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Listing Change and Sustainable Growth

-- The Moderating Effect of R&D

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Abstract

Capital market is key to the operational and sustainable growth of the firms. The proposed study contributes to the existing literature by examining the theoretical and empirical aspects of listing change in China's capital markets and providing evidence on the relationship between listing change and firm-level sustainable growth. For the reason the current study analyzed the listing changes on the sustainable growth of the firms in the Chinese capital market. A panel of 26193 A-share Chinese listed firms over the period of 2007 to 2018 is investigated through Propensity Score Matching (Hereafter PSM) in the endogeneity test. The results found positive and significant effect of listing change on sustainable growth in Chinese listed firm for the subsequent three years. More intuition investigation is carried out by using research and development (R&D) expenditure to check the sustainable growth. The finding is consisting with the former model that sustainable growth is highly influenced by the R&D expenditure and analyst coverage. Furthermore, variable replacement and changing of PSM methods in the robust test is explored to check the reliability of the model and the result confirms the reliability of research finding. The consistency of the results with most of the prior studies in term of capital market role in growth of the firm portrays the reliability and consistency of the proposed model.

Keywords

Listing Change; Growth; R&D; Sustainability.

1. Introduction

Multi-tier capital market is a general trend of stock market development [1]. Research on the current dilemma focus mainly on the factors of listing change, the profits obtained or operating returns after listing change [2]. Reason of the switch from Nasdaq or AMEX to NYSE is to increase liquidity and improve price [3]. Moreover, switching to NYSE has helped firms to expand their investor bases and increase their visibility [4, 5]. In addition, listing change to NYSE obtain a type of bonding effect associated with the tighter regulatory standards on NYSE [6]. After the switch, firms may issue more debt and equity, and engage in more asset transactions such as acquisitions, showing that listing change is not an individual action, rather related to other important corporate intentions and objectives [7]. However, an unconventional view is there in literature showing that firms trading shift generally experience poor stock returns [8]. Tang et al. find that phase-up firms experience declines in bid-ask spreads, and the probability of informed trading during listing change. Most of the existing literature on the research of the listing change focus on developed capital markets[9]. Listing change on sustainable growth of firms is not been checked in the literature. Besides, the rate of sustainable

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growth of firms in emerging capital markets such as China is different from that in developed countries. Consequently research conclusions drawn from developed capital markets may not be applicable to emerging capital markets.

The first example of listing change in China occurred in 2007 when Guangdong Media LTD, an enterprise of NEEQ, was moved to the SME Board. By the end of 2018, 61 enterprises of NEEQ have switched to A-Share Market in China. As more and more enterprises of NEEQ have moved to A-Share Market in China, the economic concerns of listing change have attracted much attention and consideration. By studying the former study it has been find out that will listing change affect the sustainable growth of firms?This becomes a question mark for most of the researcher in recent time and this dilemma needs further clarification. Therefore this study is conducted to give a possible answer to this question.

Furthermore, the paper is organized in the following different parts. In Section 2, the study highlights an overview of the literature on listing change and sustainable growth of firms. We describe the empirical design and data in Section 3, and present empirical results in Section 4. Section 5 summarizes the findings of the study.

2. Literature Review and Hypothesis

2.1. Listing Change and Sustainable Growth of Firms

Previous studies use different research methods and samples to test that a country's financial market development and economic growth are closely related. Listing change is an important phenomenon in the development of capital market. Although the motives for switching marketplace differ, a common reason is the firms' desire to improve their visibility. Improved visibility suggests greater flow and accessibility of information about a firm, which in return may reduce information irregularity and the uncertainty about a firm's prospects [10]. Barry and Brown point out that reducing information asymmetry may enable firms to lower their cost of external capital and to reduce their financing constraints, and listing may temporarily increase information availability due to enhanced interest, which, in return, may reduce the uncertainty about the prospects of the firm and raise the stock price[11]. Merton notes that the publicity associated with listing reaches some investors who were previously not familiar with the stock [12]. Baker and Edelman find that firms moving from NASDAQ to NASDAQ NMS (National Market System) increases volume, which may enhance stock liquidity by lowering transaction costs[13]. Baker and Edelman indicate that AMEX stocks have more to gain in terms of visibility and market interest by switching to the NYSE[14].

Baker and Powell analyze whether changes in listing from the OTC to the NYSE affect a firm's visibility by using some proxies. They find that increased visibility in a firm is primarily due to changes in market capitalization and not due to the listing itself[15]. Baker and Powell examine a set of firms switching from the AMEX to the NYSE and find a positive and significant relation between switching and visibility advantage[16]. Bennett and Wei find that the firm's trading-related market quality and price efficiency improved after the switch by analyzing 39 firms switching from Nasdaq to NYSE from January 2002 to March 2003[17]. Aeroflex, as the first case moved from the NYSE to the NASDAQ, earned an abnormal positive return when switching, combined with subsequent lower bid-ask spreads and an increase in volume [18]. Carvalho and Pennacchi find that Brazilian firms that voluntarily migrated to the premium exchange segment achieved abnormal positive stock returns[19]. Jenkinson and Ramadorai test the consequences of listing change from AIM (exchange regulated market) to the MM (EU regulated market), and find that listing change from AIM with lighter regulation to the MM with higher regulation experienced, on average, significantly positive announcement returns of about 5%[20]. About 67% of the companies moving from the NYSE to the NASDAQ are aiming to reduce trading costs

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while improving liquidity, and will increase the development of the firms in the future [21]. Thus, based on the above discussion, we develop the first hypothesis:

Hypothesis 1: In general, listing change is positively related to the sustainable growth of firms.

2.2. R&D Expenditures and Sustainable Growth of Firms

R&D investments can be seen as capital expenditure for the commercial production for the production of certain products before the start of commercial production of capital spending activity stream [22]. R&D investment plays a crucial role in sustainable economic growth in many countries around the world [23]. From the view of shareholder value maximization, the ultimate aim of R&D expenditures is to maximize corporate value through enhancing and maintaining profitability. The sustainable economic growth depends on the application of new knowledge and technology to develop better products and production processes. Continuous effort for R&D is essential for the survival of a firm in the highly competitive market. Grossman and Helpman find that R&D expenditures is one of the important factors for enhancing technological progress and economic growth. Armeanu et al. identify that R&D Expenditures have a positive impact on economic growth[25]. Lev and Zarowin Argues change of R&D investment makes big difference on the change of future growth[26]. Thus, based on the above discussion, we develop the second hypothesis:

Hypothesis 2: In general, R&D expenditures are positively related to the sustainable growth of firms.

3. Methodology

3.1. Sample and Data

Looking to the study requirement the data has been collected from multiple sources. CSMAR database has been used to collect the data of all firm-year observations of publicly listed companies for the year 2007 to 2018. The following observation has been drop out from the data set such as (1) financial listed companies; (2) the firms with special treatment (ST firms); (3) main variables data missing. Reasons for dropping the above mention samples are that data of financially listed and ST companies are different from ordinary firms. Similarly the missing data of main variables may affect the regression results. To eliminate the effects of variable outliers, we sorted 1% of all main financial variables at the top and bottom (except the dummy variables). Ultimately, we obtain 26193 observations. In addition, in order to reduce the influence of data dimension on regression results, the standardized data is used for regression model.

3.2. Variables Definitions

(1) Sustainable Growth of Firms

The following equation is used to calculate Sustainable Growth of Firms which as extracted from the previous study (SGR), $SGR = P \times A \times T \times R / (1 - P \times A \times T \times R)$. Where P represents the profit margin (profit scaled by total sales), A represents asset; turnover ratio (total sales scaled by total assets), T represents leverage factor (total assets scaled by end-of-period equity) and R represents retention ratio (retained earnings scaled by profit) [27].

(2) Listing change

Securities market in China includes market in the field which consist of Main Board, SME Board, ChiNext Market and STAR Market and Over-the-Counter (OTC) market which constitute regional Equity Market. The structure is shown in Figure 1.

At present, the cases of listing change in China occur between NEEQ and market in the field. By 2018, a total of 61 NEEQ enterprises have been listed in the A-Share market. Listing change is

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used as a dummy variable and it is calculated as (LC)=1, if samples were from those 61 enterprises, and zero otherwise.

(3) R&D Expenditures

R&D Expenditures is measured by R&D investments standardized by the total assets [28].

(4) Control Variables

In order to reduce spurious results, the study tested the model in the presence of several control variables, such as size of the firm (Asset), size of the loan (Lev), sales revenue (Revenue), general and administrative expenses (Mexpense), size of board (Board), ratio of independent directors (Indep).

3.3. Model

The regression models are shown in Model 1 and Model 2. $SGR_{i,t}$ represents sustainable growth of firm rate in year t while the rest of variables are mentioned above.

$$SGR_{i,t}=\alpha_0+\alpha_1 LC_{i,t}+\alpha_2 Asset_{i,t}+\alpha_3 Lev_{i,t}+\alpha_4 Revenue_{i,t}+\alpha_5 Mexpense_{i,t}+\alpha_6 Board_{i,t}+\alpha_7 Indep_{i,t}+\alpha_8 Year_{i,t}+\alpha_9 Ind_{i,t}+\varepsilon \quad (1)$$

$$SGR_{i,t}=\alpha_0+\alpha_1 LC_{i,t}+\alpha_2 R\&D_{i,t}+\alpha_3 Asset_{i,t}+\alpha_4 Lev_{i,t}+\alpha_5 Revenue_{i,t}+\alpha_6 Mexpense_{i,t}+\alpha_7 Board_{i,t}+\alpha_8 Indep_{i,t}+\alpha_9 Year_{i,t}+\alpha_{10} Ind_{i,t}+\varepsilon \quad (2)$$

4. Results

4.1. Descriptive Statistics

The descriptive statistics are presented in Table 1. SGR is about 7.6% an average for the period of 2007 to 2018 in Chinese market. Further, in order to have a visually description of the listing change, we draw a picture according to switching to different stock markets for the period of 2007–2018. As illustrated in Figure 1. That majority of the companies choose to switch to Main board and ChiNext Market.

Table 1. Demographic Detail.

variable	N	mean	sd	min	p25	p50	p75	max
SGR	26193	0.076	1.506	-208.900	0.028	0.058	0.101	98.680
LC	26193	0.005	0.073	0.000	0.000	0.000	0.000	1.000
R&D	26193	17.660	1.818	8.068	16.670	17.700	18.770	23.240
Asset	26193	21.950	1.346	10.840	21.010	21.790	22.700	28.520
Lev	26193	0.448	1.295	-0.195	0.256	0.417	0.583	142.700
Board	26193	0.009	0.999	-4.932	-0.974	0.156	0.156	5.245
Indep	26193	0.370	0.062	0.000	0.333	0.333	0.429	0.800
Mexpense	26193	18.720	1.225	14.130	17.890	18.580	19.400	25.250
Revenue	26193	21.290	1.523	9.310	20.300	21.160	22.150	28.690

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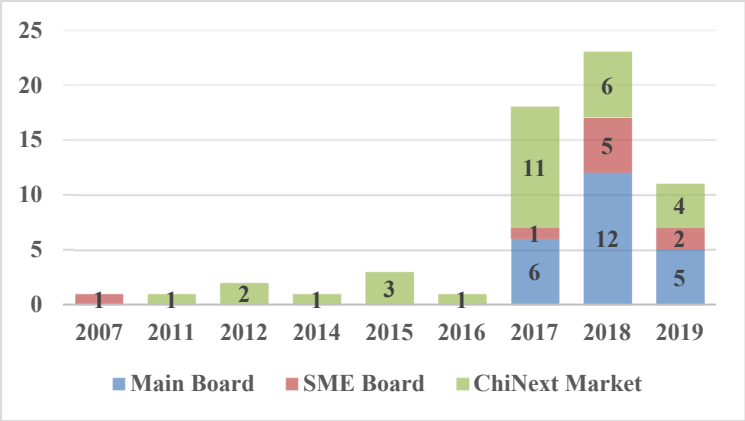

Figure 1. Stock market distribution of the listing change enterprises

4.2. Regression Results

First, we test the effect of listing change and R&D on the sustainable growth of firms. In order to examine the sustainability of the impact, we test whether listing change and R&D influence sustainable growth in the following 1st, 2nd and 3rd year.

Table 2. Regression result of the effect of listing change and R&D on sustainable growth

	(1)	(2)	(3)	(4)
	SGR_t	SGR_{t+1}	SGR_{t+2}	SGR_{t+3}
LC	0.174**	0.179**	0.283***	0.173**
	(2.023)	(2.086)	(3.285)	(1.994)
R&D	0.0400***	0.0228***	0.0134**	0.00817
	(6.271)	(3.580)	(2.094)	(1.270)
Asset	-0.0326**	-0.0372***	-0.0122	-0.0173
	(-2.333)	(-2.667)	(-0.872)	(-1.229)
Lev	3.237***	3.348***	2.923***	2.433***
	(19.189)	(19.856)	(17.279)	(14.300)
Board	-0.0138**	-0.0110	-0.00923	-0.00904
	(-1.965)	(-1.570)	(-1.310)	(-1.275)
Indep	-0.202	-0.214*	-0.299**	-0.329***
	(-1.633)	(-1.725)	(-2.405)	(-2.630)
Mexpense	0.0563***	0.0442**	0.00763	0.0208
	(2.694)	(2.117)	(0.364)	(0.988)
Revenue	-0.0135	-0.00612	0.00256	-0.00196
	(-0.740)	(-0.337)	(0.140)	(-0.107)
Year	control			
Ind	control			
_cons	-0.148	0.0570	0.190	0.402
	(-0.212)	(0.411)	(1.365)	(0.000)
N	26048	26047	26046	26045
R^2	0.0414	0.0425	0.0381	0.0299
R^2_a	0.0401	0.0412	0.0367	0.0285
F	31.20	32.10	28.58	21.67

*, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

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The first column in Table 2 shows that, the coefficient of LC is 0.174 and statistically significant at 5% level, which suggests that in general, the listing change influences SGR in the first year. While the 2nd, 3rd and 4th columns of the regression results highlight that the listing change has a significant impact on the sustainable growth for the subsequent three years, and the coefficient of LC gradually increases from 0.174 to 0.283 in the first two years and later decreases to 0.173 in the fourth year, which indicates that the impact of LC on the sustainable growth of enterprises in upcoming year gradually increased at the early stage and then decreased. This verifies the 1st Hypothesis developed in the literature. In Table 3, the coefficient on R&D is positive and statistically significant at the 1% level in the 1st Columns, suggesting that R&D influences SGR. As indicated in the regression results 2nd 3rd and 4th Columns, the R&D has a significant impact on the sustainable growth of the next three years, and the coefficient of R&D gradually decreases later in the following three year, which indicates that the impact of R&D on the sustainable growth of enterprises in the future gradually attenuated over years. This verifies the 2nd Hypothesis proposed in the literature earlier. In addition, the coefficients on control variables, namely, Lev and Mexpense are positive and significant, indicating that they contribute to the sustainable growth of firms. While the coefficients of other control variables such as, Asset, Board and Indep director are significantly negative.

4.3. Endogeneity Test

Although we alleviate the endogenous problem by lagging sustainable growth, there is still a possibility that firms with higher sustainable growth ability prefer to choose listing change. Therefore, there is a reverse causal relationship between listing change and sustainable growth.

In order to alleviate endogenous problems and overcome the selective bias, we adopt the PSM method. Specifically, in order to select the direct initial public offer (IPO) companies with the same level of sustainable growth as the control group, we adopted k nearest neighbor matching in PSM method, set k=5, and chose replacement matching. The purpose is to match the enterprises that are similar to the transfer board enterprises with in the industry, listed sector, asset size and governance. After matching, 5883 samples are obtained, and propensity score of major variables are shown in Figure 2.

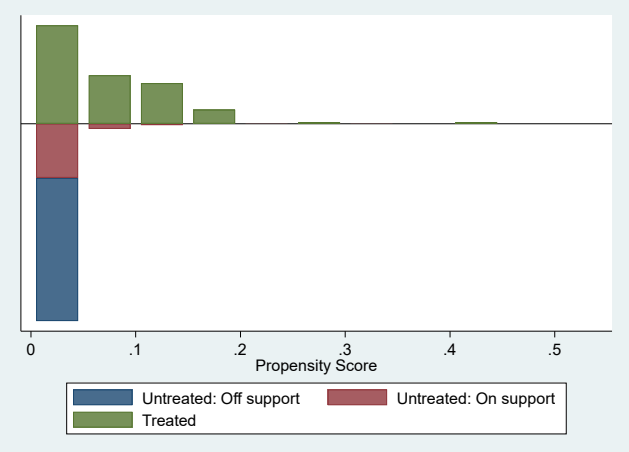

Figure 2. Propensity score of major variables

In the matching process, in order to further test the data, for any selective bias. We have carried out parallel testing to the trend of the control group and experimental group. The results find that there is no significant difference between the control variables in the experimental group and control group. As shown in Table 3 and Figure 3, that the control group selected by the PSM method has no significant difference from the experimental group in the control variables.

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Table 3. Parallel trend tests for major variables

Variable	%bias	T-test	P-value
lnasset	0.90	1.08	0.282
Lev	-1.60	-0.15	0.960
Revenue	0.01	-0.09	0.932
Mexpense	-0.10	-0.14	0.886
Board	5.10	0.47	0.638
Indep	3.20	0.25	0.359
Age	4.10	0.92	0.282

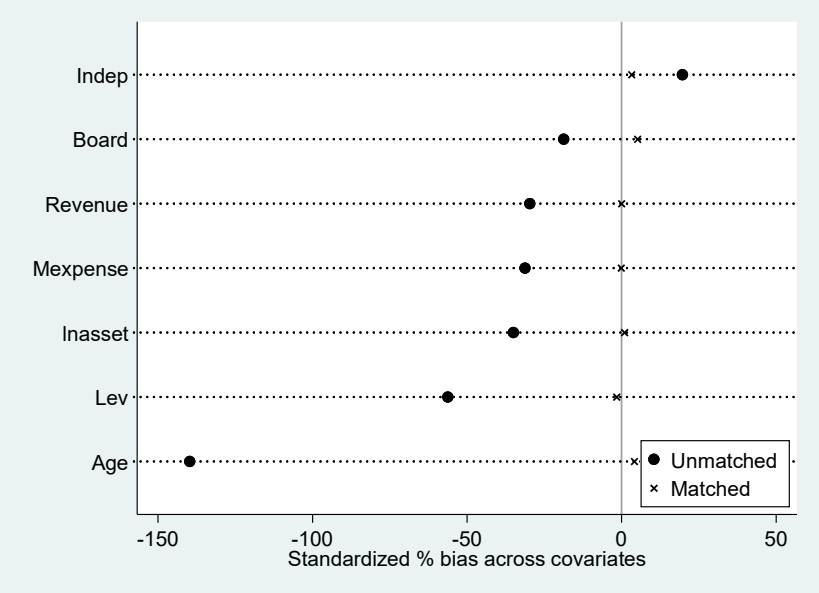

Figure 3. Standard deviation distribution of major variables

The results shown in Table 4, highlight that the coefficient of LC in the PSM samples is 0.224 and statistically significant at the 1% level in the 1st Columns, which suggests that in general, the listing change influences SGR. Similarly the regression results in 2nd, 3rd and 4th Column shows that, LC has a significant effect on the sustainable growth in the following three years but in different manners because the coefficient of LC decreases from 0.224 to 0.180 in the first two years and then increases from 0.180 to 0.276 in the middle, and then decreases to 0.197, which indicates that the impact of LC on the sustainable growth of enterprises in the future change with the time. It can be seen that the finding of this model is a slightly different from those in the previous model of Table3. Further, In Table 5 the coefficient of R&D is 0.0609 and statistically significant at the 1% level in the 1st Columns, suggesting that R&D influences SGR in the first year. The regression results in 2nd, 3rd and 4th column of table 5 indicate that the R&D has a significant impact on the sustainable growth rate of the subsequent year, and the coefficient of R&D gradually decreases to 0.0342 in the coming year, which indicates that the impact of R&D on the sustainable growth of enterprises gradually decreased over times, while later on the impact disappear in the following third and fourth year.

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Table 4. Regression result of the effect of LC and R&D on sustainable growth in PSM samples

	(1)	(2)	(3)	(4)
	SGR_t	SGR_{t+1}	SGR_{t+2}	SGR_{t+3}
LC	0.224***	0.180***	0.276***	0.197***
	(3.371)	(2.656)	(4.144)	(2.906)
R&D	0.0609***	0.0342***	0.00777	0.00843
	(6.622)	(3.662)	(0.843)	(0.901)
Asset	-1.104***	-0.303*	0.139	-0.157
	(-6.369)	(-1.720)	(0.802)	(-0.890)
Lev	3.417***	1.401***	0.872**	1.217***
	(9.368)	(3.781)	(2.387)	(3.282)
Board	-0.0883***	-0.0200	-0.0175	-0.0330**
	(-5.640)	(-1.258)	(-1.119)	(-2.077)
Indep	-0.953***	-0.144	-0.152	-0.341
	(-4.193)	(-0.624)	(-0.667)	(-1.474)
Mexpense	0.453	0.252	-0.356	-0.343
	(1.235)	(0.676)	(-0.970)	(-0.920)
Revenue	6.947***	3.165***	2.076**	1.836*
	(6.980)	(3.130)	(2.084)	(1.814)
year	control			
ind	control			
_cons	1.644***	0.289	0.0640	0.210
	(9.893)	(1.636)	(0.368)	(1.187)
N	5883	5882	5881	5880
R^2	0.0942	0.0777	0.0732	0.0551
R^2_a	0.0907	0.0740	0.0696	0.0514
F	26.50	21.45	20.11	14.86

*, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

4.4. Robustness Test

In order to get more reliable results from the investigation, the robust test is carried out by variable replacement and changing of PSM methods. First, we use the total number of scientific researchers (RN) of a firm as an alternative measure of R&D expenditures and use number of research reports (Rep) of an enterprise as an alternative measure of Analyst Coverage. In addition, we add duality of chief executive officer (CEO Duality) a new variable in the model. The results is shown in the Table 5, and it is pointed out that the coefficient of LC is 0.226 in 1st Columns and 0.190 in the 2nd Columns respectively, while both are statistically significant at the 1% level. Besides, the coefficients of RN are 0.00315 in and are statistically significant at the 1% level. The coefficient of Rep is 0.00920 and 0.00628 respectively and both are statistically significant at the 1% level. The results are consistent, which indicates that the research conclusion of this paper had a certain degree of reliability.

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Table 5. Robustness test: Alternative measure of major variables

	(1)	(2)	(3)	(4)
	SGR_t	SGR_{t+1}	SGR_t	SGR_{t+1}
LC	0.226***	0.190***	0.253***	0.207***
	(3.376)	(2.807)	(3.848)	(3.083)
RN	0.00315***	0.00107		
	(2.607)	(0.878)		
Rep			0.00920***	0.00628***
			(15.157)	(10.124)
Dual	-0.0525***	0.0119	-0.0489**	0.0144
	(-2.615)	(0.588)	(-2.481)	(0.716)
Asset	-1.258***	-0.378**	-1.099***	-0.272
	(-7.053)	(-2.097)	(-6.270)	(-1.517)
Lev	3.461***	1.419***	3.886***	1.725***
	(9.431)	(3.822)	(10.760)	(4.672)
Board	-0.0854***	-0.0182	-0.0893***	-0.0204
	(-5.377)	(-1.134)	(-5.729)	(-1.283)
Indep	-1.017***	-0.148	-1.127***	-0.222
	(-4.430)	(-0.635)	(-5.000)	(-0.963)
Mexpense	0.561	0.362	-0.196	-0.199
	(1.504)	(0.959)	(-0.534)	(-0.531)
Revenue	8.122***	3.665***	6.449***	2.650***
	(8.095)	(3.611)	(6.589)	(2.649)
Year	control			
Ind	control			
_cons	2.173***	0.318*	1.738***	-0.0129
	(12.528)	(1.758)	(10.087)	(-0.071)
N	5850	5849	5850	5849
R^2	0.0905	0.0775	0.124	0.0933
R^2_a	0.0867	0.0737	0.120	0.0896
F	24.15	20.39	34.35	24.98

*, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

5. Conclusion

Multi-tier capital market is a general trend of stock market development and provides diversified options for enterprises to go public and listing change. In this paper, we analyze the effect of listing change on sustainable growth of firms and the sustainability of the impact by adopting the samples of non-financial listed companies of China A-shares from 2007 to 2018, and conducting a panel data regressive analysis method of the impact of listing change on sustainable growth. We find that the listing change has a significant impact on the sustainable growth. And the sustainability influence would exist about for the following three years. The results indicate that listing change plays a role in serving the real economy by improving the growth of enterprises.

Moreover, we also test the impact of the R&D expenditure and analyst coverage on sustainable growth of the firms. The results show that R&D and analyst coverage have positive and statistically significant effect on sustainable growth of firms. The results indicate that R&D and

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analyst coverage will serve vital roles in improving sustainable growth of firms. With the development of the Multi-tier capital market, as well as the function of R&D and analyst coverage, the significance of listing change on sustainable growth of firm will increase step by step. The contribution of the current research as to check the theoretical and empirical influence of listing change on firm sustainable growth in China's capital markets which is rarely highlight in the literature. Besides all the positive outcome of the research every research investigation have some scope, the scope of the proposed study is Chinese capital market. Therefore this study may have the limitation of only one market analysis. Further study can be conducted in future by applying multi-tier capital market of the same market in contrast to check the changes in the results. Similarly, a more advance technique can further clarify the study panel of multi capital market investigation.

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