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Does intergeneration succession influence stock prices of family businesses?

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Abstract: China's A-shares family listed companies are facing a period of high intergenerational succession. This has attracted the attention and research of many scholars. The existing studies mainly focus on the motives, methods, and influencing factors of family business' intergenerational succession, and there are few studies involving the reaction of the capital markets. This article takes 45 listed family businesses as samples and uses the synthetic control method to examine the impact and the degree of influence that intergenerational succession has on stock price movements. Thereafter, a difference-in-differences estimation is conducted to test for robustness. At the conclusion of our research, we find that intergenerational succession has a significant negative effect on the stock price of listed companies.

Keywords: Family Business, intergenerational succession, synthetic control method, capital market reaction

1. Introduction

The Chinese economy has seen a rapid growth for more than 30 years. Family businesses or more extensive private enterprises undoubtedly constitute an indispensable driving force to China's economic development. At present, Chinese family businesses[1] are in a situation whereby it is time for the founders to pass on the businesses to the second generation. How does intergenerational succession[2] affect the company's stock price? The solution to this problem will help family businesses grow smoothly and continuously. Most of the existing research focuses on the founder characteristics (Davis and Harveston, 1999), successor selection (Benededsen et al., 2007; Cucculelli and Micucci 2008), the change in the company's medium and long-term business performance after the succession etc. (Smith and Amoakoadu 1999; Villalonga and Amit 2006; Bennedsen et al. 2015). There are few researchers focusing on the impact of intergenerational succession on the stock price of listed companies. The closest study is written by Smith and Amoakoadu (1999). They used the event research method to study 124 family-owned companies in Canada, but the study has a shortcoming of endogenous treatment. In our article, we use the regression synthesis method to further alleviate endogeneity problems, and select Chinese listed family companies as research sample to explore the causal effect of intergenerational succession on stock price. The operation of family businesses is highly dependent on the family's special assets (Nooteboom 1993; Castanias and Helfat 1991), such as the knowledge, skills, reputation, political connections, and social relationships acquired by the founders through managing family businesses for a long time (Nooteboom 1993; Fan, Wong, and Zhang: 2012). In the process of intergenerational succession, the performance of the companies often deteriorated, and the stock price fell due to an inability to pass down the founder's special assets (Bennedsen et al., 2007), the lack of management experience of the successors (Caselli and Gennaioli 2013), etc. Therefore, we make the hypothesis that intergenerational succession will negatively affect stock price

[1] According to the definition in the 'China Modern Family Business Survey Report' published by Forbes in 2016, the family business is owned or controlled by the family, and at least two or more family members are actually involved in the management of the business.

[2] The establishment and development of Chinese private enterprises mainly began in the reform and opening up in the early 1980s. It is currently in the peak period from the founder generation to the second generation of the family companies. All the samples in this article are based on the second-generation succession (not the third generations or more).

II. Data and methodology

Data

According to the 'China Modern Family Business Survey Report' published by Forbes in 2016, it was pointed out that there are 912 companies on the Shanghai and Shenzhen stock markets that are family-owned enterprises, of which 79 have successfully realized intergenerational succession. The 79 companies were further filtered to exclude companies that had the following characteristics. First, companies which were suspended when the second generation took over were excluded. Second, companies which faced other major events during the period were also excluded. Therefore, from the Shanghai and Shenzhen stock markets, a total of 42 family businesses are chosen to be part of the research samples.

Methodology

If we regard the succession as a natural experiment, then the 42 listed family companies constitute the treatment group of this experiment and other similar enterprises in the industry of each family company constitute the control group. We select 20 trading days[3] before and after the succession date as our estimation window. Comparing the stock closing price difference between the treatment group and the control group after the succession, we can estimate the impact of the intergeneration succession on the stock price.

In terms of the selection of an estimation method, considering the characteristics of this research's objective and the arbitrariness of the control group selection in classic DID method in policy intervention which results in biased estimation results, we have instead decided to use the regression synthetic control method to estimate the results. This method is a new synthesis method proposed by Hsiao, Steve Ching, and Ki Wan (2012) on the basis of the synthetic control method proposed by Abadie, Diamond, and Hainmueller (2010), and uses a linear combination of control group individuals to form the counterfactual results of treatment group individuals after the event. The method proposed by Hsiao, Steve Ching, and Ki Wan (2012) is directed to estimate the average treatment effect with only one treatment group. However, there are as many as 42 treatment groups in this study. Therefore, we draw on the method from Acemoglu, Johnson, and Kermani et al. (2016) to weight average treatment effects in the case of multiple treatment groups and obtain the final treatment effect. Specifically, if Y_{jt} is the actual closing price of the control group individual j in the period t, then

$$\hat{Y}_{it} = \sum_j \omega_j^i Y_{jt}$$

Where $\hat{Y}_{it}$ is the counterfactual estimate of the treatment group individual i after regression synthesis by the control group individual, and ω_j^i is the weight of the jth control group individual for the treatment group individual$i$. We use the equation below as a measure of the goodness of fit before the event where t only contains periods before the event.

$$\hat{\sigma}_i = \sqrt{\frac{\sum_t \left(Y_{it} - \hat{Y}_{it}\right)^2}{T}} \qquad (1)$$

The equation can be used to weight the treatment effects of all treatment group individuals. Thus, if we let $SumSigma = \sum_i 1/\hat{\sigma}_i$, and let $time$ be as at the event occurrence date, the real rate of return for a period of 20 days after the event occurs is $yield_{i,20} = lnY_{i,time+20} - lnY_{i,time}$, and the counterfactual rate of return is $\widehat{yield}_{i,20} = ln\hat{Y}_{i,time+20} - ln\hat{Y}_{i,time}$. Therefore, the total 20-day average treatment effect can be written as

$$\widehat{ATE} = \sum_i \left[\frac{1}{\sigma_i SumSigma}\left(yield_{i,20} - \widehat{yield}_{i,20}\right)\right] \qquad (2)$$

III. Results

Basic estimation result

According to the algorithm of Hsiao, Steve Ching, and Ki Wan (2012), using the closing prices of the

[3]Our estimation window is larger than that used by Smith and Amoakoadu (1999) because the Chinese stock market adopts price limit system that limits a daily 10% increase and decrease of each stock, thus it cannot fully reflect the impact of the event on the stock price if the estimation window is too short. Many event studies taking Chinese listed companies as samples choose a 20-day estimation window. In fact, the research conclusion does not change so much when we adjust the window to 15 and 25 days respectively.

Table 1. Average treatment effect estimates.

Code of Company	$\widehat{\sigma}_i$	Weight	ATE_i	Code of Company	$\widehat{\sigma}_i$	Weight	ATE_i
000007	0.07	0.00	0.14	002337	0.00	0.24	−0.11
000403	0.04	0.01	−0.03	002422	0.03	0.01	−0.06
000639	0.11	0.00	0.03	002447	0.17	0.00	−0.21
000700	0.04	0.01	0.24	002526	0.00	0.09	−0.30
000726	0.03	0.01	−0.27	002555	0.01	0.02	−0.07
000876	0.06	0.01	−0.04	002633	0.12	0.00	0.09
000929	0.05	0.01	−0.04	300,004	0.40	0.00	0.21
002023	0.08	0.00	−0.03	600,086	0.03	0.01	−0.02
002050	0.03	0.01	−0.06	600,172	0.01	0.06	0.05
002070	0.02	0.02	−0.13	600,257	0.02	0.02	−0.14
002082	0.05	0.01	−0.08	600,295	0.18	0.00	0.11
002099	0.03	0.01	0.09	600,352	0.03	0.01	0.22
002133	0.03	0.01	0.02	600,400	0.01	0.03	−0.07
002216	0.07	0.00	0.02	600,422	0.01	0.05	−0.04
002221	0.01	0.02	0.12	600,527	0.05	0.01	−0.31
002263	0.01	0.03	−0.08	600,535	0.06	0.01	−0.25
002269	0.02	0.02	0.39	600,732	0.00	0.13	−0.21
002284	0.01	0.02	−0.13	600,777	0.02	0.01	−0.01
002328	0.04	0.01	0.07	600,869	0.03	0.01	−0.22
002330	0.10	0.00	0.85	600,966	0.01	0.02	−0.01
002335	0.01	0.03	0.10	600,986	0.08	0.00	−0.15

Codes of company represent company names. $\widehat{\sigma}_i$ is the measure of fitting effect before the occurrence of the event. The smaller it is, the better the fit. The weights are calculated from $\widehat{\sigma}_i$ and used to weight the treatment effects of all treatment group individuals. ATE_i represents the total 20-day average treatment effect.

listed companies as the outcome variable, we conducted regression synthesis estimations for 42 companies in the treatment group separately. Using R statistical software, we derive the results of the average treatment effect shown in Table 1.

In Table 1, $\widehat{\sigma}_i$ is calculated according to the formula (1), and the dimension and closing price of $\widehat{\sigma}_i$ are the same. We plot the closing price density distribution of the individuals in the treatment group in Figure 1.

The closing prices of these treatment group individuals are mostly below 10 Yuan, the mean is 6.94, and the mean of $\widehat{\sigma}_i$ is 0.052. The relative error is only 0.75% = 0.052/6.94. In fact, only five companies with $\widehat{\sigma}_i$ exceeding 0.1 namely, therefore, the overall goodness of fit is still acceptable.

The third column in Table 1 is the weight calculated based on $\widehat{\sigma}_i$, and the fourth column is $ATE_i = yield_{i,20} - \widehat{yield}_{i,20}$. In order to obtain the comprehensive average causal effect, we can use the formula (2) and the information in Table 1 to calculate its value of −8.30%. This article focuses on the stock price reaction to the intergenerational succession of listed family companies. It can be seen from the results that the average share price of listed companies decreases by −8.3% compared with the control group, thus the hypothesis is verified.

To see this further, we plot the weighted average real price trend and the counterfactual price trend in Figure 2, with the weights in Table 1. The vertical line in the figure is the succession announcement date. It can be seen from the graph that, through the regression synthesis, the price trends of the two groups are very close before the announcement of the succession. After the announcement of the succession, the counterfactual price trend gradually rises and expands with time. This means that the stock price trend should have been the shape of the dotted line in Figure 2 if there is no intergenerational succession, but the fact is the stock price trend is the solid, which means that the stock price has dropped significantly after the intergenerational succession.

To obtain the confidence interval of the test result, we carry out a placebo test according to the recommendation of Acemoglu, Johnson, and Kermani et al. (2016). We obtain 1000 fake average causal effects by repeating the above process 1000 times., and then summarize several key percentiles of the 1000 fake average causal effects as shown in Table 2.

As can be seen from Table 2, the two-sided test is significant at the 10% significance level, with the p-value of approximately 0.052. This shows the empirical test results that the share price of listed family business decline by −8.3% can pass the significance test.

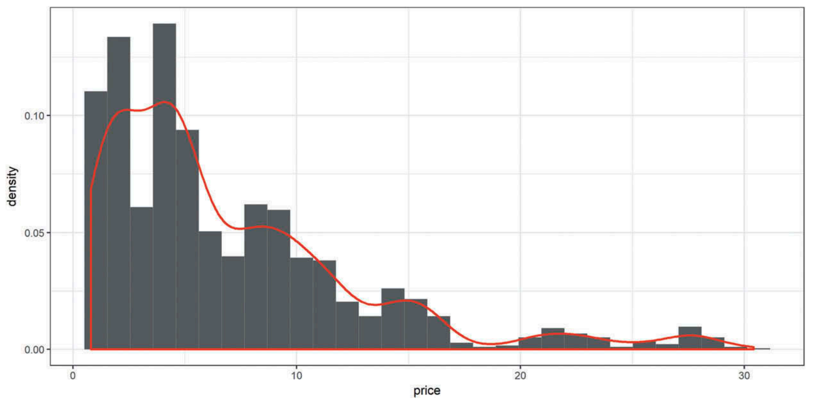

Figure 1. Stock price density distribution of the treatment group individuals.

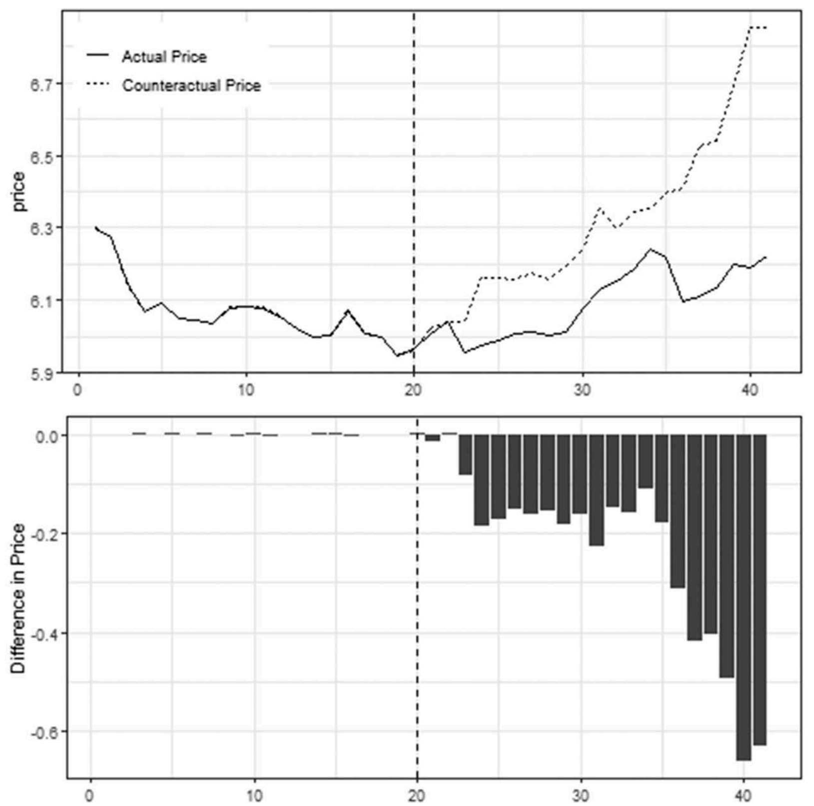

Figure 2. Weighted average real price trend and counterfactual price chart.

The solid line on the upper right side of the figure indicates the real stock prices after the succession, and the dotted line indicates the counterfactual stock prices derived from the synthetic control method. It can be seen from the figure that the element of intergeneration succession has a significant negative effect on stock prices after the next generation takes over. The longer the time, the more significant the negative effect.

Table 2. Percentile of Pseudo-average causal effect.

	0.5%	2.5%	5%	95%	97.5%	99.5%
Percentile	−0.0872	−0.0834	−0.0822	0.111	0.1756	0.1756

Robustness test

In order to further investigate the robustness of the results, we use the difference-in-differences estimation, that is, we use the treatment group and control group obtained above, and the event occurrence date, to construct the following panel data fixed effect model.

$$price_{it} = \beta_0 + \beta_1 T_t D_i + \lambda_t + \mu_i + \varepsilon_{it}$$

Here, we control the time and fixed effects λ_t, μ_i, where $price_{it}$ is the closing price, T_t is the dummy variable of the event occurrence time, and

Table 3. Estimation of controlled individual and time fixed effects.

$\hat{\beta}_1$	t stat	P value	Double fixed effect	Treatment group individual	Number of observations
−0.14	−2.54	0.01	control	41	30,832

D_i is the treatment group dummy variable. $T_t = 0$ when it is before the occurrence of the succession, and $T_t = 1$ when it is after the occurrence of the succession. $D_i = 1$represents that the company has undergone intergeneration succession, and $D_i = 0$ represents that the company has not undergone intergeneration succession. Using time and individual double fixed effect model to estimate, we obtained the results in Table 3. It can be seen that the difference-in-difference estimate of the second-generation succession has an average causal effect of −0.14 Yuan and it is statistically significant. This supports our hypothesis, that is, intergenerational succession will decrease the stock price on average.

Mechanism analysis

The operation of the family business is highly dependent on the family's special assets. During the intergenerational succession, the stock price fell because the previous generations' special assets cannot be effectively passed down. Generally speaking, the younger the successor, the less special assets such as social relations and management experience, thus the company's share price has fallen even more. In order to prove this hypothesis, we calculate the causal effect of intergenerational succession on stock prices by grouping the ages when successors take over. The empirical result shows that the share prices fall by 10.18% when the successors are less than 30 years old, exceeding the average share price decrease of 8.3%, but the stock price only fell by 1% when the successors are older than 40.

IV. Conclusion

This article uses the regression synthesis control method to investigate the impact of the intergeneration succession on the stock price. It is found that, overall, the succession will have a cumulative negative impact of −8.30% on the stock price within 20 days after the event. At the same time, the empirical result of the causal effect grouping by age indicates that the inability of effectively passing down previous generations' special assets is the main cause of stock price decline.

Disclosure statement

No potential conflict of interest was reported by the authors.

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