FAST-GROWTH ECONOMIES AND THE DETERMINANTS OF COMPETITIVENESS IN LATIN AMERICA AND THE CARIBBEAN

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Abstract. *In Latin America and the Caribbean, low productivity levels have long been blamed for the region's lagging performance. After defining Fast Growth Economies (FGEs) as those economies able to sustain an averaged five percent income growth over a period of five years, the study goes on to identify them as Panama, Peru, Uruguay, Dominican Republic and Argentina. The World Economic Forum's (WEF) twelve-pillar methodology is then applied to explore the factors that may explain those countries' superior performance, along with those that are likely to inhibit their further development. Technological Readiness, Infrastructure, and Higher Education and Training emerge as the areas driving the higher competitiveness levels of the FGEs in the region. In order to statistically estimate the reach of the findings, multiple regression analyses are conducted, combining GDP figures and the countries' WEF scores.*

Introduction

Firm-level competitiveness strongly influences the capacity of countries to develop, generate jobs, and increase prosperity. While competitiveness could be nominally enhanced by way of reduced taxes or outright subsidies, those choices merely create temporary advantages. Sustained competitiveness asks for long-term policies aimed at increasing productivity, which materializes at the firm level, but requires the overall upgrade of the business environment. This paper explores the determinants of competitiveness of Latin American and Caribbean economies, applying the novel concept of Fast Growing Economies (FGEs), in an effort to unveil the high growth rates drivers in the region.

Fast-Growing Economies (FGEs) are hereby analyzed at country level and with a special focus on the Latin American and Caribbean (LAC) region. In this context, FGEs are defined as those countries that have managed to *achieve* and *sustain* a superior GDP growth rate, relative to economies in the same or other regions. The determinants are the causal elements or factors of a country's higher growth rate. Some of those are what David Ricardo (1971) first called "comparative advantages", which are based on factor endowment conditions, such as labor, land, or natural resources. However, those factors can only partially explain current performance, since many countries with abundant resources often remain in rather poor economic conditions. Endowed resources in and of themselves do not fully determine the ability of a nation to generate a higher growth rate. Rather, it is the notion of competitiveness that emerges as a relevant lens to explore the discrepancies that the theory of comparative advantage falls short to explain. This study draws on Porter's Diamond model (Porter, 1998) as analytical framework, to assess the competitiveness drivers identified applying the World Economic Forum Global Competitiveness Index 12-pillar methodology.

The opening section reviews the theory behind fast growing economies, the methodology used to identify the FGEs in LAC, and a brief background on the region and various selected economies. The second section aims at exploring key areas of competitiveness for the region and the FGEs, and concludes with a special focus on the competitiveness of selected FGEs, applying Porter's Diamond model. Finally, a quantitative approach to growth in LAC is developed in the last section, with the purpose of statistically estimating the reach of the findings, and pinpointing the key competitiveness factors driving faster economic growth.

How to measure competitiveness

The Global Competitiveness Index (GCI), developed by the World Economic Forum (WEF), and The World Competitiveness Yearbook (WCY), issued by the Institute for Management Development (IMD) – both based in Switzerland-, make for two of the most sought-after reports on country-level competitiveness. The GCI offers a holistic crosscutting of the key elements and dynamics influencing national productivity and competitiveness by means its 12-pillar framework. The WCY, in turn, presents soft and hard data that highlight the drivers of national competitiveness, ranking countries on the basis of their capacity to reach the highest level of economic prosperity. Other than the countries covered in the reports -144 in 2013 for the GCI, while the WCY ranked 60 in the same year-, the main difference is of methodological nature –while the GCI puts more emphasis on survey data, the WCY focuses on 'hard' statistics from international, national and regional organizations.

Despite the vast amount of literature on competitiveness, the very definition of the concept, along with proper metrics to measure it, remain controversial. The factors that drive productivity and competitiveness are multiple, complex and different in nature. Systematic frameworks such as the WCY and the GCI are arguably useful tools to assess competitiveness at the country-level, and despite their limitations, they contribute to better grasp the meaning and scope of this complex concept. In the aftermath of the 2008 global financial crisis, competitiveness has become not only highly topical, but also truly relevant and impactful in shaping economic growth and prosperity.

Fast-growth economies

FGEs represent rapidly growing markets with a special emphasis on the growth drivers. Along with a number of similar concepts that try to bundle countries according to their relative stage of development –'developed' versus 'underdeveloped', 'mature' versus 'developing' countries-, and recent ones looking more closely at growth irrespective of country boundaries –'fast expanding markets' (Esposito & Tse, 2013)-, the concept of 'fast-growth economies' hereby proposed is an attempt to build bridges across those categories, emphasizing the growth dimension –and particularly the determinants of such growth-, while sticking to the country as unit of analysis.

FGEs are defined as those countries that manage to achieve and sustain high economic growth, measured as average GDP growth rates over five consecutive years. For the purpose of this research, FGEs are identified for the Latin American and Caribbean region. Being by definition a comparative metric, the concept of FGE implies looking at GDP growth over time across countries, so as to spot those that manage to reach and sustain higher income growth over the five year window. While the choices of growth rate and time window are debatable, we argue that in a context of very low –and often negative- growth rates, a five percent average increase is remarkable. Even if such exceptional mark could be occasionally achieved, the term FGE is coined to recognize the outstanding cases in which countries manage to average such high growth over a five-year period, so as to try and capture the challenges implied in sustaining such performance over time.

Leveraging on their superior growth rates, FGEs are better equipped to attract FDI, unlocking a virtuous circle of business environment improvements, likely increasing prosperity.

Methodology

Measuring fast growth

GDP at constant prices, i.e. adjusted for inflation, was collected from the International Monetary Fund (IMF) and World Bank websites, for the following set of countries in Latin America and the Caribbean:

Table 1. List of Latin American and the Caribbean countries measured

N°	Country	N°	Country
1	Argentina	13	Haiti
2	Barbados	14	Honduras
3	Bolivia	15	Jamaica
4	Brazil	16	Mexico
5	Chile	17	Nicaragua
6	Colombia	18	Panama
7	Costa Rica	19	Paraguay
8	Dominican Republic	20	Peru
9	Ecuador	21	Suriname
10	El Salvador	22	Trinidad and Tobago
11	Guatemala	23	Uruguay
12	Guyana	24	Venezuela

From the list above, the Compound Annual Growth Rate (CAGR) was calculated for the period 2007-2012 (with data up to 2011), by applying the following formula:

$$\text{CAGR}(t_0, t_n) = (V(t_n)/V(t_0))^{\frac{1}{t_n - t_0}} - 1$$

- $V(t_0)$: start value, $V(t_n)$: finish value, $t_n - t_0$: number of years.

Compound Annual Growth Rate (CAGR) is a measure for the geometric mean that provides a steady rate of return over the time interval chosen. In other words, it is the rate at which an investment -or an economy in this case- would have grown if it grew at a constant rate over the time period. CAGR diminishes the effect of volatility of periodic returns that can make arithmetic means irrelevant. In the context of this study, such a formula is especially useful to inhibit the effect of the 2008 financial crisis. Following this method, the countries that record the highest growth rates are computed and listed in the table below:

Table 2. GDP at constant prices (in billions of national currency) and CAGR for top performers (World Economic Outlook Database, April 2013, IMF Website)

Country	2007	2008	2009	2010	2011	CAGR 2007 - 2011
Panama	17,084	18,813	19,538	20,994	23,272	8,034%
Peru	174,408	191,505	193,157	210,143	224,669	6,535%
Argentina	359,17	383,444	386,704	422,13	459,571	6,356%
Uruguay	471,38	505,207	517,422	563,446	595,564	6,020%
Dominican Republic	314,593	331,127	342,564	369,117	385,664	5,224%

Latin America and the Caribbean (LAC) competitiveness standings

In order to capture the drivers of competitiveness of fast-growing countries in the LAC region, it is worthwhile comparing the GCI and WCY indexes, so as to identify the competitiveness factors that led to the superior growth rates achieved by the FGEs listed above. The table below summarizes the competitiveness ranks and scores for 2013:

Table 3. LAC GCI and WCY ranks and scores (GCR, 2013; WCY, 2013)

Country	GCI 2013		WCY 2013	
	Rank	Score (out of 7,00)	Rank	Score (out of 100,00)
Antigua and Barbuda	N/A	N/A	N/A	N/A
Argentina	94	3,87	59	42,27
Barbados	44	4,42	N/A	N/A
Belize	N/A	N/A	N/A	N/A
Bolivia	104	3,78	N/A	N/A
Brazil	48	4,40	51	53,00
Chile	33	4,65	30	67,99
Colombia	69	4,18	48	54,37
Costa Rica	57	4,34	N/A	N/A
Dominica	N/A	N/A	N/A	N/A
Dominican Republic	105	3,77	N/A	N/A
Ecuador	86	3,94	N/A	N/A
El Salvador	101	3,80	N/A	N/A
Grenada	N/A	N/A	N/A	N/A
Guatemala	83	4,01	N/A	N/A
Guyana	109	3,73	N/A	N/A
Haiti	142	2,90	N/A	N/A
Honduras	90	3,88	N/A	N/A
Jamaica	97	3,84	N/A	N/A
Mexico	53	4,36	N/A	N/A
Nicaragua	108	3,73	N/A	N/A
Panama	40	4,49	N/A	N/A
Paraguay	116	3,67	N/A	N/A
Peru	61	4,28	43	56,63
St. Kitts and Nevis	N/A	N/A	N/A	N/A
St. Lucia	N/A	N/A	N/A	N/A
St. Vincent and the Grenadines	N/A	N/A	N/A	N/A
Suriname	114	3,68	N/A	N/A
The Bahamas	N/A	N/A	N/A	N/A
Trinidad and Tobago	84	4,01	N/A	N/A
Uruguay	74	4,13	N/A	N/A
Venezuela	126	3,46	60	31,88
Total number of economies covered by the Reports	144		60	

It should be noted that LAC as a whole ranks relatively low compared to other regions. According to both indexes, the most competitive LAC economy is Chile. Both indexes concur on the least competitive economy of the region, Venezuela. The indexes also highlight the heterogeneity of the region when it comes to competitiveness.

In terms of depth and scope of coverage, the Global Competitiveness Report from the World Economic Forum emerges as the preferred tool to conduct this comparative study, as it covers 75 percent of the economies of Latin America and the Caribbean, while its counterpart only covers 16 percent of them.

FGEs competitiveness assessment

Pillar analysis of the selected FGEs

In order to further explore the determinants of competitiveness of those LAC countries identified as FGEs, the average of their scores in each of the 12 pillars of the Global Competitiveness Report are compared relative to the average of the scores in the whole LAC region. As the GCR covers 24 economies in LAC, those will serve as reference to understand the determinants in which the FGEs stand out. The scores for the FGEs, averages and differences relative to the whole set of LAC displayed in the table below, show the pillars in which the FGEs outscore the rest:

Table 4. Determinants of competitiveness - FGE comparison

Pillars	Peru	Dominican Republic	Panama	Uruguay	Argentina	Average LAC	Average FGEs	Difference FGEs - LAC
01 – Institutions	3,44	3,21	3,92	4,63	2,85	3,52	3,61	0,09
02 - Infrastructure	3,51	3,02	4,82	4,40	3,58	3,60	3,87	**0,27**
03-Macroeconomic environment	5,95	4,17	4,88	4,72	4,33	4,66	4,81	0,15
04 - Health and primary education	5,38	5,13	5,70	5,90	5,82	5,45	5,58	0,13
05 - Higher education & training	4,05	3,69	4,22	4,67	4,59	3,98	4,24	**0,27**
06 - Goods market efficiency	4,37	3,97	4,59	4,38	3,18	3,98	4,10	0,12
07 - Labor market efficiency	4,56	4,00	4,17	3,49	3,29	4,01	3,90	- 0,11
08 - Financial market development	4,46	3,74	4,88	3,81	3,18	3,94	4,01	0,07
09 - Technological readiness	3,57	3,68	4,87	4,44	3,85	3,71	4,08	**0,37**
10 - Market size	4,40	3,66	3,42	3,21	4,94	3,52	3,92	**0,40**
11 - Business sophistication	3,94	3,80	4,21	3,73	3,72	3,83	3,88	0,05
12 – Innovation	2,69	2,69	3,46	3,18	2,98	2,96	3,00	0,03
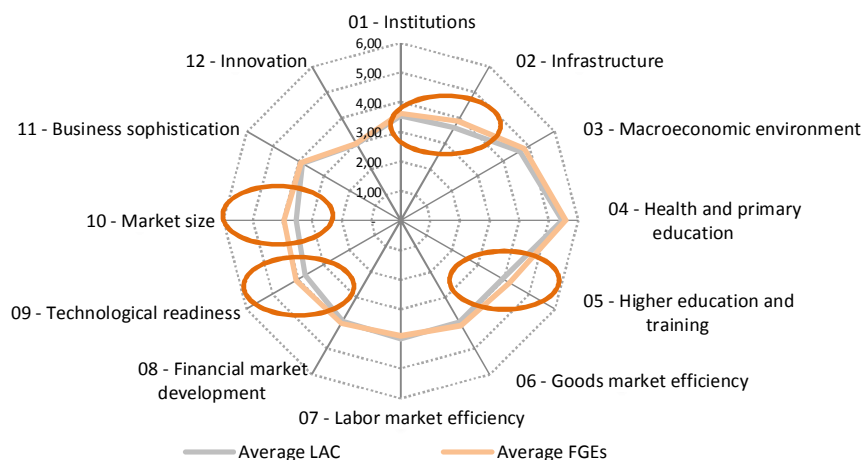
Figure 1. Determinants of competitiveness – FGE comparison (Global Competitiveness Report, 2013)

In terms of scores, the main differences between the LAC average and the FGEs average relate to **market size**, **technological readiness, infrastructure, and higher education and training**. The superior growth rate of the FGEs in the region is then likely to be driven by their higher performance in those three pillars. It should be noted that market size is hereby considered as a quasi-fixed, non-operational factor over the given timeframe, as we proceed to further look into the relationship between the pillars and GDP growth.

FGEs determinants

To better assess these preliminary findings, a regression analysis is carried out in order to further explore the contribution of each of the pillars to GDP growth. The purpose of this regression is to estimate the relative impact of those three pillars on the growth of such countries.

Contribution of the Pillars to growth

Scope and data

The study analyzes 24 economies of Latin America and the Caribbean over the period 2006 to 2012. For this model, the logarithm base 10 of GDP per Capita at current prices in USD will be used as dependent variable.

In this study, the relationship between GDP per Capita and the pillar scores is expected to be exponential, as a small increase in overall competitiveness is likely to fuel large economic growth. It is therefore appropriate to use the log-form of GDP per Capita. All the pillars are expected to be positively correlated to growth, as each of them is core to competitiveness. A brief description of the variables computed in the regression is given below in Table 5.

Table 5. Descriptive Statistics for all data points available (Global Competitiveness Report, 2013)

Category	Variable	Definition	Expected Sign
Dependent Variable	GROWTH	Log10 (GDP per Capita (Current USD))	N/A
Independent Variable	P1	1st pillar: Institutions (Score from 1 to 7)	+
Independent Variable	P2	2nd pillar: Infrastructure (Score from 1 to 7)	+
Independent Variable	P3	3rd pillar: Macroeconomic environment (Score from 1 to 7)	+
Independent Variable	P4	4th pillar: Health and primary education (Score from 1 to 7)	+
Independent Variable	P5	5th pillar: Higher education and training (Score from 1 to 7)	+
Independent Variable	P6	6th pillar: Goods market efficiency (Score from 1 to 7)	+
Independent Variable	P7	7th pillar: Labor market efficiency (Score from 1 to 7)	+
Independent Variable	P8	8th pillar: Financial market development (Score from 1 to 7)	+
Independent Variable	P9	9th pillar: Technological readiness (Score from 1 to 7)	+
Independent Variable	P10	10th pillar: Market size (Score from 1 to 7)	+
Independent Variable	P11	11th pillar: Business sophistication (Score from 1 to 7)	+
Independent Variable	P12	12th pillar: Innovation (Score from 1 to 7)	+

Regression model

The equation below reflects the regression model computed to estimate the impact of the pillars on economic growth:

$$Y = \alpha + \beta_1 P_1 + \beta_2 P_2 + \beta_3 P_3 + \beta_4 P_4 + \beta_5 P_5 + \beta_6 P_6 + \beta_7 P_7 + \beta_8 P_8 + \beta_9 P_9 + \beta_{10} P_{10} + \beta_{11} P_{11} + \beta_{12} P_{12} + F_i + \varepsilon$$

Y = Dependent Variable Log (GDP per Capita)

β_x = Parameters associated with the Independent Variables Pillars

P_x = Pillar Scores

F_i = Country-specific Fixed effects

E = Random Error term

Since this model exploits time series as well as cross-country figures, country-specific dummy variables are included in the equation. This choice is largely dictated by the moderately small set of countries in the analysis (N=24), which limits the study of cross-country differences. Fixed-effect models also hold significant benefits. Indeed, using dummy variables allows controlling for unobservable country features, to the extent that these are not expected to change over time. Attributes such as cultural environment or economic and political structure, vary among countries and could be challenging to quantify. Provided such country individual effects are assumed to remain constant over the time period of the analysis, they will be captured by country-specific dummies.

Descriptive statistics

As mentioned above, the sample used in this model consists of a group of 24 LAC countries over a 7-year period (2006-2012). With complete information, this combination should lead to 168 data sets. However, some pillar scores are unavailable for particular economies on different years, as they were not covered since the creation of the index –e.g. Haiti and Suriname were only covered in the two latest editions of the report. Moreover, the GDP per Capita used in the regression was sometimes an IMF estimate, as the latest data were not always released for each country. Table 6 summarizes the data available for the regression.

Table 6. Descriptive statistics for all data points available (Global Competitiveness Report, 2013)

Variable	N	Minimum	Maximum	Mean	Median
GROWTH	158	2,823	4,328	3,682	3,691
P1	158	2,362	5,286	3,513	3,513
P2	158	1,541	5,581	3,405	3,453
P3	158	2,255	6,153	4,563	4,667
P4	158	3,319	6,623	5,493	5,474
P5	158	1,899	5,378	3,811	3,828
P6	158	2,777	4,945	3,933	3,98
P7	158	2,877	4,962	4,037	4,096
P8	158	2,519	5,269	4,009	3,975
P9	158	2,147	5,141	3,359	3,342
P10	158	1,638	5,634	3,552	3,32
P11	158	2,772	4,651	3,849	3,899
P12	158	2,049	3,717	2,904	2,938

An interesting observation can be drawn from these statistics. As table 6 reveals, LAC economies have performed better during the period 2006–2012 in Pillar 4 (Health and Primary Education), and hold the worst score in Pillar 12 (Innovation). This is consistent with the fact that most of the region's economies are still Efficiency-Driven[6], and therefore tend to perform worst in Pillars 11 and 12.

Results and analysis

The results of regressing all explanatory variables against GROWTH are shown in Table 7 below. The coefficients and significance levels for the country dummy variables are included as well. The country dummy variable left out of the regression as a means for comparison is Argentina.

Table 7. Results (Global Competitiveness Report, 2013)

formula = (Log GDP per Cap ~ Country + P1 + P2 + P3 + P4 + P5 + P6 + P7 + P8 + P9 + P10 + P11 + P12)						
Variable	**Coefficient**	**Std. Error**	**t-value**	**Significance Level[7]**		**Predicted Sign?**
P1	0,0538	0,03562	1,51	0,133535		Yes
P2	-0,01039	0,02338	-0,445	0,65743		No
P3	0,04488	0,01226	3,66	0,000373	***	Yes
P4	-0,12681	0,02151	-5,896	3,40E-08	***	No
P5	0,11188	0,03134	3,57	0,000511	***	Yes
P6	-0,03186	0,04638	-0,687	0,493356		No
P7	-0,06664	0,02694	-2,473	0,014767	*	No

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[6] The GCR classifies economies into 3 stages of development: Factor-Driven economies mainly compete based on their factor endowments, Efficiency-Driven economies develop more efficient production processes leveraging on technological progress, while Innovation-Driven economies compete with new and/or unique products, services, processes, and models.

[7] Signifiance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

P8	0,02204	0,02431	0,906	0,366473		Yes
P9	0,15284	0,02411	6,339	4,06E-09	***	Yes
P10	0,09357	0,03078	3,04	0,002899	**	Yes
P11	-0,02859	0,05909	-0,484	0,629399		No
P12	-0,03112	0,05037	-0,618	0,537877		No
(Intercept)	3,26411	0,26091	12,51	< 2e-16	***	N/A
Barbados	0,4432	0,11733	3,777	0,000246	***	N/A
Bolivia	-0,39154	0,06876	-5,695	8,71E-08	***	N/A
Brazil	-0,0349	0,05298	-0,659	0,51129		N/A
Chile	0,05471	0,07003	0,781	0,436171		N/A
Colombia	-0,10094	0,03811	-2,649	0,009147	**	N/A
Costa Rica	0,13168	0,06879	1,914	0,057937	.	N/A
Dominican Republic	-0,05559	0,05726	-0,971	0,333594		N/A
Ecuador	-0,07627	0,05277	-1,445	0,150953		N/A
El Salvador	-0,06493	0,07458	-0,871	0,385709		N/A
Guatemala	-0,19869	0,06201	-3,204	0,001728	**	N/A
Guyana	-0,01228	0,10218	-0,12	0,90457		N/A
Haiti	-0,66015	0,12	-5,501	2,11E-07	***	N/A
Honduras	-0,32871	0,07255	-4,531	1,38E-05	***	N/A
Jamaica	0,04637	0,08624	0,538	0,591759		N/A
Mexico	0,06927	0,04817	1,438	0,152977		N/A
Nicaragua	-0,31251	0,08584	-3,641	0,0004	***	N/A
Panama	0,08083	0,07277	1,111	0,268844		N/A
Paraguay	-0,10491	0,07941	-1,321	0,188947		N/A
Peru	-0,14843	0,04973	-2,985	0,003431	**	N/A
Suriname	0,4187	0,11676	3,586	0,000484	***	N/A
Trinidad and Tobago	0,5145	0,07543	6,821	3,71E-10	***	N/A
Uruguay	0,14871	0,08401	1,77	0,079198	.	N/A
Venezuela	0,19464	0,04184	4,653	8,39E-06	***	N/A
Dependent Variable:	GDP per Capita in Logarithm base 10					
Adjusted R-squared:	**0,9801**					
F-statistic	222,4					
p-value:	**< 2,2e-16**					

These results are deemed relevant for a number of reasons. With an adjusted R-squared of 0,98, this model arguably explained 98% of the variation of economic growth in many LAC economies. This statistic along with the sign and significance level of each variable reveal quite a lot about growth rates in the region. Out of the 12 variables, half returned the predicted sign and four were highly significant. It is also interesting to note that out of the three pillars that were believed to be responsible for the superior economic growth rate of the FGEs from the previous part of the study (P2, P5 and P9), 2 of them (P5 and P9) are highly significant and register the expected sign. Moreover, Pillar 9 displays the highest coefficient among all pillars, suggesting according to this model, that this pillar is the one that holds the biggest impact on the growth of Latin American economies.

In a log-linear model, the literal interpretation of the estimated coefficient β is that a one-unit increase in X will produce an expected increase in log (Y) of β units. In terms of Y itself, this means that the expected value of Y is multiplied by e^{β}. According to this log-linear model, each one-unit score increase in Pillar 9, multiplies the expected value of GDP per Capita by $e^{0,15284} = 1,1651$, which means that a one-unit change in the score of Pillar 9 translates into a nearly 17% increase in GDP per Capita.

Pillar 9 emerges then as the one with the most influence on GDP per Capita. We now dive a level deeper in the analysis, and try to identify exactly which of the factor(s) composing this pillar is the most correlated to economic growth.

Zooming in on Pillar 9

The study analyzes the same set of 24 economies of Latin America and the Caribbean over the same period (2006-2012). The data were taken from the World Economic Database of the International Monetary Fund and from the Global Competitiveness Database of the World Economic Forum. The dependent variable used in the regression is once again the GDP Per Capita at current prices in USD, while the independent variables are the factors of competitiveness composing Pillar 9 - Technology Infrastructure. As noted earlier, Pillar 9 is broken down into 7 factors of competitiveness. However, "9.06 Internet Bandwidth" and "9.07 Mobile broadband Subscription" have only been included in the last two editions of the reports and will therefore not be taken into account in the regression analysis, as the number of observations at hand for these two variables is too low to obtain any significant results. Moreover, as previously mentioned, the GDP per Capita used as dependent variable is sometimes an IMF estimate. All the factors are expected to be positively related to growth, as those factors are the driving forces of competitiveness identified by the World Economic Forum. Table 8 provides a brief overview of the data used in this model.

Table 8 - Descriptive statistics for all data points available - Pillar 9 (Global Competitiveness Report, 2013)

Category	Variable	Definition	Expected Sign
Dependent Variable	GROWTH	Log10 (GDP per Capita (Current USD))	N/A
Independent Variable	Factor1	Availability of latest technologies, 1-7 (best)	+
Independent Variable	Factor2	Firm-level technology absorption, 1-7 (best)	+
Independent Variable	Factor3	FDI and technology transfer, 1-7 (best)	+
Independent Variable	Factor4	Individuals using Internet, %	+
Independent Variable	Factor5	Broadband Internet subscriptions/100 pop.	+

The equation below reflects the regression model computed to estimate the impact of the components of this pillar on economic growth:

$$Y = \alpha + \beta_1 F_1 + \beta_2 F_2 + \beta_3 F_3 + \beta_4 F_4 + \beta_5 F_5 + F_i + \varepsilon$$

Y = Dependent Variable Log (GDP per Capita)

β_x = Parameters associated with the Factors composing Pillar 9

F_x = Factors composing Pillar 9

F_i = Country Specific Fixed effects

E = Random Error term

Since this model runs time series as well as cross-country data, dummy variables for each country are also included. Moreover, both scores and national statistics are used as independent variables in the equation. Indeed, Factor1, Factor2, and Factor3 are scores between 1 and 7 derived from surveys, while Factor4 and Factor5 are statistics with different units of measurement. Table 9 below summarizes the data.

Table 9. Descriptive Statistics for all data points available - Pillar 9 (Global Competitiveness Report, 2013)

Variable	N	Minimum	Maximum	Mean	Median
GROWTH	157	2,823	4,328	3,684	3,694
Factor1	157	2,15	6,054	4,433	4,45
Factor2	157	3,04	5,606	4,509	4,552
Factor3	157	3,345	5,952	4,703	4,874
Factor4	157	2,397	5535,1	227,612	27,934
Factor5	157	0	22,396	3,915	2,179

The results of the linear regression of all the variables against GROWTH are shown in Table 10. The coefficients and significance levels for the country dummy variables are included as well. The country dummy variable left out of the regression as a means for comparison is Argentina.

Table 10. Results (Global Competitiveness Report, 2013)

formula = (Log GDP per Cap ~ Country + Factor1 + Factor2 + Factor3 + Factor4 + Factor5)						
Variable	**Coefficient**	**Std. Error**	**t-value**	**Significance Level[8]**		**Predicted Sign?**
Factor1	5.985e-02	2.133e-02	2.806	0.005813	**	Yes
Factor2	6.282e-02	4.148e-02	1.515	0.132378		Yes
Factor3	-6.584e-02	2.623e-02	-2.510	0.013333	*	No
Factor4	-4.947e-06	8.480e-06	-0.583	0.560700		No
Factor5	1.033e-02	2.689e-03	3.839	0.000194	***	Yes
(Intercept)	3.543e+00	1.379e-01	25.690	< 2e-16	***	N/A
Barbados	1.271e-01	4.962e-02	2.562	0.011582	*	N/A
Bolivia	-5.244e-01	4.265e-02	-12.295	< 2e-16	***	N/A
Brazil	2.955e-02	4.517e-02	0.654	0.514228		N/A
Chile	8.144e-02	4.754e-02	1.713	0.089155	.	N/A
Colombia	-9.347e-02	3.807e-02	-2.455	0.015430	*	N/A
Costa Rica	9.232e-03	5.297e-02	0.174	0.861931		N/A
Dominican Republic	-1.612e-01	4.354e-02	-3.703	0.000316	***	N/A
Ecuador	-1.879e-01	3.610e-02	-5.205	7.59e-07	***	N/A
El Salvador	-2.909e-01	3.780e-02	-7.696	3.42e-12	***	N/A
Guatemala	-4.057e-01	4.477e-02	-9.060	1.98e-15	***	N/A
Guyana	-3.776e-01	3.714e-02	-10.166	< 2e-16	***	N/A
Haiti	-9.122e-01	5.377e-02	-16.965	< 2e-16	***	N/A
Honduras	-4.929e-01	4.292e-02	-11.484	< 2e-16	***	N/A
Jamaica	-2.021e-01	4.125e-02	-4.900	2.87e-06	***	N/A
Mexico	1.369e-01	4.264e-02	3.212	0.001673	**	N/A
Nicaragua	-5.878e-01	3.685e-02	-15.950	< 2e-16	***	N/A
Panama	-4.400e-02	5.148e-02	-0.855	0.394312		N/A
Paraguay	-3.610e-01	3.803e-02	-9.491	< 2e-16	***	N/A
Peru	-1.560e-01	4.296e-02	-3.632	0.000407	***	N/A
Suriname	5.485e-02	5.292e-02	1.037	0.301910		N/A
Trinidad and Tobago	3.653e-01	4.132e-02	8.840	6.75e-15	***	N/A
Uruguay	1.051e-01	4.458e-02	2.358	0.019884	*	N/A
Venezuela	1.406e-01	3.435e-02	4.093	7.53e-05	***	N/A
Dependent Variable:	GDP per Capita in Logarithm base 10					
Adjusted R-squared:	**0,9639**					
F-statistic	148,5					
p-value:	**< 2,2e-16**					

This model arguably explains over 96% of the variation in GDP per Capita. From these results, three out of the five independent variables reported the expected sign, and two of them display a significance level below 1%. The factor "Availability of latest technologies" and "Broadband Internet Subscriptions" hold a low p-value and a positive coefficient. Most of the dummy variables attributed to the economies are also highly significant.

According to this model, a one-point score increase in terms of "Availability of latest technologies" (Factor1) would lead to a 6% increase in GDP per Capita, while a one-point increase in terms of

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[8] Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

"Broadband internet Subscriptions" (Factor5) would lead to a 1% increase in GDP per Capita. Taking into account the fact that Factor5 is a rate between 0 and 100, while Factor1 is only measured on a scale from 1 to 7, it appears that it is factor5 that holds the biggest impact of the two on economic growth. Moreover, it could be argued that a one-point increase in the broadband penetration rate is a lot easier to attain than a one-point increase in the score of "Availability of latest technologies[9]", which requires both deep structural changes and a lengthy perceptional evolution, as the score is derived from a WEF survey question.

Showing the lowest p-value and the biggest impact, "Broadband Internet Subscriptions" appears as the key factor of the Pillar driving economic growth in the region. That relationship is graphically represented in the figures 2 and 3 below:
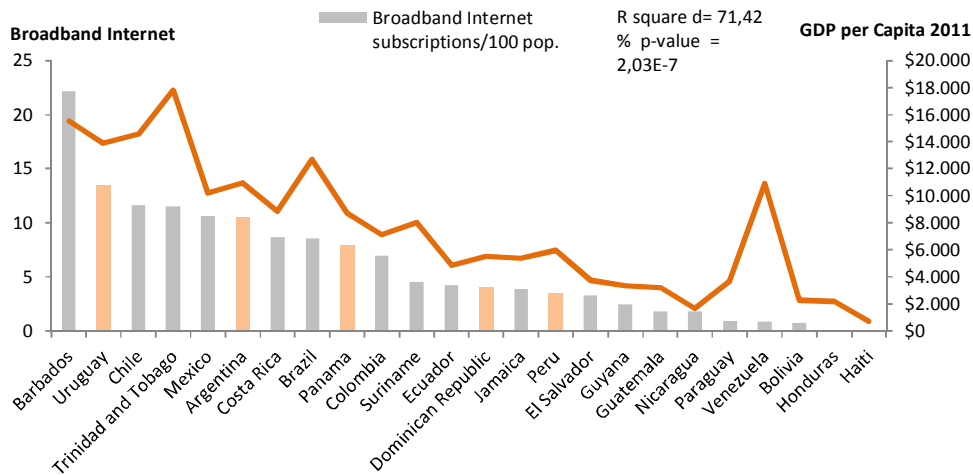
Figure 2. Fixed Broadband Penetration – The Key to Competitiveness (Global Competitiveness Report, 2013)
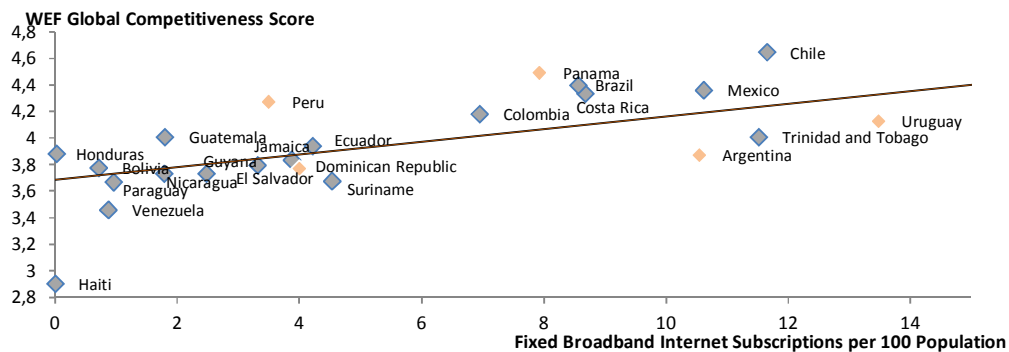
Figure 3. Correlation Fixed Broadband Penetration and Competitiveness (Global Competitiveness Report, 2013)

The United Nations in its Millennium Development Goals points at Internet penetration as a crucial metric in the efforts to diminish poverty and foster sustainable development (United Nations, 2008). An increasingly important part of the social and economic life of people around the world is becoming digital, and therefore, a fast and reliable internet connection has turned into a crucial and basic need. As electricity was a century ago, a reliable internet connection is now part of the foundations that support

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[9] The Factor1 score is derived from the results of the survey question: 'To what extent are the latest technologies available in your country?'

economic growth, competitiveness, and prosperity. The broadband likely transforms and enhances the activities carried out by every economic actor, providing nations with the capacity to create and develop new comparative and competitive advantages. Indeed, the World Bank considers that broadband holds a "significant impact on growth and deserve a central role in country development and competitiveness strategies" (World Bank, 2009). The essence of its impact stems from industries increasing their productivity, creating more jobs, developing living standards, and generating economic growth through its adoption. Multiple studies specific to the Latin American and the Caribbean region argue for the crucial impact of broadband on competitiveness, employment, and economic growth. Among them, a 2012 study from the Inter-American Development Bank states that LAC economies that boost broadband penetration by 10 percent are likely to experience related surges of 3,19% in GDP, 2,61% in productivity, and generate 67.016 new jobs (Zaballos & López-Rivas, 2012). Furthermore, the study underlines the multiplier effect of broadband, which generates proportionally incremental contributions to GDP, employment, and growth, as the penetration rate increases.

Conclusions, limitations and future research

Despite the extensive available literature on competitiveness, both its definition and assessment methods remain underexplored, as different views, concepts, and levels of analysis co-exist. The factors that drive productivity and competitiveness are multiple, complex and different in nature, but remain crucial to economies in their efforts to increase prosperity.

This study aims at untangling the key factors of competitiveness that are arguably the drivers of higher growth rates in Latin American and the Caribbean economies, using FGEs as a basis of comparison. The key findings of this research intend to contribute to the existing literature on competitiveness and might provide both corporate and public sector decision-makers with additional inputs to implement effective policies and reforms that could spur growth. While the multiple regression models used in this study might stand as relatively simple, its findings are likely to add new insights to the debate on growth and competitiveness, which currently dominates the discourse of managers and policy-makers in the region. Indeed, the theory associated with fixed effects linear regression is well-understood, and the results of this study would therefore stay relatively easy to grasp and interpret to anyone interested in the topic.

Following a top-down approach to competitiveness on the basis of the Global Competitiveness Report framework centered around 114 key determinants –the factors that make up the 12 pillars-, the empirical findings suggest that technological readiness, and more precisely broadband penetration bear significant impact on the LAC countries' economic growth. Broadband benefits are major and robust, boosting productivity across industries and paving the way to increased prosperity. Its transformative capacity as an enabler of economic and social development makes it an indispensable instrument for empowering individuals, shaping an environment that cultivates technological and service innovation. Whether this potential to support competitiveness and economic growth is fully unleashed will ultimately depend on the capacity of firms to implement broadband across their value chains –potentially eased by a well-functioning business environment shaped by the policy maker. Indeed, seizing the broadband opportunity requires fostering a supportive environment through policies and reforms, investments, and private-public coordination. In Latin America and the Caribbean, broadband penetration rates differ significantly from one country to another, while remaining much lower than in more industrialized economies. Some countries, such as Uruguay, have already embraced the broadband as a key factor of competitiveness, and are starting to reap the benefits. Other economies are putting into place major plans to develop the required infrastructure and increase the penetration rate. For example in October 2010, Argentina launched a USD 1,8 billion national plan known as *Argentina Conectada* (Argentina Connected), with the purpose of propelling Internet access in the country, extending broadband coverage, as well as improving speed and quality of the service, with a special focus on rural areas. For the first time in July 2013, the Broadband World Series took place in Latin America, in Sao Paulo, which is another signal that the region, though at asymmetric speeds, is increasingly grasping and unlocking the value of broadband.

On the back of this study, multiple leads for future research could follow suit. First of all, it would be relevant to assess the key determinants of competitiveness of different regions, so as to verify whether broadband penetration consistently remains central to competitiveness in other parts of the world. Furthermore in Latin America, once longer periods of data become available, the contribution to economic growth of the two factors of Pillar 9 hereby left out due to insufficient data (Internet Bandwidth and Mobile broadband Subscription) could be also analyzed to complement this research. Another relevant study could explore the same region but using a different competitiveness framework. Applying different frameworks would be an interesting way to look at the same topic through a different lens and avoid potential biases arising from the exploitation of this index.

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