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Can the Replacement of Fixed Assets in the New Era Really Promote Economic Development

-- Empirical Evidence from Guangzhou

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Abstract: Since the reform and opening up, China has carried out four large-scale equipment renewal campaigns, and the fifth equipment renewal campaign was officially launched in March 2024. Although each renewal considers that the national economy has been boosted and the expected goal has been achieved, it is demonstrated from the macro level. Whether it can really significantly promote the growth of the major enterprises in economic development remains to be studied. This paper empirically studies the role of fixed assets in corporate growth by taking the listed manufacturing industry in Guangzhou, the holy land of reform and opening up in China, as a sample from 2012 to 2022. The results show that: TEC investment has no significant impact on corporate growth in Guangzhou and there is no heterogeneity among industries. This provides an important reference for the accurate implementation of national economic governance and corporate micro-governance.

Keywords: Enterprise Growth; Equipment Renewal; Fixed Assets; Economic Development.

1. Introduction

On March 13, 2024, the State Council released an action plan to promote large-scale equipment renewal and the exchange of old and new consumer goods. According to the estimation of the China Bank Research Institute, this round of large-scale equipment renewal will boost the overall investment in fixed assets by 1.2-1.5% and GDP by 0.4%. However, the growth of GDP is mainly due to the economic growth of enterprises, especially the contribution of industrial enterprises.

Since the founding of the People's Republic of China, New China has successively carried out five large-scale equipment renewal campaigns. The first (1982-1991) was the stage of transition from a planned economy to a market economy, mainly for manufacturing and infrastructure. The second (1991-2002), industrial upgrading and structural adjustment, mainly for the upgrading and transformation of high-tech industries such as information and machinery manufacturing and traditional industries such as steel and chemical industry; For the third time (2002-2012), after joining the WTO, it responded to the international competition and implemented a 4 trillion investment plan, prompting enterprises and individuals to renovate and purchase equipment on a large scale. The fourth (2016-2021) response to the global financial crisis, expanding domestic demand and maintaining steady growth, mainly for traditional industries such as steel, nonferrous metals and chemical industry, and promoting industrial upgrading and independent innovation; For the fifth time (2023-2027), the stage of cultivating and promoting new quality productive forces is mainly oriented to green, low-carbon and other circular economy areas, with high-end, intelligent, green and digital as the main direction. (Jupai Net, 2024) [1]

Looking at these five large-scale equipment upgrades, we can see that the different stages of China's economic development are accompanied by corresponding equipment upgrades and industrial upgrades. On the whole, these updates reflect the dynamic demand of China's economic development and the ever-increasing technological level, as well as its flexible response to changes in market demand. However, how effective are the large-scale equipment updates and the existence of fixed assets?

The role in industry growth is worth further study. Based on this, this paper empirically studies the role of fixed assets in the growth of enterprises by taking the listed manufacturing industry in Guangzhou, the holy land of reform and opening up in China, as a sample from 2012 to 2022.

2. Review of Relevant Literature

Fu Sheng, chairman of Cheetah Mobile, summarized the four stages of human cognition. 95% of people are in the first stage, that is, "I don't know if I don't know". If you are humble enough to admit that "actually, I don't know this thing", it means that you have evolved into 4% of the population, which is the second stage of "knowing that you don't know". The third stage is a higher level of "knowing that you know". Buffett and Munger are at least in this realm. He knows what I can buy without losing money. Such people account for 0.99%, which is one in a hundred. The top group of people, who "don't know what they know", account for 0.1%, one in a thousand. Don't fall behind 95% of the people when investing, thinking that you know everything, but you don't actually know it (Geshang Finance, 2020) [8] (see Figure 1). Therefore, the investment community believes that the trend is king and follows the trend, so it is of great significance to study the internal laws of the economy and the macro-trends of the government.

At the macro level, the most typical theories about economic development are Keynes's "pit digging economy" and "Reagan economy". The micro aspect mainly revolves around corporate governance and growth.

The theory of enterprise growth originates from the study

of mass production. It is generally believed that Adam Smith (1776) used the benefit of scale economy of division of labor to explain the problem of enterprise growth in classical economics, which was the earliest study in this field. With the rapid development of China's economy, economists are more and more concerned about the growth phenomenon of the general economy. Many scholars study it from different angles. Dr. Yang Du (1995) takes operating resources as the key concept in his study in "The Theory of Enterprise Growth", pointing out that enterprise growth includes both quantitative growth and qualitative growth. Wang Qingyan and He Youshi (2005) conducted a factor analysis on the growth of listed companies in China, and measured the empirical impact of asset characteristics, capital structure and equity structure on the growth of enterprises. (Wang Qingyan, He Youshi, 2005)[2] He Linjuan (2013) believes that the asset structure of an enterprise is constantly adjusted and optimized along with the industrial structure and the market competition environment, which is a comprehensive reflection of different growth stages of an enterprise. (He Linjuan, 2013) [3] Zhang Xiue et al. (2024) studied the relationship between digital transformation and new quality productivity (Zhang Xiue et al., 2024)[4], Pan Haifang et al. (2009) studied the relationship between asset quality and enterprise growth (Pan Haifang et al., 2009)[5], Yang Huixin et al. (2016) studied the relationship between intangible assets and enterprise growth (Yang Huixin et al., 2016)[6]. This paper studies the quantitative relationship between fixed assets and corporate growth in an empirical way to explore its internal logic.

3. Research and Design

This paper selects the data of 56 manufacturing enterprises in China's reform and opening-up holy land from 2012 to 2022 for empirical test. The panel regression model is constructed for the impact of technical fixed assets and corporate growth except for housing and transportation. The relevant raw data are mainly from financial terminal of iFind and financial data of CSMAR.

1. Model design

Through the preliminary collation of the original data, it is found that both the research and development investment and the total profit of the companies in Guangzhou area have shown an overall upward trend in the past ten years. Is it because research and development promote profit growth or is it because profit growth is the only condition to increase research and development investment? Is there a correlation between the two? Therefore, in order to further explore its internal causes, the following assumptions are made in this study:

H0: The growth of technological assets is positively correlated with the growth of profit;

H1: Social responsibility positively moderates the growth of technological assets and profit;

H2: R&D investment positively moderates social responsibility and profit growth;

H3: The interaction between research and development investment and social responsibility positively affects the growth of technological assets and profits.

In order to verify the above assumptions, the following model is constructed at three levels:

Table 1. Variable Definition Table

Variable type	Variable name	Variable meaning	Measurement method
dependent variable	INC	the total profit	Gross profit before tax
independent variable	TEC	Technical assets	Assets other than houses and vehicles
regulated variable	CSR	social responsibility	Corporate social responsibility expenditure
	RD	Research and development investment	Enterprise research and development investment
covariate	RD*TEC	Interaction between R&D Investment and Technical Assets	RD*TEC
	RD*CSR	Interaction between research and development and social responsibility	RD*CSR
	TEC*CSR	Interaction between Technology Assets and Social Responsibilities	TEC*CSR
Control variable	ASSET	Total assets of the enterprise	Total assets of the enterprise
	NP	Total number of employees in the enterprise	Total number of employees in the enterprise
random error	μ	random error	random error

Level 1

(1)INCit = a0+β1ASSETit + β2NPit+β3 TECit +μit

(2)INCit =a0+β1ASSETit + β2NPit+β3 CSRit +μit

(3)INCit = a0+β1ASSETit + β2NPit++β3RD i t-1 +μit

Level 2

(4)INCit =a0 +β1ASSET it + β2NP i t+β3 TEC it +β4CSR it+μit

(5)INCit =a0 +β1ASSET it + β2NP i t+β3 TEC it+β4 RD i t-1+μit

Level 3

(6)INCit =a0 +β1ASSET it + β2NP i t+β3 TEC it

+β4CSR it+β5 CSR it *TEC it+μ it

(7)INCit =a0 +β1ASSET it + β2NP i t+β3 TEC it +β4 RD i t-1 +β5 TEC it* RD i t-1+μ it

(8)INCit =a0 +β1ASSET it + β2NP i t+β3 TEC it +β4 CSR it+β5RD it-1+β6RD it-1 *TEC it+β7RD it-1* CSR it+β8 TEC it * CSR i+μit

The first level tests the influence of independent variables and adjusting variables on the explained variables, the second level tests the influence of adjusting variables on independent variables, and the third level tests the influence of interaction between independent variables and adjusting variables on dependent variables.

2. Description of variables

This study mainly explores the effect of technical fixed assets on the growth of enterprises. The explanatory variable is the pre-tax profit of enterprises, and the explanatory variable is the technical assets of enterprises except for transportation vehicles, houses and buildings. See Table 1 for other regulatory variables and control variables.

3. Descriptive statistics

According to the research design and sample data mentioned above, the relevant sample characteristics are described as follows after the analysis, sorting, classification and negative elimination of the original data in this research:

Table 2. Descriptive Statistics

. tabstat INC TEC CSR Rd, s (N mean sd min max) f(%12.3f) c(s)

Variable	N	Mean	SD	Min	Max
INC	543	285442.591	119720.151	0.000	1443672.031
TEC	543	3.092e+09	5.452e+08	0.000	8.456e+09
CSR	543	1339943.432	4233174.427	0.000	42869038.259
Rd	543	1.840e+08	5.771e+08	0.000	6.526e+09

As can be seen from the above table, the total number of observations for each variable is 543, among which the maximum values of explanatory variables and related adjustment variables are significantly different from their mean values, and the standard deviation of each variable is also significantly higher, indicating that the trend of data dispersion is relatively large, indicating that there are significant differences among the above-mentioned variables of each company, and there is a relatively large elastic space for most companies. Is there any correlation between the above variables?

4. Regression Analysis

(1) Correlation analysis

Table 3. Pearson and spearman relationships

VAR.	INC	TEC	CSR	Rd
INC	1.0000	0.3455***	0.4447***	0.4380***
TEC	0.5605***	1.0000	0.2883***	0.3357***
CSR	0.6320***	0.3743***	1.0000	0.5854***
Rd	0.8122***	0.6633***	0.5521***	1.0000

Upper-Spearman; Lower-Pearson* p<0.1, ** p<0.05, *** p<0.01

Table 3 shows that the correlation between technological assets, social responsibilities and corporate growth, technological assets of enterprises and current research and development investment are significantly positively correlated with corporate growth at 1%. As research and development investment lags behind, the relationship between them needs further analysis.

Considering that the conduction of action of R&D is lagging behind, this study refers to (Li jun,2023) [7] and takes R&D lagging behind for one phase to participate in the analysis. The correlation coefficient of each variable of R&D lagging behind for one phase is as follows:

Table 4. Pearson and spearman relationships

VAR.	INC	TEC	CSR	1_Rd
INC	1.0000	0.8301***	0.7600***	0.1961***
TEC	0.9037***	1.0000	0.7175***	0.1383***
CSR	0.5026***	0.3004***	1.0000	0.3266***
1_Rd	0.2830***	0.1103***	0.3788***	1.0000

Upper-Spearman; Lower-Pearson* p<0.1, ** p<0.05, *** p<0.01

From Table 4, it can be seen that after the lag period Rd is added, INC is still positively correlated with CSR, TEC and lag period Rd at a significant level of 1%, but the correlation degree of lag period Rd and INC is significantly decreased as compared with Table 3. The Pearson correlation coefficient decreased from 0.8122 to 0.2830, and the Spearman correlation coefficient also decreased from 0.4380 to 0.1961, with a significant decrease, especially the Pearson correlation coefficient decreased by 65.16%. This indicates that RD has obvious hysteresis conduction effect.

The lower left corner of the above table is the Pearson correlation coefficient, and the upper right corner is the Spearman correlation coefficient. From the table, we can see that both the Pearson correlation coefficient and the Spearman correlation coefficient among the above variables are significant at the level of 1% and have a positive correlation. From the data point of view, R&D is the most relevant variable among the above coefficients, followed by CSR, which may be the result that a responsible enterprise is conducive to establishing a positive public image and bringing a virtuous circle to the enterprise in many aspects. Finally, TEC is the carrier of R&D from the economic logic point of view. It needs R&D to realize the transformation into productivity, because R&D is the internal driving force.

(2) Regression Analysis on the Impact of TEC Investment on Enterprise Growth

In order to further explore the relationship between the above variables and find out the quantitative relationship between these variables and their properties, according to the construction model, this study uses STATA 18 software to analyze and process the above sample data in turn by OLS regression and panel regression. The results of the first to third levels of regression are as follows:

Level 1 regression results:

Table 5. Consolidation of M1-M3

MODE	m1	m2	m3
VAR.	INC	INC	INC
NP	2.9057***	2.2570***	3.1669***
	-7.7151	-5.848	-8.1497
SSET	391.2167***	365.7411***	536.2477***
	-14.6572	-14.9871	-12.0994
TEC	0		
	(-0.2998)		
CSR		0.0041***	
		-5.1692	
l_Rd			-0.0001***
			(-4.0802)
_cons	2.52e+05***	2.45e+05***	2.45e+05***
	-13.0732	-88.1659	-79.4338
N	543	543	487
R2	0.7384	0.7507	0.7514
adj. R2	0.737	0.7493	0.7499

t statistics in parentheses p < 0.10, ** p < 0.05, *** p < 0.01*

The first level regression results show that under the premise of controlling enterprise assets and staff size, the above variables have an independent impact on INC, and CSR has a negative moderating effect on INC, indicating that enterprises' performance of CSR and increase of RD and technological assets investment have a significant impact on INC. The establishment of the above model 1 indicates that the assumption that H0 does not hold water, H3 does not hold water when research and development investment lags by one stage, Li Jun 2023, Research shows that the current RD has a U-shaped relationship with corporate growth. Only when RD is put into a certain number of levels, such as the power of RD, will RD have a significant positive correlation with corporate growth. However, this research cannot prove this by using R&D2 lag phase of R&D2, which indicates that H0 in the sample data of Guangzhou companies for the period 2012-2022 does not hold water.

The second level regression results are as follows:

Table 6. Consolidation of M4-M5

MODE	m4	m5
VAR.	INC	INC
NP	2.2553***	3.1223***
	-5.7975	-8.0269
ASSET	365.3551***	524.5904***
	-13.7571	-11.6972
TEC	0	0
	-0.037	-1.5966
CSR	0.0041***	
	-5.1554	
l_Rd		-0.0001***
		(-4.2475)
_cons	2.45e+05***	2.11e+05***
	-12.9505	-9.6805
N	543	487
R2	0.7507	0.7527
adj. R2	0.7489	0.7507

t statistics in parentheses * p < 0.10, ** p < 0.05, *** p < 0.01

The above table shows that after controlling the enterprise assets and staff size, CSR and lagging Rd respectively have a negative moderating effect on TEC. The results show that both CSR and lagging Rd have a negative moderating effect on TEC, but the effect is more significant than lagging Rd, while CSR has a more significant impact on INC in the current period, which is mainly due to the different treatment of the two in the accounting standards. According to the current standards, TEC is included in the current assets, Rd is classified into capitalization and non-capitalization, and CSR is directly included in the current profit and loss.

The third level regression results (see Table3),

As can be seen from Table 7, when observing the interaction between technological growth and lagging first-stage research and development investment and the interaction between CSR and lagging first-stage research and development investment separately under the condition of controlling enterprise assets and staff size, the interaction

between technological growth and research and development investment is significant at 5%, while the interaction between CSR and lagging first-stage research and development investment is insignificant. When all the above variables are included at the same time, the interaction between R&D investment and technological growth and social responsibility is significant at 5% and 1% respectively, and the interaction between technological growth and social responsibility is significant at 1%. At this time, R and R are close to 80%, indicating that model (8) fits well.

Table 7. M6-M8 Consolidation

MODE	M6	M7	M8
VAR.	INC	INC	INC
NP	1.4489***	3.0948***	1.2151**
	-3.5575	-7.4878	-2.5792
ASSET	377.6088***	523.1446***	460.8668***
	-14.5337	-11.5019	-10.1227
TEC	-0.0000**	0	0
	(-2.3756)	-1.3531	(-1.2192)
CSR	-0.0068***		-0.0152***
	(-3.1480)		(-5.2910)
TEC_CSR	0.0000***		0.0000***
	-5.4223		-7.1334
l_Rd		-0.0001**	0
		(-2.2322)	-1.2218
l_RdTEC		0	-0.0000**
		(-0.1978)	(-2.5474)
l_RdCSR			-0.0000***
			(-4.6354)
_cons	2.98e+05***	2.07e+05***	2.79e+05***
	-14.2765	-7.2216	-9.8892
N	543	487	487
R2	0.7637	0.7527	0.7852
adj. R2	0.7615	0.7502	0.7817

t statistics in parentheses * p < 0.10, ** p < 0.05, *** p < 0.01

(3), panel model selection and inspection

In order to further test the validity and robustness of model (8), this study uses the full sample data of companies in Guangzhou area to verify by OLS regression and panel regression.

First of all, assume that there is no correlation between these variables, which only changes with time, i.e. it is independent of variables. In this study, Pool regression is used and cluster robust standard error analysis is used. The regression results with and without control variables are as follows:

As can be seen from Table 8 and Table 9, when considering intra-group autocorrelation, the cluster robust standard error method is used for Pool regression with a significant P value, indicating rejection of the original assumption that there is no individual effect, i.e. the correlation between each variable is caused by individual factors, i.e. there is individual effect. For this reason, the relevant panel data are further tested for individual effect. The results are as follows: TEC is significantly positively correlated at the level of 10% in the individual effect after the control variables are added.

The above tables 9-11 all indicate that there are effects. In order to further find out the internal reasons for the existence of individual effects, the time effect of model 8 is estimated subsequently. The test results show that the P value is significantly 0. In order to save space, the analysis process is not disclosed. When chow test is used for the time effect, the F statistic is 3.2723546, which is greater than the critical value of 1.3438528, indicating that there is no time effect, i.e. there is time effect for the whole sample data. It is necessary to adopt an individual point-in-time dual fixation effect model, but is this fixation effect caused by random factors? The houseman test is further performed on the whole sample data, and the results are as follows:

[b = Consistent under H0 and Ha; obtained from xtreg.

B = Inconsistent under Ha, efficient under H0; obtained from xtreg.

Test of H0: Difference in coefficients not systematic

chi2(2) = (b-B)'[(V_b-V_B)^(-1)](b-B)

= 39.71

Prob > chi2 = 0.0000

(V_b-V_B is not positive definite)]

Table 8. Pool Regression without Control Variable

```
. reg INC  TEC l_Rd CSR,vce(cluster id)

Linear regression                               Number of obs     =        487
                                                F(3, 55)          =     236.87
                                                Prob > F          =     0.0000
                                                R-squared         =     0.6553
                                                Root MSE          =      74133

                                    (Std. err. adjusted for 56 clusters in id)
------------------------------------------------------------------------------
             |               Robust
         INC |      Coef.   Std. err.      t    P>|t|     [95% conf. interval]
-------------+----------------------------------------------------------------
         TEC |    .000033   .0000302     1.09   0.279    -.0000275    .0000935
        l_Rd |   .0001214   .0000207     5.85   0.000     .0000798     .000163
         CSR |   .0083128   .0024522     3.39   0.001     .0033984    .0132272
       _cons |   153671.5   88352.46     1.74   0.088     -23390.8    330733.8
------------------------------------------------------------------------------
```

Table 9. Pool Regression with Control Variable

```
. reg INC  TEC l_Rd CSR ASSET NP ,vce(cluster id)

Linear regression                               Number of obs     =        487
                                                F(5, 55)          =    1188.94
                                                Prob > F          =     0.0000
                                                R-squared         =     0.7622
                                                Root MSE          =      61705

                                              (Std. err. adjusted for 56 clusters in id)
------------------------------------------------------------------------------
             |               Robust
         INC |  Coefficient  std. err.      t    P>|t|     [95% conf. interval]
-------------+----------------------------------------------------------------
         TEC |   .0000119   .0000217     0.55   0.586    -.0000315    .0000553
        l_Rd |  -.0000603   .0000787    -0.77   0.447    -.0002181    .0000974
         CSR |   .0036525   .0027844     1.31   0.195    -.0019274    .0092325
       ASSET |   493.4195   245.9892     2.01   0.050     .4461654    986.3928
          NP |   2.530388   .5202795     4.86   0.000     1.487725    3.573051
       _cons |   209287.6   62210.46     3.36   0.001     84615.03    333960.1
------------------------------------------------------------------------------
```

Table 10. Individual Effect Test without Control Variables

```
. xtreg  INC TEC CSR l_Rd,fe r

Fixed-effects (within) regression               Number of obs     =        487
Group variable: id                              Number of groups  =         56

R-squared:                                      Obs per group:
     Within  = 0.1415                                         min =          2
     Between = 0.8477                                         avg =        8.7
     Overall = 0.6549                                         max =         10

                                                F(3, 55)          =       9.14
corr(u_i, Xb) = 0.6612                          Prob > F          =     0.0001

                                              (Std. err. adjusted for 56 clusters in id)
------------------------------------------------------------------------------
             |               Robust
         INC |  Coefficient  std. err.      t    P>|t|     [95% conf. interval]
-------------+----------------------------------------------------------------
         TEC |    .000017   .0000276     0.62   0.540    -.0000384    .0000724
         CSR |   .0053395   .0027543     1.94   0.058    -.0001803    .0108592
        l_Rd |   .0000806    .000027     2.99   0.004     .0000266    .0001347
       _cons |   214314.6   82604.93     2.59   0.012     48770.67    379858.6
-------------+----------------------------------------------------------------
     sigma_u |  54105.872
     sigma_e |  65113.311
         rho |    .408451   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

Table 11. Panel Individual Effects of Adding Control Variables

```
. xtreg  INC TEC CSR l_Rd TEC_CSR l_RdTEC l_RdCSR NP ASSET ,fe

Fixed-effects (within) regression               Number of obs     =        487
Group variable: id                              Number of groups  =         56

R-squared:                                      Obs per group:
     Within  = 0.5320                                         min =          2
     Between = 0.8863                                         avg =        8.7
     Overall = 0.7766                                         max =         10

                                                F(8, 423)         =      60.10
corr(u_i, Xb) = -0.7573                         Prob > F          =     0.0000

------------------------------------------------------------------------------
         INC |  Coefficient  Std. err.      t    P>|t|     [95% conf. interval]
-------------+----------------------------------------------------------------
         TEC |  -.0000254   8.62e-06    -2.94   0.003    -.0000423   -8.43e-06
         CSR |  -.0164265   .0025921    -6.34   0.000    -.0215215   -.0113316
        l_Rd |  -.0000516   .0000358    -1.44   0.150    -.0001219    .0000187
     TEC_CSR |   6.40e-12   7.97e-13     8.03   0.000     4.83e-12    7.96e-12
     l_RdTEC |  -9.12e-15   4.15e-15    -2.20   0.028    -1.73e-14   -9.68e-16
     l_RdCSR |  -3.25e-12   7.17e-13    -4.53   0.000    -4.65e-12   -1.84e-12
          NP |   2.314337   .7901921     2.93   0.004     .7611445    3.867529
       ASSET |   860.0486   63.56664    13.53   0.000     735.1028    984.9945
       _cons |   304380.1   25875.13    11.76   0.000     253520.3     355240
-------------+----------------------------------------------------------------
     sigma_u |  56244.498
     sigma_e |  48359.705
         rho |  .57495154   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0: F(55, 423) = 5.17                     Prob > F = 0.0000
```

Table 12. Consolidated table of fixed effect, random effect and houseman test

MODEL	FE	RE	HAUSMAN
VAR	INC	INC	INC
TEC	-0.0000***	0	0
	(-2.9434)	(-1.3721)	(-1.3721)
CSR	-0.0164***	-0.0159***	-0.0159***
	(-6.3372)	(-5.6134)	(-5.6134)
l_Rd	-0.0001	0	0
	(-1.4429)	-1.153	-1.153
TEC_CSR	0.0000***	0.0000***	0.0000***
	-8.0307	-7.4088	-7.4088
l_RdTEC	-0.0000**	-0.0000***	-0.0000***
	(-2.1990)	(-2.7406)	(-2.7406)
l_RdCSR	-0.0000***	-0.0000***	-0.0000***
	(-4.5303)	(-4.6203)	(-4.6203)
ASSET	860.0486***	488.5696***	488.5696***
	-13.5299	-10.5168	-10.5168
NP	2.3143***	1.0573**	1.0573**
	-2.9288	-2.2149	-2.2149
_cons	3.04e+05***	2.83e+05***	2.83e+05***
	-11.7634	-10.1689	-10.1689
N	487	487	487
R2	0.532		
adj. R2	0.4622		
t statistics in parentheses		* p < 0.10, ** p < 0.05, *** p < 0.01	

As can be seen from Table 12, a full sample hausman test for Model 8 shows that a fixed effect model should be used.

5. Research Findings

Through the presentation and analysis of the above-mentioned data on corporate social responsibility, research and development investment, technology growth and corporate growth in Guangzhou, the study found that the return on TEC investment of enterprises is not high or even negative, and the return on TEC investment is indeed uncertain, non-linear and heterogeneous, which is basically consistent with the research results of Pan Haifang (2009) and He Linjuan (2013), etc. The specific conditions are as follows:

(1) Without adding relevant control variables, there is no statistical correlation between technology asset renewal and corporate growth within 10%, and the degree of impact is slightly negatively correlated and negligible. There is a significant positive correlation between R&D investment and enterprise growth at the level of 1%.

(2) When the relevant control variables are not added, the moderating effect of social responsibility on the investment in technical assets is significantly positively correlated at the level of 10%.

(3) After adding all the variables, the study found that corporate assets and staff size significantly positively affect corporate growth at 1% level, and in the interaction, social responsibility and technology growth positively regulate the impact of CSR investment on corporate growth at 1% level, social responsibility and lagging first-stage research and development investment significantly negatively regulate corporate growth at 1% level, lagging first-stage research and development investment and technology growth negatively regulate corporate growth at 5% level, and there is no time effect.

(4) After all variables are added, the milliman test indicates that the fixed effect model should be adopted, indicating that each explanatory variable has individual effect and is significantly correlated with the explained variable.

(5) When examining the relationship between TEC investment and corporate growth of Guangzhou companies by industry, it is found that there is no obvious heterogeneity among industries. That is, the relationship between the two has nothing to do with the manufacturing industry segments.

The above research findings have also been confirmed by other scholars' research in recent years to a certain extent, such asChen Yan (2017)The conclusion of Zhang Xiue (2022) research points out that the investment in enterprise information and digital transformation plays a significant role in promoting the growth of enterprises.

6. Conclusion and Recommendations

In recent years, the research on financial performance from the perspective of innovation investment and social responsibility fulfillment has become a hot issue in the academic circle, but the research has not reached a consistent conclusion. Based on the findings of this study, the relevant conclusions and recommendations are as follows:

1. There are many factors that affect the growth of an enterprise. An enterprise should find out the key factors of success in its industry and focus on strengthening and breakthrough. We should pay attention to R&D investment for the technology-driven type, and carefully and moderately grasp the factor-driven type.

2. Whether the investment in technological assets of an enterprise can promote the growth of the enterprise is also highly related to the asset category, asset quality and revenue ability. An enterprise should analyze the specific situation in the actual operation process, because it is essentially a tool and a means, and whether the actual effectiveness and efficiency are brought into play depends on the entrepreneurial talents of the managers.

3. The state shall, when formulating relevant industrial support policies, make accurate policies for the industrial pain points as far as possible, and combine self-financing by the enterprises with state aid to prevent flooding.

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