asp

A quick glance at countries with a suppressing dissonance between 'knowledge/entrepreneurial' potential and institutional environment, whose share in total number of surveyed countries increased from 14

[7] On the other hand, the negative value suggests that the economic regime is not a major impediment—the task should be to increase capacity of EDU and ICT pillars. The negative difference between KI and EIR is likely to a set a virtuous cycle: expanding demand for higher skilled labor force will increase rewards for education and innovativeness.

[8] The values of a correlation coefficient were 0.81 in 1995, 0.85 in 2000, and 0.82 in 2012.

percent to 20 and 21 percent in 2000 and 2012, suggests that they also have low scores for both KI and EIR pillars. Except for South Korea in 2000 and 2012, not a single country in this group scored in EIR above 4.5 points.

By the same token, the differences in EIR and KI scores alone do not offer a full assessment relative to the scores of a country in respective dimensions. In order to relate these values to the achieved level of KI, we shall normalize it and call it the suppression index (SI): SI can be expressed as (KI-EIR)/(EIR+KI)*100 for KI>EIR. The SI can assume values between 0 and 100. Since the EIR suppresses exploitation of the knowledge and entrepreneurship potential only for the values above zero, negative values provide indication that the road to increase efficiency does not go through the improvement in economic regime. For positive values, which can go up to a maximum of 100, we shall refer to it as a suppression index (SI). As argued earlier, the negative values of the SI would simply suggest that the EIR does not prevent tapping country's potential: thus, there would no suppression effect. Had the scores along EIR and KI dimensions fully matched, the values of SI would equal zero. But this is not the case as the discussion of differences between KI and EIR above showed. The number of countries with SI (i.e., with KI>EIR) was falling from 77 countries in 1995 to 68 in 2000 and 58 in 2012. By the same token, the number of countries with institutional arrangements not hindering entrepreneurship increased in this period from 63 to 82.

Table 2: Twenty countries with highest values of suppression index in 1995, 2000 and 2012

Country	1995	Country	2000	Country	2012
Tajikistan	93	Angola	72	Zimbabwe	92
Lao PDR	92	Belarus	63	Venezuela, RB	86
Iran, Islamic Rep.	76	Russian Fed.	62	Myanmar	76
Serbia	73	Myanmar	59	Iran, Islamic Rep.	74
Uzbekistan	71	Zimbabwe	59	Uzbekistan	62
Rwanda	67	Uzbekistan	58	Sudan	58
Georgia	62	Algeria	52	Cuba	56
Sudan	56	Sudan	50	Argentina	52
Azerbaijan	53	Cuba	44	Russian Fed.	51
Angola	51	Azerbaijan	43	Kyrgyz Rep.	49
Kazakhstan	51	Ukraine	36	Guinea	46
Cameroon	48	Nigeria	33	Belarus	45
Belarus	47	Fiji	32	Ecuador	43
Ethiopia	44	Syrian Arab Rep.	31	Fiji	40
Russian Fed.	44	Lebanon	29	Guyana	34
Nigeria	42	Iran, Islamic Rep.	29	Nigeria	33
Myanmar	40	Sierra Leone	26	Bolivia	33
Ukraine	39	Kazakhstan	25	Algeria	30
Algeria	37	Georgia	25	Ukraine	23
Armenia	37	Albania	22	Barbados	23
Memorandum: Number of countries with SI values above 10					
	44		25		36

Source: As in Table 1.

The improvement, however, has been lower than the increase in the number of countries with economic regimes incapable of capitalizing on countries' assets. The average value of the SI fell from 23 in 1995 to

18 in 2000 and went back to 23 in 2012. The number of countries with the values of SI above 10 fell from 44 in 1995 to 25 in 2000 but increased to 36 in 2012 (Table 2).

A cursory examination of this group of countries suggests that a liberal market-based democracy shows up, if at all, only for economies at single digit values of the CI. The common feature of countries with the values of SI above 10 is that not a single one of them classified as a market-based democracy. In terms of Acemonglu and Robinson (2012) framework, their political institutions were extractive, i.e., controlled by a small group of individuals as opposed to inclusive institutions, where outcomes would involve participation of vast segments of society.

Furthermore, amongst SI economies, there are both authoritarian regimes and failed states. Thanks to the centralization of institutions and power, the former can generate economic growth but only insofar as they are not anywhere near the world technological frontier. In order to examine characteristics of this group, we shall take a closer look at the top twenty of countries with most suppressing arrangements.

The list of countries imposing greatest shackles on entrepreneurial and innovative potential has evolved over time with its membership showing two traits: state micromanagement of both polity and economy and the combination of political instability, violence and economic chaos. As for the first group, note the 'dominance' of former Soviet republics, which declined as dismantling of central planning progressed. While they accounted for almost half (9 countries) of the "Top Twenty" list in 1995, their number fell to seven and five in 2000 and 2012, respectively. Zimbabwe moved to the "Top Twenty" in 2000 and in 2012 occupied the position number one. Ill-conceived turned Zimbabwe from the fastest growing economy in Africa in 1996-98 into the fastest shrinking economy in the world with an average contraction of the real GDP of 7 percent per year in 1999-2008 (Kaminski and Ng 2013). Of course, neither Zimbabwe nor former Soviet republics were not the only ones characterized by state micromanagement of the economy. There were others; some of them affected by natural resource curse (e.g., Nigeria) and others governed by highly exploitative 'collectivist' political regimes (e.g., Lao's People Democratic Republic, Cuba). Some, like Angola, had both socialist political regime and several decades of devastating civil war ended in the early 2000s.

Extremely high values of SI of countries suffering from rampant ethnic strives resulting in civil wars tend to abate once the conflict has been resolved. Examples include Tajikistan (civil war in 1992-97) and Rwanda. Following the end of Tajik civil war in 1997, Tajikistan, ranked first in 1995, disappeared from the Top Twenty already in 2000. Similarly the Rwandan civil war ended in 1995 and Rwanda left the top Twenty five years later. So did Serbia and Croatia, two former Yugoslav republics, engaged in civil war. On the other hand, Sudan, plagued by internal conflicts and ethnic cleansing, retained its position among top twenty 'suppressants.'

In all, it seems that juxtaposing institutional economic regimes against their respective knowledge and entrepreneurial potential offers interesting observations concerning the potential impact of institutional arrangements. Many analysts predicted in the early 2000 an inevitable shift in economic power in favor of five rapidly developing countries referred to as BRICS; standing for Brazil, Russia, India, China, and South Africa. Except for India with values of 0 in 1995, (-) 9 in 2000, and (-) 11 in 2012 and South Africa in 2012 (-4);[9] the CI was suppressing for other BRICS: Brazil had 3 in 1995, 14 in 2000, and 18 in 2012; Russia 44,

[9] The shift to a positive category was mainly the result of declining score in knowledge intensity of South African economy

62, and 51;[10] China had 9, 19, and 9; and in 1995 and 2000 South Africa scored 29 and 5, respectively. What initial observations could be derived from these values? First, positive values of the suppression index may not hinder economic growth of net exporters of food, energy and raw materials assuming, of course, that their world prices remain high. This was the case until 2008: Brazil and Russia were booming.[11] Falling world prices may bring this growth to a screeching halt. Second, the case of China stands out as the level of institutional suppression in China has remained relatively low: its economic growth performance has remained strong in spite of the world depression. Third, it would seem that India may have stronger revealed innovative advantage than other BRIC peers. Incidentally, empirical research comparing R&D intensive activities conducted by multinationals in China and India has confirmed much better performance of the latter in spite of China's three major advantages: GDP more than three times larger; R&D expenditures more than four times larger; and much larger number of graduates with PhDs (Gupta and Wang, 2009 and 2011).

3. Application of the compatibility analysis to transition from central planning

We shall further illustrate the value of this type of an analysis by taking a closer look at countries that began their transition from central planning in 1989-92 following the collapse of the Soviet Bloc and Yugoslav brand of socialism. Except for Turkmenistan and Bosnia and Herzegovina, all other post-central planning economies are represented in the database. Altogether, there are 23 economies falling into this group: fourteen former Soviet republics including Baltic States; six former Soviet-led Council for Mutual Economic Assistance (counting newly-established Czech and Slovak Republic as two); Albania; and four former Yugoslav republics.

Although the '"K4D"' database only has data beginning in 1995, that is, already after the so-called transformational recession was over in some former Centrally Planned Economies (FCPEs), observations from three points in time spread over a period of 17 years provide sufficient base to examine and identify patterns of their economic institutional evolution. Given a modest format of this note, we shall only elaborate main points. For starters, this group indeed stood out among countries in several respects but, with the passage of time, its idiosyncratic features have largely disappeared. The extent of state micro-management of the economy was huge in 1995. Out of 26 former FCPEs, 19 had 'suppressing' economic regimes in 1995; but by 2012 their number dropped to 10. So did the value of SI, albeit to a lesser extent (Table 3).

The improvement was due to economic reforms which removed some shackles imposed on economic activity by state's micromanagement. The average EIR score increased from 4.27 (or 51% of the average score for high income economies) in 1995 to 4.58 (54%) in 2000 and 5.71 (68%) in 2012. As expected, scores of knowledge intensities (KI) of former communist countries were significantly higher than EIR scores relative to other countries. The KI scores initially fell from 6.38 in 1995 to 6.03 in 2000 and increased

[10] The situation in Russia in terms of the size of suppression effect is reminiscent of the Soviet Union. Soviet scientists and engineers were superbly trained but the economic system made impossible to capitalize on their work (Baumol et al. 2007; p. 65).

[11] Oil prices increased ten-fold over 1999-2010. This was the only reason for Russia's rapid economic growth during this period.

to 6.16 in 2013: in terms of the average for High Income Countries, they amounted to 67% in 2000 and 71% in 2012.[12]

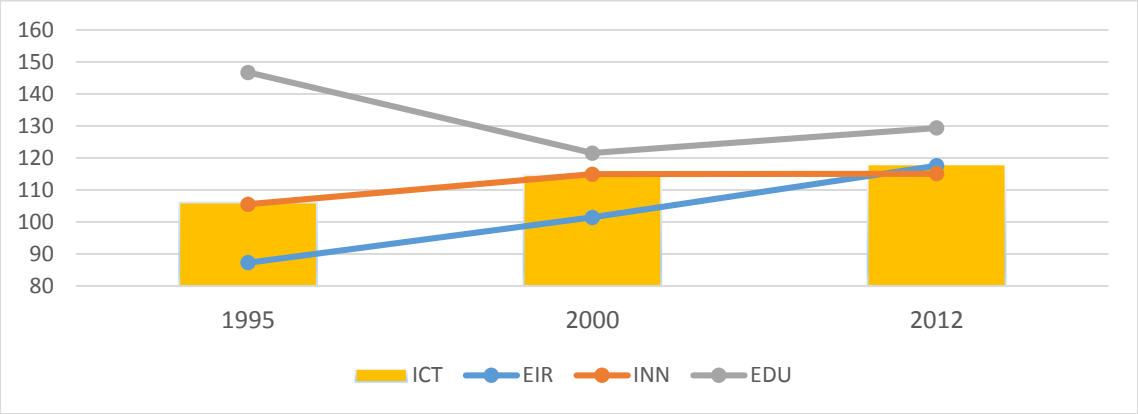
Table 3: Average values of Suppression index (SI) and the number of countries with 'suppressing economic regimes' in 1995, 2000, and 2012

	1995	2000	2012
1. Number of all countries with SI>0	77	68	58
2. Number of former FCPES with SI>0	19	20	10
3. Average for 1	23	18	23
4. Average for 2	37	22	31
5. Average for all excluding FCPEs	6.40	0.05	-0.42
6. Average for FCPES	26.10	16.20	8.00

Source: As in Table 1.

The average scores of FCPEs were significantly higher on all dimensions of KI, i.e., innovation, education, and ICT. The largest was in education, which—together with excessive industrialization relative to the level of economic development—was a unique feature of Soviet-type economies (Winiecki, E., Winiecki, J. 1992). The advantage in education, although significantly reduced, continued in 2000 and 2012. However, the greatest change occurred in the average EIR score: it was, 23 percentage points below the average in 1995, one percentage above it in 2000, and 18 percentage points in 2012 (see Figure 1).

Figure 1: Ratios of averages for FFCPEs to averages for totals excluding FCPEs of scores for economic regime, innovation, education and ICT in 1995, 2000, and 2012 (in percent)



Source: As in Table 1.

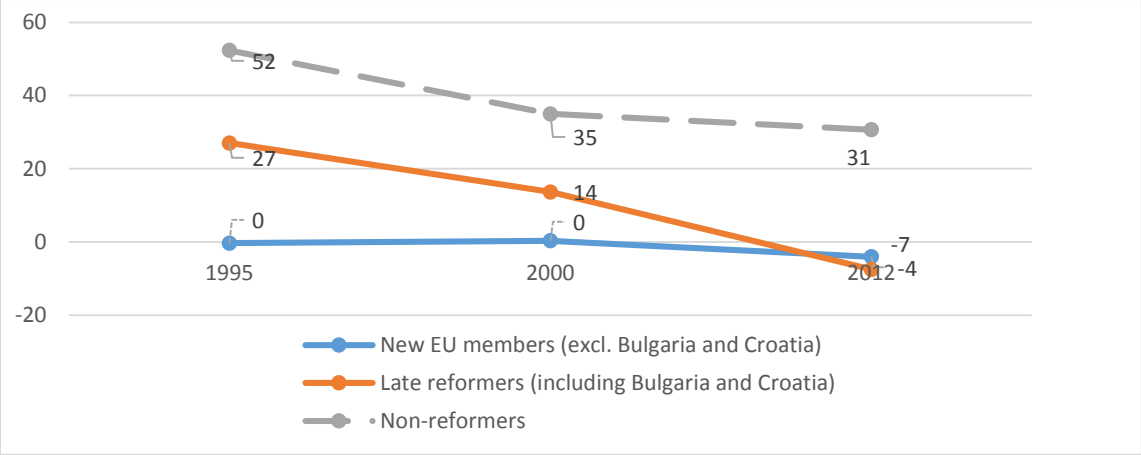
Hence, the reduction in suppressing impact of the EIR occurred not as a result of contraction in KI scores but mainly thanks to liberalization of the economy. In the process, there has been alignment in the scores on all dimensions of KI and of the latter with the EIR scores. In all, these countries have moved closer to averages in line with their achieved level of knowledge intensity increasingly compatible with economic incentive regime.

A closer examination of developments within FCPEs corroborates findings derived from other detailed analyses. First, the pace of removing suppressing impact of the economic regime was the fastest amongst

[12] No data available for income groups in 1995.

countries that adopted radical approach to economic reforms and progress was slower for countries located further from Brussels (for detailed analysis, see Kaminski and Kaminski 2009). The suppression index was either positive or lower than 7 for ten countries, excluding Bulgaria, that acceded to the EU in 2004 and 2007 (Figure 2). Albania also had in 1996 a negative suppression index, which moved to the positive domain following the economic crisis and instabilities in 1997. In 2000, the group meeting the above criterion increased to 11 as two former Soviet republics—Armenia and Moldova—moved forward with economic reforms. The largest improvement occurred between 2000 and 2012 coinciding with the entry of 11 FCPEs to the EU and more active EU policy supporting reforms in the Balkans and other countries falling under the umbrella of European Neighborhood Policy. The number of FCPEs with the values of SI below zero increased to 16 with all other countries scoring above 7. On top of 11 new EU members, the group included Balkan countries (excluding Serbia) and two Transcaucasia's former Soviet republics—Armenia and Georgia. In contrast to other 'flower' revolutions, only the Revolution of Roses in Georgia has produced a dramatic turnaround in the economic regime. With the value of suppression index of minus 24 (no suppression) in 2012, Georgia, relative to its 'innovative' potential, had the least restrictive economic regime among FCEs. Neither Tulip Revolution in 2005 nor Orange Revolution in Ukraine in 2004 has led to liberalization of respective economic regimes.

Figure 2: Values of suppression indices for selected groups of FCPEs in 1995, 2000, and 2012



Source: As in Table 1.

This leads to the second point: the composition of a group of FCPEs with economic regimes hugely suppressing innovativeness and entrepreneurship, thereafter referred to as non-reformers, has remained unchanged over the last two decades. The FCPEs can be divided into the following three groups: EU members excluding Bulgaria and Croatia;[13] 'delayed' bold reformers; and persistent non-reformers. Already in 1995, i.e., when they were not even EU candidates, an average suppression index was zero (see Figure 2). The EU member group also scored very high on economic regime: in percent of the average for high income economies, their scores ranged between 100% (Estonia) and 72% (Romania). By 2000, the range increased to 105% and 88% with the same countries at boundaries. All of these countries recorded

[13] Croatia was not a member in 2012: she acceded in 2013. Both countries, albeit for different reasons, had highly oppressive economic regime in 1995.

improvements in their KI grades between 1995 and 2012. Thus, the change in compatibility was the result of positive changes in both EIR and KI.

This was not the case of the 'delayed' group, which—in addition to Bulgaria and Croatia—contains all other countries with suppression indices moving to a negative territory by 2012. These countries are: Armenia, Bosnia and Herzegovina, Georgia and Macedonia. As mentioned earlier, the most impressive were improvements in Georgia's economic regime vis-à-vis her innovation/entrepreneurship potential: the value of a suppression index moved from 62 in 1995 to 25 in 2000 and jumped to minus 24 in 2012, the highest value amongst FCPEs. Except for Bosnia and Herzegovina and Croatia, the improvement was not the result of better 'grades' in both KI and EIR, with the latter increasing more than the former, but an increase in the EIR and contraction in KI.

The group of non-reformers including Russia, Belarus, Serbia, Azerbaijan, Kazakhstan, Kyrgyz Republic, Moldova, Tajikistan and Uzbekistan is a highly diversified group both geographically and in terms of resource endowments. Russia, Azerbaijan and Kazakhstan meet all the requirements to suffer from the resource curse. Except for Uzbekistan, Serbia and Moldova, they are all members of the Russia-dominated Eurasian Economic Community Union. Except for Kyrgyz Republic, Uzbekistan and Russian Federation, all other countries improved their grades in economic regime. However, except for Russia, their grades for KI deteriorated.

The analysis above suggests two roads of integrating into global structures: one through Brussels and another one through Moscow. Non-reformers are mostly countries closely integrated into Russia through now-formalized ties (various regional trade agreements).[14] Countries from other two groups are those who actively sought integration into the EU with a possible exception of Armenia seeking for political reasons closer ties with Moscow. Using different indicators (EBRD's indicators of transition and economic governance quality derived from the World Bank's data), we arrived at a similar pattern (Kaminski and Kaminski 2009.

4. Concluding comment

The "K4D" database is a source of useful information that can be used as a preliminary diagnostic tool identifying major constraints to the development of a strategy of productively using country's 'knowledge-related' assets. Moreover, it allows to see country's position relative to other economies at a similar level of economic development. Last but not least, the de facto ranking of countries in terms of the Knowledge Economy Index provides an incentive to the authorities, as it is the case with the Cost of Doing Business rankings, to undertake measures designed to improve scores on the respective dimensions.

The proposed index of suppression is based on the recognition of the fact that the identified determinants of knowledge intensity are linked to an economic incentive regime. The latter not only may unleash forces to improve, for instance, the level of education but it also may put available resources to a productive use. Negative values of the index measures the extent to which an economic regime leads to an underutilization of knowledge-assets that a country has at its disposal.

It does not, however, measure the propensity of a given economy to innovate. But this raises a broader question: is it possible to identify measurable variables that would shed light on the capacity of an

[14] For an excellent discussion of recent developments in Russia-centered regional integration, see Vousinas (2014).

economy to innovate. The difficulties abound. Some stem from the fact that countries at a lower level of economic development have huge gains from technology absorption: for these more relevant are measures depicting the capacity to absorb. Others relate to cultural and institutional sources of innovative dynamism rooted in individual freedoms. Phelps (2013: p. X and 324) warns that the tendency observed in highly developed countries over the last fifty years of "putting state over individual" and "haze of regulations and pork barrel contracts" led to the loss of dynamism. The task for further research is to conceptualize and develop measures assessing country's capacities to develop and absorb ideas improving productivity and allocation of resources.

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