Technological Innovation & Governance Institutions in Latin America

Luigi Manzetti*

Abstract:
There is a broad consensus among economists that innovation and technological change have been key in promoting growth in advanced capitalist economies. However, political scientists have paid less attention to this important phenomenon. This is particularly true when it comes to the role that good governance indicators play in fostering, or hindering, science and technology development, which is at the heart of innovation. Cross-national, empirical analyses on this topic regarding Latin America have been missing. In this article we address this gap in the scholarly debate by showing how poor governance standards penalize Latin America in terms of technological innovation. This, in turn, partly explain the inability of this region to keep up with other parts of the world in this regard, with predictable negative socioeconomic consequences for the future.

Keywords:
Innovation, Technology, Research & Development, Institutions, Latin America

Introduction

In the last thirty years the world has experienced phenomenal technological innovations, which have played a leading role in the globalization of the planet's economy[1]. However, Latin America has been largely a by-stander as a generator of innovative technology. Why is it the case? In the 1960s, South Korea, Taiwan, Singapore, and China were poor and well behind Latin America by many socioeconomic indicators, but today they are key producers in global value chains, whereas Latin America remains at the margins of these trends[2]. For many, this state of affairs

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1 Technological innovation is defined as a process leading to the development of new, or improvement of, technologies, concepts, services, methods, and techniques.

2 C. Cadestin, J. Gourdon, P. Kowalski, Participation in Global Value Chains in Latin America: Implications for Trade and Trade-Related Policy, in «OECD Trade Policy Papers», OECD Publishing, Paris 2016.

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is puzzling. In fact, there is substantial empirical evidence demonstrating that the returns on investments in research and development (R&D), which is a main driver of technological innovation, are very high and can help poor countries in catch up economically with the most developed ones. Goñi and Maloney argue that unfortunately «developing countries do not take measures to facilitate private sector R&D investment, or even undertake it directly»[3], and most of Latin America seems to fall into this pattern.

Scientifically driven technological improvements are at the heart of innovation, which in turn drives socioeconomic advances in a wide array of areas, such as economic growth, competitiveness, standards of living, etc. However, the 2015 UNESCO (United Nations Educational, Scientific and Cultural Organization) report on science and technology, noted that Latin America keeps falling behind other parts of the world[4]. The report also concludes that to enhance R&D Latin America must significantly «improve governance» in terms of political stability, government effectiveness, and corruption control. We define innovation as the result of scientific research resulting in technological progress broadly understood. Accordingly, this article examines the relationship between governance institutions and innovation in Latin America.

2. *Latin America's poor R&D performance*

Currently, Latin America exports remain dominated by commodities, and diversification has been negligible since the early 2000s[5]. This is a major concern because historically commodity prices have been highly volatile making growth based upon them very unstable. Conversely, there is a substantial consensus among analysts that a shift toward innovation-driven products would make an important contribution in reducing the dependency on commodities, increasing productivity growth, and helping the region to catch up with the wealthiest countries of the world[6]. Unfortunately, less than 30 percent of Latin America's total exports come from manufacturing and 80 per cent of it is concentrated among Argentina, Brazil, Chile, Mexico, and Uruguay[7]. Moreover, much of this output is of low technological sophistication, and most of what is sold abroad remains within Latin America thanks to preferential regional trade agreements. Only Mexico and Costa Rica have significant technology exports, but they are driven by FDIs in automotive and electronics respectively whose technology comes from abroad. However, remaining a commodity export re-

3 E. Goñi, W. Maloney, *Why don't poor countries do R&D?*, in «Policy Research Working Paper», Series 6811, 2014, The World Bank.

4 G. Lemarchand, Latin America, in UNESCO Science Report: Toward 2030, United Nations Educational, Scientific and Cultural Organization, Paris 2015.

5 M. Moreira, M. Stein, E. Stein, Trading Promises for Results What Global Integration Can Do for Latin America and the Caribbean, Inter-American Development Bank, Washington D.C. 2019.

6 R. Hausmann, J. Hwang, D. Rodrik, *What you export matters*, in «Journal of Economic Growth», 12, 2007.

7 *National innovation surveys in Latin America: empirical evidence and policy implications*, Economic Commission for Latin American and the Caribbean (ECLAC), New York 2011.

gion has serious long-term consequences[8]. Indeed, between 1980 and 2010, countries producing high technological intensity goods performed better than commodity producers in terms of their balance of payments and growth.

This poor performance is due to several issues, some of which are structural in nature like education. Analysts agree that a critical mass of highly skilled human capital specializing in science and technology (S&T) is a prerequisite to develop high-tech products. Presently, in terms of S&T, Latin America is far behind most regions of the world aside from the Middle East and Africa. The roots of this are in part due to basic education. Although many countries have reasonable budgets, instructional curricula are heavily concentrated in the humanities and social sciences. The 2018 PISA (Program for International Student Assessment) test in reading, mathematics, and science reports that 15-year-old Latin American students are on average two years behind their counterparts from the OECD (Organization of Economic Cooperation and Development) countries[9]. This has consequences when students reach higher education. In 2012, roughly 50 percent of PhDs were in the humanities and social sciences, as opposed to 26 percent in engineering, mathematical, and natural sciences, whereas in the Far East the ratio is almost the opposite[10]. This creates a situation where the private sector demand for highly skilled personnel vis-à-vis the available pool is one of the worst among emerging markets. Closely related is the issue of high-quality academic productivity. The bulk of the researchers find employment in publicly funded universities and research centers. The number of these institutions is quite large by international standards and scientific publications have increased tremendously in the last two decades as well. However, when measured by international benchmarks the quality of research so produced is low[11].

3. *Politics & Innovation*

The bulk of scholarly research focusing on R&D in Latin America comes from science and business innovation publications[12]. Research on the relationship among institutions, technological innovation, and politics are few. One study by De Gregorio and Lee concludes that institutions and policies conducive to growth are significant in explaining the region's R&D between 1960 and 1995[13]. Hira[14]

8 *Economic Growth in the 1990s: Learning from a Decade of Reforms,* World Bank, Washington D.C. 2005.

9 E. Di Gropello et al., *What are the main lessons from the latest results from PISA 2018 for Latin America?*, in «World Bank blogs», 6 December 2019.

10 G. Lamarchand, *Latin America*, cit.

11 G. Crespi, A. Maffioli, P. Mohnen, G. Vázquez, *Evaluating the Impact of Science, Technology and Innovation Programs: A Methodological Toolkit*, Inter- American Development Bank, Washington, DC 2011.

12 S. Olavarrieta, M. Villena, Innovation and business research in Latin America: An overview, in «Journal of Business Research», 67, 2014.

13 J. De Gregorio, J. Lee, *Economic Growth in Latin America: Sources and Prospects*, paper prepared for the Global Development Network, 1999.

14 A. Hira, *Learning from the Tigers: Comparing Institutions of Innovation in East Asia, Europe*

stresses the importance of institutional and policy weaknesses and national innovation systems at both the national and regional level[15]. A few studies examine the politics affecting S&T in the region from the vantage point of the «middle-income trap» theory. Doner and Schneider argue that the creation of pro-innovation coalitions bringing together parties, labor, and business were a key element in the success stories of the Far East[16]. On the contrary, in Argentina, Brazil, Colombia, Peru, and Mexico this pattern has not emerged because political divisions among societal actors have hindered the establishment of institutions promoting innovation[17]. Indeed, Latin American countries have been usually dominated by a few large firms that have historically lobbied for economic protectionism, which penalizes innovation. Put differently, coalition politics matters. Moreover, Paus traces back Latin America's poor performance by showing that public policies under import substitution industrialization first, and neoliberalism later, failed to develop domestic innovation[18]. Equally important, she contends that China's and other East Asian's countries international competitiveness strides since the 1990s have widened the gap with the most advanced Latin American countries. To compound matters, government capabilities for designing, implementing, and coordinating effective policy are weak in the region[19].

4. *Hypothesis, Methodology, and Data*

When it comes to institutions, econometric models rely on indexes measuring the rule of law, corruption, public education, trade openness, and research subsidies as proxy variables. For Taylor this is because politics represents «irrational inefficiencies that are to be assumed away, or random "exogenous" factors that cannot be modeled»[20]. By contrast, he notes, political scientists have shown little interest in R&D and its determinants assuming that its dynamics are idiosyncratic and «immune» from political influences. On the contrary, Taylor contends that «the political environment can have a major impact on high-tech business strategies, networks, and performance»[21].

and Latin America, in «Problemas del Desarrollo», 156, 2009.

15 M. da Cunha Resende, D. Almeida Raposo Torres, F. Almeida Raposo Torres, *National Innovation System and External Constraint on Growth*, in «Brazilian Journal of Political Economy», 4, 2016.

16 R. Doner, B. Schneider, *The middle income trap. More politics than economics*, in «World Politics», 68, 2016.

17 T. Chiarini, F. Cimini, M.S. Rapini, L. Alves, *The Political Economy of Innovation. Why is Brazil Stuck in the Technology Ladder?*, in «Brazilian Political Science Review», 14, 2020.

18 E. Paus, Innovation Strategies Matter: Latin America's Middle-Income Trap Meets China and Globalisation, in «The Journal of Development Studies», 56, 2020.

19 World Bank Publications, Report 41230, 2024. The World Bank Group, Washington D.C. 2024.

20 M. Taylor, The Politics of Innovation: Why Some Countries Are Better than Others at Science & Technology, Oxford University Press, New York 2016, p. 19.

21 Ivi, p. 20.

Accordingly, our hypothesis is that poor governance has a negative impact on innovation. Although the argument may seem rather uncontroversial, there is very little *empirical* evidence to this effect when it comes to Latin America *cross-nationally*. Therefore, this study fills an important gap in the current political science literature. We compare Latin America with the OECD countries which, as a group, comprise members from different parts of the world, but are at the cutting edge of the technological frontier. We expect that countries displaying high levels of good governance, as in the OECD group, should fare much better than their counterparts in Latin America, where such standards have been historically lower.

Methodologically, we adopt a two-step approach. First, we use correlation analysis to verify the degree of association between S&T and governance indicators covering Latin America and OECD countries. Second, we then use panel data analysis to gauge the causal effect of government effectiveness on innovation for the same set of countries.

Let us now turn to the data. According to the World Bank, good governance implies a high degree of government effectiveness in promoting economic policies that contribute to growth, stability, and the welfare of the citizenry. Further characteristics are a high level of responsiveness (to societal demands), accountability, transparency, public participation, openness, and a strong respect for the rule of law.

Here we employ the World Bank's Worldwide Governance Indicators (WGI). These are composite indexes which combine weigh mass and expert surveys from a wide variety of sources (i.e., polling organizations, multilateral agencies, think tanks, nongovernmental organizations, and political and business risk-rating agencies) whose numbers vary depending on the country. The strength of the WGI rests on several factors. It is the largest, and most widely used data set of its type, accounting for most of the countries in the world. These standardized aggregate data also allow comparability across countries. Thus, they enable us to create quantitative measurements for statistical analyses that can facilitate the move from country studies to broad cross-national comparisons. In turn, this helps us in assessing differences across countries on the same governance indicator. The second data set deals with the issue of measuring innovation. To this end, we employ the World Bank's World Development Indicators (WDI) on Science and Technology, which contain the most comprehensive information available in this regard. In addition, we use a third data set, the Global Innovation Index, which gauges innovation using a broader number of indicators and has been published since 2007 through a partnership of Cornell University, the Institut Européen d'Administration des Affaires (INSEAD), and the World Intellectual Property Organization.

There is considerable debate about which of these different measurements are most appropriate to determine progress in innovation. Taylor, for instance, breaks down S&T categories into inputs (i.e., researchers/technicians, scientific publications, R&D expenditures) and outputs (i.e., high-technology exports, charges for the use of intellectual property, patent applications, trademark applications, industrial design applications) and argues that the latter are the most precise types of measurements to assess the actual impact on innovation[22]. For instance, we already saw that scientific publications from Latin America, while increasing in recent years, fare poorly in terms of quality (measured by impact factors). Accordingly, in this study we adopt a balanced approach by using some of the most used factors from both categories.

5. *Data Analysis*

When we compare international performance according to S&T commonly used indicators, Latin America fares poorly. Table 1 reports WDI information on S&T indicators for Latin America and the OECD countries. The years reported vary depending on data availability. Three of the S&T indicators (researchers in R&D per million of people; scientific and technical journal articles; and R&D expenditures as a percentage of GDP) fall into the input category. The remaining nine are outputs (high-technology exports as percentage of manufactured exports; intellectual property rights receipts in $US millions; intellectual property rights payments in $US millions; resident patent applications; non-resident patent application; resident trademark applications; non-resident trademark application; resident industrial design applications; non-resident industrial design applications).

At first glance, Latin America seems to have made significant strides over the past two decades in terms of percentage increases in two out of the three inputs (researchers in R&D per million of people; scientific and technical journal articles). When we examine the output record, the positive trend is less pronounced. Intellectual property rights payments and receipts fare well, followed by patent and industrial design applications by non-residents. Yet, the last two indicators show that it is non-resident foreigners who dominate these fields. This indicates that the improvement in input indicators is not translating into tangible endogenous patent and industrial design increases. Moreover, what is troublesome is that in raw numbers the gulf between Latin America and the OECD countries remains huge.

We now turn to the relationship between governance indicators and innovation. We correlate the relationship between four governance indexes (government effectiveness, rule of law, corruption, and regulatory quality) incrementally, beginning with specific S&T variables and then moving onto two large indexes that can give us greater confidence in terms of generalization purposes. The first index, government effectiveness, is the most important as it best captures on a general level the quality of government institutions in supporting socioeconomic development in a broader sense. The remaining three, rule of law, corruption, and regulatory quality, are narrower in scope, but have been widely used in many cross-national economic analyses to measure the relevance of specific institutional characteristics. Accordingly, we pair the four governan-

22 M. Taylor, *The Politics of Innovation*, cit.

ce indexes with two variables commonly used to gauge innovation inputs and outputs which are, respectively, R&D expenditures as a percentage of GDP and high-tech exports as a percentage of GDP. Due to space limitation, we report scatterplots only for the relationship between different S&T measurements and government effectiveness. Figure 1 shows a strong linear correlation between government effectiveness and R&D expenditures (.72).

Moreover, Latin America as a group is clustered in the low, left-wing end of the scatterplot. The additional tests for the other three governance indicators display relatively lower but still consistent results (Table 2) and the same regional clustering. Once we shift our attention to high-tech exports vis-a-vis governance indicators the regression results are somewhat less robust, but still congruent with the previous ones. Figure 2 reports a .56 correlation between government effectiveness and high-tech exports. The other three regressions average about .51 (Table 2).

The next two sets of tests are of a different nature since they pull together more variables into indexes, which can potentially capture innovation in its different components more accurately. All regressions are for 2018. The first index is «knowledge and technology», which is one of the pillars of the Global Innovation Index. This comprises a total of fourteen factors, ten of which are mostly inputs and the remaining four are outputs[23]. The regression in Figure 3 shows a very strong and positive association between government effectiveness and knowledge and technology (.84). The overall pattern is even more pronounced than in the previous tests, with Latin America again scoring poorly vis-à-vis the OECD countries. The regressions for the other governance indicators average about .76, therefore a little lower, but they are nonetheless similar to the previous findings in terms of strength (Table 2) and direction. The last tests use only the «knowledge and technological diffusion» index grouping the four output factors which, for many analysts, are more accurate measures of S&T's concrete effects on innovation. We examine the relationship between this smaller, more cohesive index with government effectiveness. The strength of the linear regression is not as robust as it is in knowledge and technology, standing at .66, but it is still appreciable and displays the same direction and general pattern. The scores of the other four governance factors average .59 (Table 2).

In sum, the results of the correlations have been encouraging, but to establish the causality of our hypothesis we need a more complex and richer empirical context using panel fixed effects with time trends and cluster-robust errors. To determine the causal effect of government effectiveness over time in Latin America and the OECD we employ a panel analysis method using the same data sets from 1994 to 2018. To

23 The Index is divided into three categories. Knowledge creation: patents by origin/bn PPP$ GDP; PCT patents by origin/bn PPP$ GDP; utility models by origin/bn PPP$ GDP; scientific & technical articles/bn PPP$ GDP; citable documents H-index. Knowledge impact: growth rate of PPP$ GDP/worker, %; new businesses/th pop. computer software spending, % GDP; ISO 9001 quality certificates/bn PPP$ GDP; high- & medium-high-tech manufactures, %. Knowledge diffusion: intellectual property receipts, % total trade; high-tech net exports, % total trade; ICT services exports, % total trade; FDI net outflows, % GDP.

operationalize the dependent variable, we selected R&D expenditures as a percentage of GDP, which is one of the most common measurements gaging innovation.

The base-line model specification is as follows:

RD = a + bi + gov_eff + t + e

Where *RD* is Research & Development; *gov_eff* is the independent variable; *a* is the constant; *bi* are fixed effects; *t* is the time trend; and *e* is the error. Table 3 reports the robustness of the model as additional specifications are added. The estimates of Column 1 (pooled regression) are questionable since we do not use robust errors and don't include a time trend to account for possible trending of variables over time. The results for Column 2 (RE without time trend) show robust errors, but still no time trend. The estimates for Column 3 (RE with time trend and robust errors) are sound, assuming that RE is the best model specification. The results show that dRD/dLA: = =1.136 + (-.351 x Gov_EFF). If we evaluate this estimate at the mean of gov_eff for Latin American (LA) countries (which is equal to -.033) we get a value of -1.12. This means that compared to OECD countries, LA'sRD share is lowered by 1.12 percentage points.

Column 4 includes FE with time trend and robust errors. This is the best model specification since we account for trend in variables and heteroscedasticity of errors, plus the model surpasses the RE model using the Hausman-Wu test (Appendix A). Since we include country-specific fixed effects, we cannot identify the time-invariant differences between regions (such as OECD or LA). However, for the time varying variable such as gov_eff, we can still estimate the (slope) difference between regions. In particular we find that dRD/dgov_eff = .268 + (-.323 x LA dummy =1) = -.055. Hence, gov_eff is negative for RD shares in LA countries. However, the coefficient estimates are insignificant, therefore gov_eff has no effect on RD share in LA countries. For LA countries, if the estimates in (4) were significant, increasing gov_eff would worsen the R&D share. In other words, those LA countries with the least effective governments would have the highest R&D share. This result is slightly counterintuitive, so the fact that the LA coefficient estimate is insignificant is actually consistent with the initial hypothesis. Furthermore, for OECD countries dRD/dGov_eff = .268. Hence, for OECD countries, the effect of gov_eff is positive. Since the coefficient estimate is significant, gov_eff has an effect on RD share in OECD countries.

What kind of preliminary conclusions can we draw from these findings? The strong relationships observed in the initial correlation regressions have been confirmed by the panel data analysis using strong controls. This gives us a high degree of confidence in that high levels of government effectiveness positively affect R&D expenditures as a percentage of GDP in the OECD countries, whereas poor government effectiveness penalizes Latin America. All of this confirms that progress in innovation does not occur independent of institutional constraints. Thus, improving government effectiveness will likely help Latin American countries create a more hospitable environment for technological innovation.

6. *Conclusion*

In recent years several studies have shown that institutions and policies are crucial factors in shaping technological innovation in Europe, East Asia, and North America. However, to the best of our knowledge, there have not been any empirical analyses providing any evidence about the relationship between technological innovation and governance indicators in Latin America. In this article we have tried to fill this gap in the literature by showing empirically that poor government effectiveness penalizes the region's ability to compete in technological innovation. Unfortunately, this does not bode well for the future socioeconomic prospects of Latin America, which risks becoming even more marginalized in the global economy if the trend continues.

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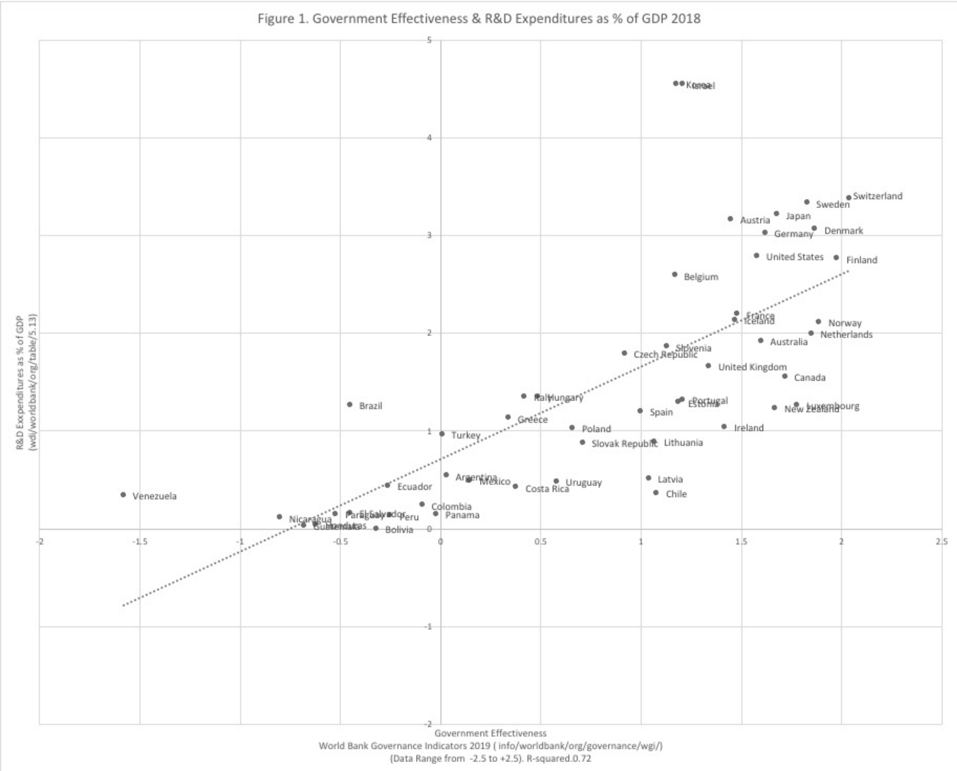

Figure 1

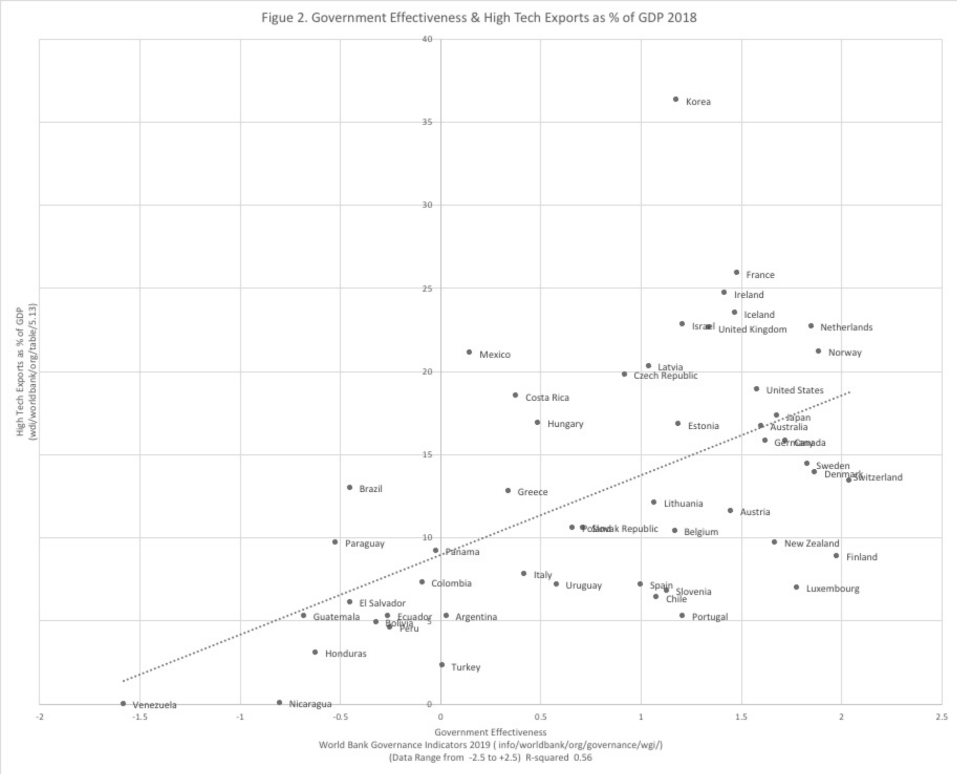
Figue 2. Government Effectiveness & High Tech Exports as % of GDP 2018
High Tech Exports as % of GDP
(wdi/worldbank/org/table/5.13)
Government Effectiveness
World Bank Governance Indicators 2019 (info/worldbank/org/governance/wgi/)
(Data Range from -2.5 to +2.5) R-squared 0.56
Korea
France
Ireland
Iceland
Israel
United Kingdom
Netherlands
Norway
Mexico
Latvia
Czech Republic
United States
Costa Rica
Hungary
Estonia
Japan
Australia
Germany
Canada
Sweden
Denmark
Switzerland
Brazil
Greece
Lithuania
Austria
Slovak Republic
Belgium
Paraguay
Panama
New Zealand
Finland
Italy
Uruguay
Colombia
Spain
Slovenia
Chile
Luxembourg
El Salvador
Guatemala
Ecuador
Bolivia
Peru
Argentina
Portugal
Honduras
Turkey
Venezuela
Nicaragua

Figure 2

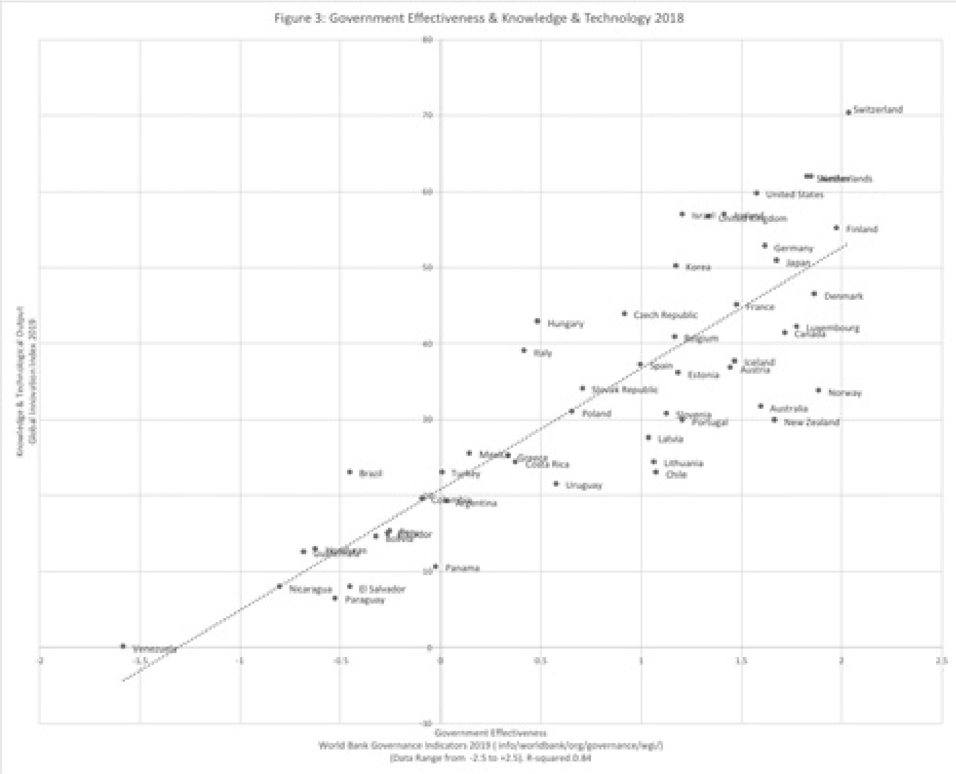
Figure 3: Government Effectiveness & Knowledge & Technology 2018
Switzerland
United States
Finland
Germany
Japan
Korea
Denmark
France
Czech Republic
Hungary
Luxembourg
Canada
Italy
Spain
Estonia
Iceland
Austria
Slovak Republic
Norway
Poland
Australia
Portugal
New Zealand
Latvia
Lithuania
Chile
Brazil
Costa Rica
Uruguay
Argentina
Panama
Nicaragua
El Salvador
Paraguay
Venezuela
Government Effectiveness
World Bank Governance Indicators 2019 (info/worldbank/org/governance/wgi/)
(Data Range from -2.5 to +2.5). R-squared 0.84

Figure 3

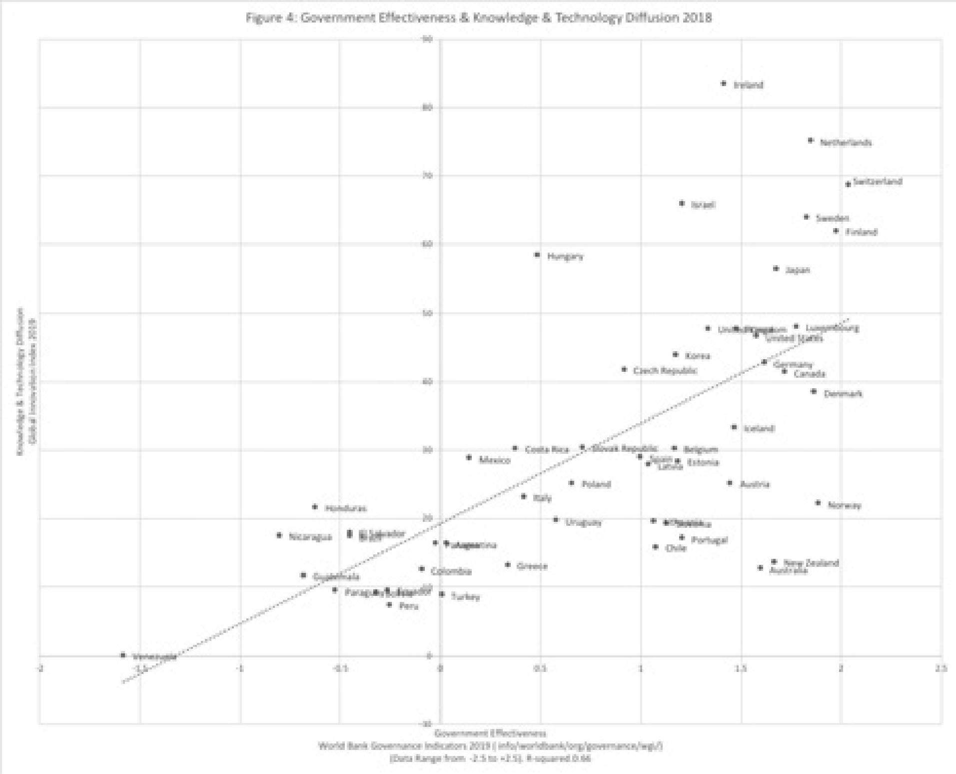
Figure 4: Government Effectiveness & Knowledge & Technology Diffusion 2018
Knowledge & Technology Diffusion
Global Innovation Index 2019
Government Effectiveness
World Bank Governance Indicators 2019 (info/worldbank/org/governance/wgi/)
(Data Range from -2.5 to +2.5). R-squared 0.66
Ireland
Netherlands
Switzerland
Israel
Sweden
Finland
Hungary
Japan
Luxembourg
United States
Korea
Czech Republic
Germany
Canada
Denmark
Iceland
Costa Rica
Slovak Republic
Belgium
Mexico
Spain
Latvia
Estonia
Poland
Austria
Italy
Norway
Honduras
Uruguay
Nicaragua
El Salvador
Portugal
Chile
Colombia
Greece
New Zealand
Australia
Guatemala
Turkey
Peru
Venezuela

Figure 4

Table 1: Science &Technology Indicators in LA & OECD

Researchers in R&D (per millions of People)	2000	2014	% Increase
LA	298	580	94.63%
OECD	2,706	3,468	28.16%
Scientific and technical journal articles	**2000**	**2018**	
LA	27,717	108,227	290.47%
OECD	880,616	1,422,262	61.51%
Research & Development Expenditures (% GDP)	**2000**	**2018**	
LA	0.6	0.7	16.67%
OECD	2.3	2.6	13.04%
High-Technology Exports (% of manufactured exports)	**2010**	**2018**	0.40%
LA	13.5	14.3	5.93%
OECD	19.2	17.6	-8.33%
Intellectual property rights receipts ($US million)	**1990**	**2018**	
LA	195	1,445	641.03%
OECD	26,594	379,044	1325.30%
Intellectual property rights payments ($US million)	**1990**	**2018**	
LA	982	11,965	1118.43%
OECD	22,621	337,384	1391.46%
Patent Applications Residents	**1990**	**2018**	
LA	4,590	8,148	77.52%
OECD	525,481	823,092	56.64%
Patent Application non-resident by count	**1990**	**2018**	
LA	13,878	45,943	231.05%
OECD	211,890	544,754	157.09%
Trademark Applications residents by count	**2010**	**2018**	
LA	386,763	487,560	26.06%
OECD	1,314,359	2,666,179	102.85%
Trademark Application non-resident by count	**2010**	**2018**	
LA	178,518	203,684	14.10%
OECD	485,654	920,521	89.54%
Industrial Design Applications resident by count	**2000**	**2018**	
LA	4,708	7,489	59.07%
OECD	180,457	284,126	57.45%
Industrial Design Applications non-resident by count	**2000**	**2018**	
LA	3,488	7,415	112.59%
OECD	70,085	90,629	29.31%

Table 2: Correlation Coefficients between Governance and Science &Technology				
	Gov. Effect.	Corruption	Regulatory Quality	Rule of Law
R&D Expenditures as a % of GDP	0.72	0.66	0.63	0.56
High-Tech Exports as a % of GDP	0.56	0.46	0.57	0.51
Knowledge & Technological Output	0.84	0.79	0.79	0.72
Knowledge & Technological Diffusion	0.66	0.61	0.62	0.54

Table 3. Regression Results OECD and LA with LA Region Dummy and Cross Effect

Dep Var: R&D_PCGDP				
Sample: OECD and LA				
Model type: Panel	Pooled	RE	RE	FE
errors clustered		yes	yes	yes
time trend			yes	yes
	(1)	(2)	(3)	(4)
	m1	m1	m1	m1
VARIABLES	rd_pcgdp	rd_pcgdp	rd_pcgdp	rd_pcgdp
goveff	0.998***	0.291	0.320*	0.268*
	(0.051)	(0.209)	(0.166)	(0.180)
la	-0.221***	-1.189***	-1.136***	
	(0.084)	(0.269)	(0.213)	
goveff_la	-0.895***	-0.283	-0.351*	-0.323
	(0.097)	(0.213)	(0.197)	(0.216)
year			0.024***	0.024***
			(0.004)	(0.004)
Constant	0.545***	1.470***	-45.948***	-46.201***
	(0.072)	(0.265)	(8.682)	(8.775)
Observations	893	893	893	893
R-squared	0.596			0.298
Number of panelid		56	56	56

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1