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Honesty and R&D Investment—Take Guangdong Province as an Example

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Abstract

This paper adopted the 30 provinces in 2006-2016 (except Tibet and Hong Kong, Macao and Taiwan) of R&D input, honesty and economic variable data, set up a panel data model, studied the honesty degree of influence R&D input, then used the level panel data from 2006 to 2017 in Guangdong province, to strengthen the honesty degree of the empirical test results of R&D input. The results show that the higher the level of honesty, the more investment in R&D will be brought in, and the country's technological strength as well as core competitiveness will be stronger. On the contrary, the lower level of honesty leads to lower R&D investment; second, the degree of honesty has a significant positive impact on R&D investment in the eastern region, while in the central and western regions the degree of honesty have no significant impact on R&D investment; finally, the honesty of Guangdong prefecture-level cities has a significant positive effect on R&D investment.

Keywords

Honesty, R&D Investment, Guangdong Province

1. Introduction

In 1988, when Deng Xiaoping was talking to the President of Czechoslovakia, he putting forward the important claim that "science and technology is the first productive force". Science and technology is the core of modern economy, and the essence of science and technology is innovation. In 2017, general secretary Xi Jinping put forward in the party's nineteenth report that innovation was the first driving force for development and a strategic support for building a modern economic system. In modern times, China's scientific and technological progress has become increasingly significant in the wave of economic integration and globalization. As Solwo said, "economic growth stems from technological

progress," the competition of contemporary economic forces is to a large extent the competition of the use of advanced technology in economic activities [1]. Along with China's economic slowdown and economic structural transformation, how to improve our innovation ability becomes more and more important. As early as 2006, China proposed to build an innovative country by 2020, making scientific and technological innovation a core force driving the future development of China's economy [2].

China has paid great attention to the development of science and technology over the years. After decades of research and investment, the scientific and technological achievements of China have made a breakthrough and created the "Chinese miracle". In the past five years, China's scientific and technological innovation capacity has been significantly enhanced, and the "heavenly palace" has stepped into space, "Jiao long" has explored the deep sea, and the "celestial eye" listens to the universe... "Refresh" has been a major achievement in the global science and technology innovation arena, and has achieved the leapfrog of "running" to "running" and "running". Party's report pointed out the direction for science and technology innovation of the nineteenth, depicts the blue figure—"to aim at the world technological frontier, strengthen the basic research, implementing forward-looking basic research, leading a major breakthrough in the original achievements", "deepening the reform of science and technology system, the establishment of enterprise as the main body, market oriented, the depth of the fusion of technology innovation system", "training a large number of strategy of science and technology talents with international level, science and technology talents, youth science and technology talents with high level innovation teams"... The development of science and technology is inseparable from investment in science and technology. R&D investment actually means the demand for investment in new industries or industries, and R&D budget invested to ensure R&D strength will promote the creation, development, application and dissemination of new technologies [3].

In China on the basic research, applied research and development investment, for example, according to the 2016 statistics bulletin of the national science and technology spending, basic research funding in China in 2016 is 822.9 billion yuan, an increase of 14.9% over the previous year, significantly higher than the applied research (5.4%) and test development expenditure growth (11.1%). The proportion of basic research continued to rise last year, to 5.2%, the highest level in nearly a decade. It can be said that it is the massive investment in science and technology that has produced the "Chinese miracle" that China has been praised by others. Although the scientific and technological achievements of China have made great progress, the overall level of China still lags far behind that of developed countries. The current situation of R&D in China is not optimistic. One is that the investment intensity is too low, and the other is that the structure is not reasonable. The investment proportion of enterprises in R&D activities is not high enough. As can be seen from **Table 1**, whether in relative rankings or absolute rankings, China's R&D expenditures at the corporate level or the university

Table 1. The situation report of China's R&D.

Year	Countries	R&D (Enterprise)		R&D (School-Enterprise)	
		Rank	Value	Rank	Value
2008-2009	134	24 (17.91%)	4.2	23 (17.16%)	4.5
2009-2010	133	23 (17.29%)	4.2	23 (17.29%)	4.6
2010-2011	139	22 (15.83%)	4.1	25 (17.99%)	4.6
2011-2012	142	23 (16.20%)	4.2	29 (20.42%)	4.5
2012-2013	144	24 (16.67%)	4.1	35 (24.31%)	4.4
2013-2014	148	22 (14.86%)	4.2	33 (22.30%)	4.4
2014-2015	144	23 (15.97%)	4.3	32 (22.22%)	4.4
2015-2016	140	23 (16.43%)	4.2	32 (22.86%)	4.4
2016-2017	138	25 (18.12%)	4.4	30 (23.19%)	4.3
2017-2018	137	21 (15.33%)	4.6	28 (20.44%)	4.4

Note: according to the world economy BBS's annual global competitiveness report income, which is stated as some numerical value of the corresponding item in the sample countries ranked in the absolute, the "()" for China's relative rank in the sample countries. The value of R&D is 1 - 7, among which: 1 indicates that it is not spent on R&D; 7 is spending heavily on R&D. This value essentially reflects the innovation level of R&D.

corporations' cooperative expenditures are below the highest level in the world, and they all need to be greatly improved. But in relative terms, R&D spending is relatively high on the corporate level, with R&D spending more at the school level.

Although China's science and technology have achieved great success in recent years, the level of science and technology in China still lags far behind that of developed countries. Under the table in a report on research and development situation of China, according to whether the relative ranking or absolute, the level of research and development in China has not been in the world, relatively speaking, China's spending on research and development costs are rising.

At the same time, the honesty of our officials is not optimistic. The severity of corruption in Table 2 shows that the corruption of Chinese officials is becoming more and more serious. In terms of the index of corruption, whether it is absolute or relative, it is basically decreasing year by year. Although the index of corruption in 2016 has slightly increased, it is still not optimistic in general.

In the backdrop of the central anti-corruption power, with the improving of the economic level in China, China of R&D funds to investment and scientific and technological achievements unceasingly obtains the breakthrough, but the overall level of science and technology is less than the level of developed countries such as America, we can not help but ask, internal relations between them? Why does the increasing investment in R&D funds fail to bring china's science and technology to the ranks of the developed countries? What is the role of honesty? Unfortunately, the existing research has largely failed to link honesty with

Table 2. China's corruption index, ranking and honesty of the past years.

Year	Corruption index	Countries	Absolute rank	Relate rank	Serious honesty
2006	3.3	163	70	42.94%	——
2007	3.5	179	72	40.22%	——
2008	3.6	180	72	40.00%	6
2009	3.6	180	79	43.89%	6
2010	3.5	178	78	43.82%	3
2011	3.6	183	75	40.98%	5
2012	39	176	80	45.45%	5
2013	40	177	80	45.20%	3
2014	36	175	100	57.14%	2
2015	37	167	83	49.70%	6
2016	40	176	79	44.89%	5

Note: Transparency international released per year since 1995, the annual report on global corruption, reported around the world businessmen, academics and analysts observation of the world corruption and feelings, namely the corruption perceptions index. Before 2012, the index adopted a 10-point scale: among them, 10 was the highest and the most honest. 0 is the most corrupt; Between 8.0 and 10.0, it is honesty; Mild corruption between 5.0 and 8.0; 2.5 - 5.0 the corruption is serious; Between 0 and 2.5 is extreme corruption. Then, transparency international adjusted the score to a percentage, but the higher the value, the lower the value. Honesty degree of seriousness said problems in economic activities of the main problems in the rank, the size of its numerical reflect the seriousness of the problem, the numerical value according to the world economy BBS "global competitiveness report" sorted each year.

R&D investment, let alone in-depth analysis of the role of honesty in R&D investment. And the existing related research basic stay in terms of national and provincial level, from the prefecture level analysis of the related research of little less, more of the provincial level and municipal level combined analysis. In view of this, this paper tries to build a basic regression model of honesty and R&D investment; Then, the concrete effect of honesty on scientific and technological progress is empirically tested at the provincial level. Then, using the data of prefecture-level city of Guangdong province for further analysis, this paper provides a more robust verification of the impact of honesty on R&D investment.

2. Literature Review

For R&D input, the development of R&D industry on the entire range of manufacturing industry and even the entire national economy development has the important influence, today, the technological progress of traditional exogenous theory has been emphasized the endogenous technological progress, innovation, and alternative size characteristics of the new economic growth theory. Cornwall (1977) proposed the idea, advocated technological progress endogenous model, and points out that the manufacturing industry to the national economy plays a very key role [3]. ZviGriliches, Bronwyn h. Hall and Ariel Pakes (1991), the study supports the idea. They found that in some high technology industry (especially the electronics industry) technology is an important source of many ser-

vice industry growth [4]. In mid and late 1980 s the rise of new economic growth theory broke some of neoclassical growth theory hypothesis, puts forward technological progress such as endogenous hypothesis, among them with Romer (1990), due to the incomplete inherent market economy two, one is the R&D technology spillover, the second is the most durable goods production company realized by selling the new capital goods may obtain monopoly profits, but still not possess all consumer surplus, society benefits from innovation more than monopoly private gains, so there were distinct underinvestment in R&D [5]. However, in domestic studies, Ann Tongliang, Zhou Shaodong and Pi Jiancai (2009) [6] analyzed the impact of three factors, such as industry, scale of enterprises and ownership of enterprises, on the enterprise's R&D behavior. Wu Yanbing (2008) [7] verified the impact of market structure and property right structure on R&D investment in China's manufacturing industry. In terms of the influencing factors of R&D behavior, Schmookler *et al.* (1966) [8] found that the number of scientists and engineers in the period from 1870 to 1950 had the same trend as the number of patents, which explained the difference in R&D investment. Mueller (1966) [9] also prove the point, 1958-1960 he used six industrial enterprise data correlation coefficient analysis, found that the number of patents and measurement of R&D input of each index (basic research, applied research and trial development, the number of R&D expenditure and R&D) there is a high correlation between. Stephan Schmitt and Denes Kucsera (2014) [10] from the largest European utilities in eight countries as the breakthrough point, the empirical found in Europe in the process of regulatory reform of the overall impact of R&D input is fuzzy. The data show that the closer to liberalization, the resulting competition inhibits R&D investment. Because of increased uncertainty and additional risk, utilities have reduced their R&D spending. However, once established the condition of market and regulatory frameworks, businesses have become accustomed to the new situation, higher level of competition will be a positive influence on R&D, and established firms will increase investment, to "escape" competition. Jeroen Hinloopen and Jan Vandekerckhove (2011) [11] start from the perspective of market competition, and the conclusion that the impact of market competition on R&D investment incentive is consistent with Stephan Schmitt and Denes Kucsera (2014) [10].

Aidt (2003) [12] pointed out in his review article that "corruption is a multi-faceted phenomenon and it is difficult to make a precise and comprehensive definition of it". Corruption in various countries are generally regarded as a kind of illegal behavior and prohibited by law, many definitions as a fundamental, such as Shleifer and Vishny (1993) [13] think corruption is "government officials for the sake of personal gains and sell the power of the government behavior". Jain (2001) [14] defines corruption as "the act of a government official using power to obtain personal benefits in ways that violate the rules of the game". Svensson (2005) [15] summarized corruption as "government officials abuse their power for personal gain", and Banerjee *et al.* (2012) [16] defined corruption as the act of "breaking the rules for selfish interests by bureaucrats or

elected officials". Lu blossoming smile (2008) [17] is pointed out that in the study of economics "corruption" and feel the "corruption" in daily life is different, the main research object involves the illegal transfer of economic benefits. If viewed from a microeconomic perspective, corruption is a rent-seeking behavior, which refers to the political and economic activities of a few people using legal or illegal means to obtain economic rent. He Wei *et al.* (1999) [18] believes that corruption is not exactly equivalent to rent-seeking. Zhang Jun (1996) [19] also maintain a consistent with this conclusion, he pointed out that corruption are defined with the rent-seeking activities like yesterday, the definition of corruption to emphasize the following factors: 1) a third party payment, 2) by closing the pay is not the principal agent (not to the client); 3) this payment is illegal. Serra and Wantchekon (2012) [20] the latest definition of corruption by: "corruption refers to civil servants to private interests over the public interest, or official abuse of power for private gain, or a member of the organization to provide for its unfair interests. There are two important characteristics of corrupt behavior, one is to break the rules to obtain illegal gains, and the other is that these behaviors often "hide behind the door".

Comprehensive existing literature has found that the research on honesty and R&D investment has not appeared. Therefore, based on the existing literature, this article attempts from the Angle of the R&D investment to discuss the honesty degree of the influence of R&D input, to provide a new perspective to this field of research, is helpful to objectively evaluate the honesty degree of economic efficiency. This paper mainly focuses on the following two aspects, on the one hand, it increases the understanding of R&D investment. The R&D level of a country reflects a country's technological strength and core competitiveness, which reflects the political and economic strength of a country. There are many influence factors in R&D input, but if you can't improve the level of honesty, rooting out corruption environment, only to increase investment in R&D is not enough, it is difficult for China's scientific and technological strength and core competitiveness to get rapid development. At the same time increased awareness of honesty. Honesty degree and economic growth in research literature, part of that honesty is conducive to economic growth, others think that honesty is not conducive to economic growth, but there are few literature research honesty degree of the influence of R&D input. On the other hand, this paper innovatively starts from the provincial panel and the prefecture-level city panel, and comprehensively considers the impact of honesty on R&D investment, making the empirical results more cautious and reasonable.

As China's economic strength gradually improved, China's investing heavily on research and development spending, as well as scientific and technological achievements unceasingly obtains the breakthrough, but the overall level of science and technology as the level of developed countries such as America, we can't help but want to ask, the intrinsic relationship between them? Why is the increasing investment in research and development not able to bring China's

science and technology to the ranks of the developed countries? What is the role of probity? Unfortunately, first, there is no link between honesty and R&D, not to mention the role of integrity in R&D investment. Second, whether it's clean, alone or single research spending on research and development of existing related research mainly focused on the national level and provincial level, analyzes the related research from the prefecture level is very scarce, and more of the provincial level and municipal level a linkage analysis. In view of this, this paper tries to build a basic regression model of probity and R&D investment; Then, the concrete effect of probity on R&D investment from the provincial level is verified. Then, using the data of Guangdong prefecture-level city panel data to further analyze, to explore the impact of integrity on R&D investment to provide more powerful verification.

3. Empirical Research

3.1. Basic Regression Equation

$$Y_{pt} = \alpha_0 + \beta X_{ct} + \delta_p + \theta_t + \varepsilon_{pt}$$

Among them, the subscript p stands for each province, the subscript t represents the year, and Ypt represents the expenditure of R&D expenditure. It represents the provincial fixed effect, which is used to absorb factors that do not change over time but can affect the level of scientific and technological progress. It represents the fixed effect of the year, which is used to absorb the macro factors that may affect the level of scientific and technological progress in all provinces in one year. And the epsilon, the pt is the error term. In this paper, variable data of 31 provinces from 2006 to 2016 were collected.

3.2. Variable Description and Data Source

R&D input. Interpreted variables. We measure the internal expenditure (ten thousand yuan) of R&D expenditure. The data comes from the China statistical yearbook of science and technology in 2006-2016.

Honesty. Core explanatory variables. We measure the number of people who file a crime. The number of cases of job crimes includes the number of cases of corruption and bribery and the number of cases of malfeasance. Among them, corruption and bribery include corruption, the number of bribes (including bribery and bribery), and embezzlement of public funds. Dereliction of duty includes dereliction of duty, abuse of power and smuggling. The data comes from the China procuratorial yearbook 2006-2013. The rest of the 2013-2016 data comes from the website of the national procuratorate of the supreme procuratorate of the People's Republic of China and the website of the local people's congress on the website of the Chinese website. The larger the value, the lower the honesty.

Consumption level. Control variables. We measure the average wage (yuan) of workers in urban units. The data comes from the China statistical yearbookin 2006-2016.

Science and technology. Control variables. We measure it by the number of research and development institutions. The data comes from the China statistical yearbook of science and technology in 2006-2016.

Human capital. We use the R&D personnel of full-time equivalent (one year) to measure. The total time equivalent of the R&D staff is the sum of the total number of personnel and the total number of employees. The data comes from the China statistical yearbook of science and technology in 2006-2016.

Local economy. Control variables. We measure it by the total output of the provinces. The data comes from the China statistical yearbook in 2006-2016.

3.3. Empirical Results

Before determine what method is used for the empirical analysis, this paper in order to sample data for the mixed regression and the effects of fixed and random effects, through F test and Hausman test p values were 0.0000, so the rest of this article adopted the fixed effects of static panel model for empirical analysis. The basic regression results of honesty and technological progress are reported in Table 3. The expectation of this article is that the impact of honesty on technological progress is positively correlated, that is, the higher the level of honesty, the higher the level of scientific and technological progress. On the contrary, the lower the honesty, the slower the progress of science and technology.

Column (2) we control the consumption level of urban residents. In this paper, with the average salary for unit employment in cities and towns to measure the level of consumption of urban residents, if the residents' income increase, so the demand for science and technology will increase, which would lead to a further development of science and technology level. As can be seen from column (2), the correlation coefficient of control variable consumption level is 0.526, which is significantly positive at 1% level. This shows that improving the consumption level of residents can effectively promote the progress of science and technology. This verifies the expected assumptions of this article. At the same time, the correlation coefficient of the core explanatory variable honesty is −0.080, which is significantly negative at 5% level. This shows that the higher the honesty, the higher the level of scientific and technological progress. Therefore, it is appropriate to control consumption level in regression.

Column (3) we control the scale of science and technology. This paper USES the number of research and development institutions to measure the scale of science and technology. As can be seen from the column (3), the correlation coefficient of technology scale is 0.690, which is significantly positive at 1% level. This shows that the bigger the technology, the faster the technology. That is, the state should strongly support the establishment and establishment of research and development institutions, which can further promote the development of science and technology. After continuing to control the scale of science and technology, the correlation coefficient of the core explanatory variable was −0.70, which was significantly negative at the 1% level. Therefore, it is appropriate to control the scale of science and technology in the regression.

Table 3. The basic regression results of honesty and scientific and technological progress.

	(1)	(2)	(3)	(4)	(5)
Honesty	0.453***	−0.080**	−0.070*	−0.082**	−0.088**
	(0.064)	(0.040)	(0.039)	(0.037)	(0.037)
Consumption level		0.526***	0.559***	0.395***	0.086
		(0.020)	(0.020)	(0.036)	(0.107)
Science & technology			0.735***	0.690***	0.714***
			(0.151)	(0.144)	(0.142)
Human capital				0.046***	0.039***
				(0.009)	(0.009)
Local economy					0.296***
					(0.096)
Constant term	5.412***	3.706***	-0.127	1.283	1.795**
	(0.453)	(0.256)	(0.823)	(0.829)	(0.834)
P fixed effect	Yes	Yes	Yes	Yes	Yes
Y fixed effect	Yes	Yes	Yes	Yes	Yes
N	324	324	324	324	324
R^2	0.147	0.746	0.765	0.787	0.793

Note: the bracket is standard error, *p < 0.10, **p < 0.05, ***p < 0.01.

Column (4) we control human capital. Human capital partly reflects the main force of technology. Human capital is measured by the total time equivalent of R&D personnel. The total time equivalent of R&D personnel includes basic research, applied research and experimental development. It can be assumed that the more advanced the technology, the more investment in R&D personnel, the higher the human capital level. As can be seen from the column (4), the correlation coefficient of human capital is 0.039, which is significantly positive at the 1% level, indicating that the more human capital is, the progress of science and technology is also being promoted. It is worth noting that, after controlling human capital, the honesty of the core explanatory variables still significantly influences the progress of science and technology.

Column (5) we control the economic level of the provinces. As can be seen from the column (5), the correlation coefficient of economic level is 0.296, which is significantly positive at 1% level. This indicates that the higher the level of economic development, the higher the level of science and technology in the province and the faster progress of science and technology in the province. From column (5), we can still see that the coefficients of the core explanatory variables are significantly negative. This again shows that honesty has a significant impact on scientific and technological progress, and the higher the honesty, the faster the R&D input. At the same time, to be sure, the first column (5) in the level of consumption coefficient becomes no longer significant, this may be because before joining the economic level of control variables together with linear level ex-

ist, so cause the level of consumption coefficient is no longer significant.

Overall, Honesty has a significant impact on technological progress. After successively joining the control variables such as consumption level, technology scale, human capital and economic level, the correlation coefficient of honesty is significantly negative. This is consistent with our expectations. This shows that if a province wants to raise the level of scientific and technological progress, the government should pay more attention to the science and technology strategy from the angle of honesty.

3.4. Robustness Test

1) Differences in measures of honesty. With reference to the thinking of existing literature, this paper separately in duty crime case number (Dang li, Yang ruilong, Yang Jidong, 2002) and the proportion of the number of criminal cases and civil servants (Huang Shoufeng, 2016) to measure the degree of honesty.

2) Regional differences. Will the empirical results be different depending on the degree of regional development? To this end, this paper divides 30 provinces, cities and autonomous regions into eastern, central and western regions.

Honesty measures the difference. We can see from **Table 4**, as shown in the first column (4) honesty degree was measured by filing number of duty crime, as shown in the first column (5) honesty is to use duty crime case number and the number of civil servants weight measure. Therefore, we need to compare the empirical results between the two. From column (4), we can see that the correlation coefficient is −0.088, and the correlation coefficient is negative at 5% level. This shows that there is a significant correlation between honesty and technological progress, that is, the higher the level of honesty in a province, the higher the level of scientific and technological progress. Then we can see from the (5) column that the correlation coefficient is still significantly negative in the core explanatory variable, which is measured by the ratio of the number of criminal cases and the number of public officials. We can therefore conclude that both choose number of duty crime case measure and to position the proportion of the registered and the number of civil servants to measure indicators, shall not affect the main conclusions of this paper. The higher the honesty, the higher the technological progress.

Regional index differences. Columns (1), (2) and (3) of **Table 4** above represent the impact of honesty on technological progress in eastern, central and western regions. From the first column (1) the table we can see that the eastern region honesty degree of the correlation coefficient is 0.480, the 1% significance level is negative, at the same time, consumption level, economic level of control variables such as correlation coefficient is not significant. In **Table 2**, the core explanatory variables of the central region are not significant, but the correlation coefficients of the control variables are significant. In particular, the correlation coefficient of consumption level in the central region is −0.904, which is significantly negative at 1%. This shows that the higher the consumption level in the central region, the lower the level of scientific and technological progress. In

Table 4. Robustness test results.

	(1)	(2)	(3)	(4)	(5)
Honesty	−0.480***	−0.039	−0.109	−0.088**	
Honesty	(0.114)	(0.139)	(0.135)	(0.037)	−0.083** (0.036)
Consumption level	0.052	−0.904***	−1.491***	0.086	0.063
	(0.214)	(0.161)	(0.186)	(0.107)	(0.107)
Science & technology	1.221***	0.776***	0.391***	0.714***	0.720***
	(0.074)	(0.187)	(0.109)	(0.142)	(0.142)
Human capital	0.189***	0.141***	0.500***	0.039***	0.037***
	(0.042)	(0.041)	(0.046)	(0.009)	(0.009)
Local economy	0.149	0.775***	0.328**	0.296***	0.302***
	(0.109)	(0.160)	(0.142)	(0.096)	(0.097)
Constant term	1.941	5.478***	13.787***	1.795**	0.867
	(1.993)	(1.673)	(1.775)	(0.834)	(0.822)
P fixed effect	Yes	Yes	Yes	Yes	Yes
Y fixed effect	Yes	Yes	Yes	Yes	Yes
N	142	66	116	324	324
R^2	0.845	0.760	0.868	0.793	0.793

Note: the bracket is standard error, *p < 0.10, **p < 0.05, ***p < 0.01.

Table 3, the level of honesty in the western region has the same impact on the level of scientific and technological progress as in the central region, which is not significant. At the same time, the influence of consumption level on the level of scientific and technological progress is the same as that in the central region, and there is a significant negative effect.

3.5. Take Guangdong Province as an Example

Column (1) the empirical results are based on panel data of 30 provinces, municipalities and autonomous regions (excluding Tibet and Hong Kong, Macao and Taiwan). Column (2) represents the empirical results of the panel data of 14 prefecture-level cities in Guangdong province. Can be seen from Table 5, compared with the first column (1), the first column (2) of the honesty degree of correlation coefficient is 0.347, the 1% significance level, which explains, within the scope of Guangdong province, a city of honesty degree is higher, the higher level of science and technology also. The first column (2) the correlation coefficient is 0.478, the level of consumption to 10% significance level is negative, and the level of consumption in the first column (1) the correlation coefficient is positive, but not significantly, this shows that for the level city of Guangdong province, the higher the level of consumption, the level of R&D input is negative to the relationship. The correlation coefficient of human capital in column (2) is 0.219, which is significantly positive at the 1% level, and its significance level is stronger than the correlation coefficient of human capital in column (1).

Table 5. Empirical results of prefecture-level cities.

	(1)	(2)
Honesty	−0.088**	−0.347*
	(0.037)	(0.202)
Consumption level	0.086	−0.478*
	(0.107)	(0.246)
Science & technology	0.714***	0.222*
	(0.142)	(0.123)
Human capital	0.039***	0.219***
	(0.009)	(0.036)
Local economy	0.296***	0.317*
	(0.096)	(0.164)
Constant term	1.795**	8.088***
	(0.834)	(1.579)
P fixed effect	Yes	Yes
Y fixed effect	Yes	Yes
N	324	125
R^2	0.793	0.365

Note: the bracket is standard error, *p < 0.10, **p < 0.05, ***p < 0.01.

In general, in order to build a better and stronger Guangdong province and enhance the level of scientific and technological progress in Guangdong, prefecture-level cities should build a better honesty environment and improve the city's honesty. Second, the investment in human capital should be increased to give full play to the significant effect of human capital on the level of scientific and technological progress.

4. Conclusions

This paper adopts the 30 provinces in 2006-2016 (except Tibet and Hong Kong, Macao and Taiwan) of R&D input, honesty and economic variable data, sets up a panel data model to study the honesty degree of influence R&D input, then adopts the prefecture-level panel data from 2006 to 2017 of Guangdong province to strengthen the credibility of the empirical test results related to R&D input. The results show that the higher the level of honesty, the more investment in R&D will be brought in, and the country's technological strength as well as core competitiveness will be stronger. On the contrary, the lower level of honesty leads to lower R&D investment; second, the degree of honesty has a significant positive impact on R&D investment in the eastern region, while in the central and western regions the degree of honesty have no significant impact on R&D investment; finally, the honesty of Guangdong prefecture-level cities has a significant positive effect on R&D investment.

The policy implications of this article mainly include two aspects. On the one

hand, it was confirmed for the first time that the improvement of credibility can effectively raise the level of R&D, so central government can improve the level of research and development through the effective construction of the degree of honesty, so as to achieve the purpose of improving the level of science and technology in China. On the other hand, we found that the level of honesty has significantly promoted the level of R&D in the eastern region, but it has no significant impact on the central and western regions. This phenomenon deserves policy makers' focus on anti-corruption in the central and western regions of China.

The deficiency of this paper is that there is no empirical analysis of the data of grass-roots procuratorate; the analysis of theoretical analysis and mechanism has not been further studied. A lot of detail processing also has the rough problem.

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