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Research on the Deleveraging Effect of Accounts Receivable Securitization

-- Empirical Evidence based on PSM Method

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Abstract

This paper makes an empirical study on the influence of the accounts receivable securitization on the leverage ratio of enterprises by applying the data of the accounts receivable securitization of listed enterprises in China from 2015 to 2020. We found that the accounts receivable securitization significantly reduces the leverage ratio of enterprises, especially the current leverage ratio. Furthermore, we found that the enterprise accounts receivable securitization has a better deleveraging effect on non-state-owned enterprises. Further research shows that the shareholding ratio of the top ten shareholders of enterprises is one of the important influencing mechanisms, which partly explains the heterogeneity between state-owned enterprises and non-state-owned enterprises. The results provide empirical evidence for correctly understanding the accounts receivable securitization, promoting the structural deleveraging of enterprises and improving the economic quality.

Keywords

Securitization of Accounts Receivable; Corporate Leverage Ratio; Deleveraging; Propensity Score Matching Method.

1. Literature Review

1.1. Accounts Receivable Securitization

At present, the empirical research results of asset securitization at home and abroad are inconsistent. Some research results think that asset securitization is not beneficial to the development of enterprises. For example, Wang (2007) thinks that putting risky asset securities will increase the capital cost of asset sellers by increasing the risk of asset sellers, while its effect on asset buyers is uncertain. Some other research results think that asset securitization is beneficial to enterprises.

Specifically, from the perspective of capital structure, the research of Skarabot J (2002) shows that the initiating enterprises will use asset securitization to optimize the capital structure. Zhang et al. (2006) found that the risk isolation mechanism of enterprise asset securitization helped enterprises open up financing channels. Iacobuci et al. (2004) proved that the asset securitization of enterprises can reduce the agency cost of agents by reducing the incorrect information, while Schwarcz (1994) also showed that the asset securitization of enterprises helped enterprises save the cost of capital use by reducing the financing interest rate of enterprises, and Leland H(2006) also increased the tax shield income and reduced the bankruptcy cost through asset securitization, which showed the positive role of asset securitization of enterprises. From the perspective of asset liquidity, Claire (1996)' s research shows that through asset securitization, enterprises can realize assets with low liquidity, thus promoting capital turnover and having a positive impact on enterprises.

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With regard to securitization of accounts receivable, Myers et al. (1977) showed that securitization of accounts receivable used special purpose entities and bankruptcy remote subsidies to purchase related accounts receivable, which separated financing decision-making from investment decision-making and minimized some agency problems related to unsecured debt, thus allowing enterprises to make more value-added investments. The research of Denis Petkovic (2001) proves that the securitization of accounts receivable has great returns, and provides a new financing channel for enterprises, whether in emerging markets with low financing cost or in countries with no investment grade. Darius Palia et al. (2004) provided an optimal contractual framework for determining the securitization of accounts receivable in the presence of seller's moral hazard. Sanket Korgaonkar (2009) found that the sponsors of accounts receivable securitization usually have the characteristics of large scale and high credit risk. As a form of secured financing, securitization of accounts receivable can really help enterprise customer service agency problems caused by debt surplus.

Compared with foreign countries, there are few related researches in China. Zhou et al. (2007) analyzed and discussed the cost, benefits and risks of securitization of accounts receivable assets, and gave some policy suggestions.

1.2. Deleveraging

From 1993 to 2017, the financial leverage ratio of China's real economy increased from 108% to 242%, an increase of 134 percentage points in 24 years. From the perspective of level and growth rate, the problem of excessive financial leverage of Chinese enterprises has attracted much attention (Zhang et al., 2019). Rapid credit growth and sharp rise of financial leverage are usually the main indicators of the outbreak of financial crisis, and endanger a country's long-term economic growth (Ma et al., 2016; Zhou, 2011; Olivier Jeanne et al., 2019; Yi, 2020).

We attribute the reasons for the rapid increase of China's economic and financial leverage ratio in recent years to three points. First of all, in 2008, 4 trillion economic stimulus increased production capacity, resulting in overcapacity in traditional industries. Secondly, the rapid expansion of shadow banking in China provides sufficient funds for enterprises at relatively low cost (Allen et al., 2019). In China, the size of the shadow banking sector has doubled since 2011, and by the first half of 2016 it was equivalent to 82% of its GDP. Third, in order to maintain steady growth and ensure employment, Chinese governments at all levels provide implicit guarantees, administrative subsidies and policy support for inefficient state-owned enterprises. Therefore, these inefficient enterprises use readily available loans to maintain their operations, resulting in high financial leverage (Zhang et al., 2019).

Domestic scholars have been studying "deleveraging" for several years. Ji et al. (2017) found that information and transaction costs, tax burden and soft budget constraint incentive mechanism are the main reasons for China's high leverage at the micro level. The research of Cai et al. (2017) also confirmed that the return on assets of listed companies is closely related to the leverage level.

However, at present, the research on China's "deleveraging" policy mostly focuses on the impact of deleveraging on macro-economy and micro-economy, and lacks the empirical research on the effect of non-financial enterprises' financing decisions on deleveraging. By combing the existing literature, we can see that scholars have discussed the influence of asset securitization on the leverage ratio of enterprises to a certain extent, but they have not reached a consistent conclusion, and there are still some shortcomings to be further explored.

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2. Theory and Hypothesis

2.1. Accounts Receivable Securitization and Enterprise Leverage Ratio

Franco Modigliani and Merton H. Miller (1958) first put forward the idea that enterprise value does not depend on capital structure, which prompted economists to study why capital structure and financing methods used are helpful to build our hypothesis and analysis. The uniqueness of securitization of accounts receivable assets lies in that it is not only a form of secured loan, but also safer because the assets are held by SPV, which further enhances its superiority. Therefore, we believe that the securitization of accounts receivable assets should create certain value for enterprises.

The logic of accounts receivable asset securitization helping to reduce the leverage ratio of enterprises is not difficult to understand, because theoretically, financing will involve the increase of liabilities, while asset securitization can obtain financing without increasing liabilities and indirectly reduce the debt ratio.

An important advantage of asset securitization is that the financing obtained by special purpose entities is hardly affected by the credit rating of the initiating company. This is because the securities backed by securitized assets are issued by a legally independent and different entity (i.e., special purpose entity). This advantage allows companies with low credit quality to finance new business at low cost and low interest rate. Therefore, asset securitization can increase the leverage ratio of companies through off-balance sheet financing, and then reduce the overall capitalization requirements. This has the effect of reducing the total cost of capital and increasing the leverage potential of a given asset base.

For enterprises that use securitization, the reduction of leverage ratio is the first purpose of implementing securitization of accounts receivable assets, because the reduction of leverage ratio is beneficial to their financing. Non-financial enterprises sell accounts receivable to SPV, which is proficient in securitization, to improve the quality of enterprise assets and enhance liquidity, thus improving the financing ability of enterprises. For example, the research paper of Titman (1984) shows that enterprises can minimize the expected cost of customer settlement by choosing a lower leverage ratio, which allows enterprises to raise product prices.

The value created by asset securitization also depends on the separation of securitized assets and original enterprise risks, which is helpful to alleviate the financing friction. By financing securitized assets separately from other parts of the balance sheet, Gorton et al. (2007) proposed that securitization can reduce the expected cost of bankruptcy by allowing original enterprises to apply for bankruptcy protection without affecting securitized assets. Lemmon et al. (2014) believe that securitization can provide enterprises with the opportunity to enter the advanced credit market, because the risk of asset-backed securities can be constructed to be smaller than that of the original enterprises. If pricing is not fully integrated into the market, asset-backed securities can reduce the capital cost of enterprises by providing market access for investment-grade bonds and commercial paper.

Based on the above analysis, we put forward hypothesis 1: The accounts receivable securitization is beneficial to reduce the leverage ratio of enterprises.

2.2. State-Owned Enterprises and Non-State-Owned Enterprises

In China, government intervention in the production and operation of enterprises is very common. As far as enterprise deleveraging is concerned, the production and operation of state-owned enterprises are not only more vulnerable to government intervention, but also the main force of deleveraging. Therefore, this paper studies the heterogeneity between state-owned enterprises and non-state-owned enterprises.

This paper assumes that the deleveraging effect of accounts receivable asset securitization is more obvious for non-state-owned enterprises, mainly based on the following aspects.

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First of all, the government is the actual controller of state-owned enterprises. It has the motivation and power to directly intervene in the management decisions of state-owned enterprises by simply appointing senior managers (Yang et al., 2013). The government provides implicit guarantee for bank loans of state-owned enterprises (Chang et al., 2019). The evaluation and promotion of these managers by state-owned enterprises often depends on their business performance and social responsibility (Liu et al., 2015). Since the decision to reduce the financial leverage ratio was adopted at the Fifth Plenary Session of the Eighth Central Committee in October 2015, managers of state-owned enterprises have to follow this requirement. Therefore, we expect that, based on the hard targets issued by the central government, state-owned enterprises are more likely to choose to directly "de-capacity, de-inventory and de-leverage" to reduce the asset-liability ratio by reducing production, while non-state-owned enterprises are more motivated to reduce their leverage ratio through securitization, although they do not need to follow government policies and instructions.

Secondly, because of the implicit guarantee of state-owned enterprises, they can easily obtain loanable funds. Although the role of state-owned enterprises has weakened since the large-scale reform of state-owned enterprises in the late 1990s, these departments continue to receive preferential credit treatment (Chang et al., 2019). Therefore, we expect that state-owned enterprises mainly use debt to finance their growth, while government officials will reduce loans and public debt more to realize the deleveraging of state-owned enterprises.

Third, state-owned enterprises do not need to worry about the decline of return on assets caused by deleveraging. Liu et al. (2017) studied the impact of China's interest rate liberalization on capital mismatch in a two-sector model. Their findings show that state-owned enterprises have easier access to credit than non-state-owned enterprises. However, the average productivity of Chinese state-owned enterprises is lower than that of non-state-owned enterprises (Hsieh et al., 2009). Since the end of 2014, due to the inefficiency of state-owned enterprises, the gap of return on assets between state-owned enterprises and non-state-owned enterprises has gradually widened. Therefore, managers of state-owned enterprises can respond to the government's call for responsibility by not continuing to expand.

Based on the above analysis, we put forward hypothesis 2: Compared with state-owned enterprises, the accounts receivable securitization is more effective in deleveraging non-state-owned enterprises.

2.3. Shareholding of Top10 Shareholders

Previous studies have found that major shareholders have significant influence on agency costs, corporate performance and debt maturity structure of enterprises. This has brought two consequences. On the one hand, it alleviates the agency conflict between shareholders and managers and reduces the degree of information asymmetry. On the other hand, it is also prone to the phenomenon of "dominance". Traditional agency theory holds that the concentration of ownership may improve corporate governance (Jensen et al., 1976; Kose et al., 2010). By holding highly concentrated shares, these major shareholders will have enough power and incentives to reduce the capital cost of enterprises. However, major shareholders have two sides in corporate governance: they may also use their power to encroach on the wealth of other shareholders. From the perspective of avoiding creditors' monitoring, self-interested major shareholders will prefer debts with longer maturities to be free from external monitoring for a longer period of time (Lin et al., 2013).

Compared with European and American countries, the ownership structure of listed companies in China is concentrated, so major shareholders will exert greater influence on the management of enterprises. Major shareholders are likely to infringe the interests of creditors through asset substitution and insufficient investment. Especially before the reform of non-tradable shares, state shares, legal person shares and employee shares could not be listed and circulated on the

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exchange, which made the proportion of non-tradable shares too large, which greatly restricted the development of the capital market.

Further analysis shows that the major shareholders of state-owned enterprises and non-state-owned enterprises may be different. First, shareholders of state-owned enterprises may be interested in political goals, such as paying more taxes and promoting employment and regional development (Boubakri et al., 2008; Zhang et al., 2016), therefore, they tend to transfer the company's resources to projects that help to achieve these goals but have little value to the company. Secondly, shareholders of state-owned enterprises may be more risk-averse than private shareholders (Zhu W. et al., 2016), therefore, they may be inclined to achieve external financing in a more traditional way. Third, because of the agency problem between the shareholders of state-owned enterprises and their ultimate owners, namely national citizens, their motivation to participate in corporate governance is generally inferior to that of shareholders of non-state-owned enterprises (Chen et al., 2017).

As an important shareholder of an enterprise, major shareholders have greater decision-making power in the financing decision-making of the enterprise. However, there will be some differences between state-owned enterprises and non-state-owned enterprises in response to the accounts receivable securitization, a new financing method. Xiao (2009) found that due to the lack of incentives and effective supervision of managers, the agency conflict of state-owned enterprises is more serious, which leads to the interests of shareholders of state-owned enterprises being more serious than that of non-state-owned enterprises.

State-owned enterprises, supported by government credit and administrative intervention, have occupied funds to a great extent. In order to establish a stable bank-government relationship, banks also have irrational preference for government projects, which makes it more difficult for non-state-owned enterprises to obtain loans from banks (Wang, 2019).

Based on the above analysis, we put forward hypothesis 3: The shareholding ratio of major shareholders is the internal mechanism of higher deleveraging effect of non-state-owned enterprises, and the lower shareholding ratio of major shareholders improves the effect of securitization of accounts receivable assets.

3. Empirical Analysis and Hypothesis Test

3.1. Research Design

If OLS method is directly used for identification, there will be selective bias and mixed bias, which is mainly because whether or not an enterprise securitizes accounts receivable assets in reality may be non-random, but a self-selected event.

Under the background of securitization of accounts receivable, as enterprises with high leverage ratio may generally be more inclined to finance accounts receivable, the selection bias is generally positive, which leads to the difference of leverage ratio between securitized enterprise groups and non-securitized enterprise groups overestimating the average processing effect of participants. If the absolute value of the selection deviation is large enough, it may happen that the leverage ratio of the enterprises with securitization of accounts receivable assets is higher than that of the enterprises without securitization of accounts receivable assets.

Theoretically, the above problems can be solved by random grouping, but random grouping is not feasible in all cases. Generally speaking, in the past literature, instrumental variable method was used to solve endogenous problems. However, there are some problems in this method. Therefore, our empirical design attempts to solve the problem of self-selection about the endogeneity of securitization decision-making through the application tendency score matching (PSM) method proposed by Heckman et al. (1997).

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Specifically, we need to build a non-securitized enterprise group (i.e., control group) which is as similar as possible to the main characteristics of securitized enterprises (i.e., the processing group) before securitization of accounts receivable, and then match the enterprises in the processing group with those in the control group, so that the matched enterprises of the two sample groups are different only in whether or not securitization of accounts receivable has been implemented, but are identical or very similar in other aspects. Next, the matched control group can be used to approximate the "counterfactual" of the alternative treatment group to the maximum extent, and finally, the difference of leverage level between the two groups of enterprises after the securitization of accounts receivable assets is compared, so as to determine the causal relationship between the securitization of accounts receivable assets and the leverage ratio of enterprises.

First of all, we divide the samples into two groups, one group is the enterprises that have securitized accounts receivable assets (recorded as the treatment group), and the other group is the enterprises that have never securitized accounts receivable assets (recorded as the control group).

For simplicity, we construct a binary dummy variable $Sec_i = \{0,1\}$. When enterprise i is a securitization enterprise, Sec_i takes 1, otherwise, Sec_i takes 0.

Defining Lev_{it} as the leverage ratio level of enterprise i in period $t$is the result variable that we pay attention to.

$$Lev_{it} = \alpha_0 + \alpha_1 Sec_{it} + \alpha_2 Age_{it} + \alpha_3 Size_{it} + \alpha_4 Roa_{it} + \alpha_5 Roe_{it} + \alpha_6 Top10_{it} + \alpha_7 Fixed\_assets_{it} + \alpha_8 Growth_{it} + \alpha_9 GDP_t + \alpha_{10} M2_t + \alpha_{11} Ind_i + \varepsilon_{it}$$

$$Lev\_u_{it} = \alpha_0 + \alpha_1 Sec_{it} + \alpha_2 Age_{it} + \alpha_3 Size_{it} + \alpha_4 Roa_{it} + \alpha_5 Roe_{it} + \alpha_6 Top10_{it} + \alpha_7 Fixed\_assets_{it} + \alpha_8 Growth_{it} + \alpha_9 GDP_t + \alpha_{10} M2_t + \alpha_{11} Ind_i + \varepsilon_{it}$$

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In order to realize the estimation of the above formula, this paper uses the nearest neighbor tendency score matching as the treatment group (i. e. securitization enterprises) to find the similar control group (i. e. non-securitization enterprises).

Among them, the estimated coefficient α_1 depicts the actual influence of the securitization of accounts receivable assets on the leverage ratio of enterprises. If it is estimated that $\alpha_1 > 0$ it means that before and after the securitization of accounts receivable assets, the leverage ratio of enterprises in the treatment group has increased more than that of enterprises in the control group, that is, the securitization of accounts receivable assets has increased the leverage ratio of enterprises. If it is estimated that $\alpha_1 < 0$, it means that before and after the securitization of accounts receivable assets, the improvement of leverage ratio of enterprises in the treatment group is less than that of enterprises in the control group, that is, the securitization of accounts receivable assets reduces the leverage ratio of enterprises.

3.2. Data

We selected the accounts receivable securitization in iFind database as the research object, and the sample period is 2015-2020.

According to the data of the accounts receivable securitization collected on iFind, 35 enterprises listed on the Shanghai and Shenzhen main boards from 2015 to 2019 have implemented securitization of accounts receivable. After excluding the enterprises that have undergone special treatment such as ST and *ST during the sample period, the remaining 22 enterprises are taken as our experimental group samples.

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3.2.1. Variable

The explanatory variable is whether the enterprise implements the securitization of accounts receivable. As mentioned above, we construct a binary dummy variable $Sec_i = \{0,1\}$. When enterprise I is a securitization enterprise, Sec_i takes 1; otherwise, it takes 0.

The explained variable is enterprise leverage ratio (Lev_{it}), that is, the asset-liability ratio of an enterprise, which is measured by the ratio of its liabilities to assets. In order to further discuss the influence of accounts receivable asset support plan on debt ratio under different statistical caliber, this paper further subdivides the leverage ratio according to the debt maturity. The leverage ratio (Lev_u_{it}) is equal to the current liabilities/total assets; non-current leverage ratio is equal to non-current liabilities (Lev_c_{it})/total assets. Current and non-current liabilities are divided according to the limit of one year.

We control the variables found in the previous research literature that will affect the dependent variables.

Previous empirical research on enterprise leverage ratio shows that the level and structure of enterprise leverage ratio will vary with the size of enterprise, the years of establishment of enterprise, industry, net interest rate of assets, return on net assets, and the structure of the top ten shareholders' shareholding ratio, so we add the above variables into the control variable group. In addition, this paper specially controls the proportion of fixed assets, considering that enterprises are more likely to use fixed assets outside asset-backed securities trading. In contrast, current assets are more likely to be irrelevant. In addition, we added Tobin Q as a control variable to measure growth opportunities. We expect Tobin's Q value will affect the leverage ratio of enterprises, because this ratio is often used to capture the expected performance of enterprises. Finally, we added the macro variables GDP growth rate and M2 growth rate to measure the macroeconomic situation and inflation factors respectively.

3.2.2. Matching

In order to avoid the above-mentioned deviation estimation as much as possible, this paper selects a series of characteristic variables of the year before the enterprise implemented the accounts receivable securitization as control variables, and adopts the matching method of "one to four", which is the control group with the closest matching characteristics in the experimental group.

Specifically, we selected a series of enterprise characteristic variables at the end of 2015 to form the covariant X_i for the enterprises that implemented the accounts receivable asset support project in 2015, and matched them with the control group according to these variables. The text Probit model is used to estimate the following formula:

$$p(X_i) = P(Sec_i = 1|X = X_i)$$

Among them, Sec_i is a dummy variable, which is taken as 1 when enterprise i implements the accounts receivable securitization, otherwise, it is taken as 0; P is a function of probability density. The economic meaning of the score $p(X_i)$ is the probability that the enterprise with the characteristic of X_i will implement the accounts receivable securitization in advance.

After that, we matched the "enterprise-year" samples of any experimental group with the "enterprise-year" samples of the control group according to the method of "one with four", which made the tendency scores of the two groups the closest. In the same way, this paper repeats the above matching process for the enterprises that implemented the accounts receivable securitization in other years (2016, 2017, 2018 and 2019).

After the above matching, 358 research samples were finally obtained in this paper, including 77 samples of "enterprise-year" in the experimental group and 281 samples of "enterprise-

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year" in the control group. The characteristic differences of the samples before and after matching are tested, and the results are shown in Table 3. It can be seen that before the trend score matching, except for the age of the enterprise, the return on net assets and the shareholding ratio of the top ten shareholders, the difference test results of other variables are significant, but after the matching, the difference test results of all variables are not significant. It can be seen that the tendency score matching method in this paper alleviates the bias of sample self-selection, so next, this paper uses this sample for follow-up empirical research.

Table 1. Balance test of tendency matching

Variable	Unmatched/Matched	Mean		t-test	
		Treated	Control	t	p
age	U	2.9952	2.9199	2.03	0.042
	M	2.9952	3.0426	-0.89	0.372
size	U	24.725	22.151	16.65	0.000
	M	24.725	24.693	0.19	0.848
roa	U	2.8202	4.9307	-2.77	0.006
	M	2.8202	2.7566	0.1	0.922
roe	U	7.4674	8.0163	-0.38	0.706
	M	7.4674	6.9016	0.29	0.770
top10	U	63.383	61.249	1.21	0.227
	M	63.383	62.752	0.27	0.789
fixed_assets	U	0.12886	0.20942	-4.61	0.000
	M	0.12886	0.12628	0.11	0.914
growth	U	1.1694	2.6069	-6.19	0.000
	M	1.1694	1.1408	0.43	0.671
gdp	U	5.2885	5.7721	-2.34	0.019
	M	5.2885	5.2589	0.09	0.925
m2	U	9.45	10.223	-3.75	0.000
	M	9.45	9.432	0.09	0.930
age	U	2.9952	2.9199	2.03	0.042
	M	2.9952	3.0426	-0.89	0.372

3.3. Empirical Results

3.3.1. Descriptive Statistical Analysis

Table 2 shows the descriptive statistical results of the samples. It can be seen that the average enterprise size is 24.64, which is higher than the average level of non-securitization sample enterprises. This shows that asset securitization transaction itself needs very large enterprise reserves, which may not be a feasible and attractive financing method for small enterprises. The average value of asset-liability ratio is 0.633, and the maximum value is 0.919, which shows that the leverage ratio of Chinese enterprises is partly on the high side, which is consistent with the actual demand of deleveraging mentioned above. The minimum value of return on total assets is -16.91, which indicates that some enterprises in China are losing money and their profitability needs to be improved. The standard deviation of enterprise scale is 1.096, which shows that the sample enterprise scale is quite different.

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Table 2. Descriptive statistics of variables

Variable	Sample size	Mean	Standard deviation	Min	Max
lev	358	0.633	0.152	0.130	0.919
lev_u	352	0.478	0.150	0.0482	0.799
lev_c	351	0.150	0.121	0.000311	0.442
sec	358	0.215	0.411	0	1
age	358	3.038	0.332	1.386	3.555
size	358	24.64	1.096	21.18	26.38
roa	358	2.878	4.020	-16.91	16.57
roe	358	7.104	12.57	-50.33	37.51
top10	358	62.58	15.29	25.71	96.69
fixed_assets	358	0.132	0.151	0.00187	0.674
growth	358	1.153	0.422	0.500	3.934
gdp	358	5.293	1.927	2.300	7.041
m2	358	9.433	1.290	8.300	13.57

3.3.2. Regression Analysis

The panel fixed effect model is used for regression, and the benchmark regression results are listed in Table 3. The explained variables in columns (1) to (3) are enterprise leverage ratio, current leverage ratio and non-current leverage ratio respectively.

Table 3. Regression analysis results

	(1) Lev	(2) Lev_u	(3) Lev_c
sec	-0.067***	-0.075***	0.005
	(-3.688)	(-3.164)	(0.244)
age	0.048	-0.097	0.145
	(0.485)	(-0.750)	(1.272)
size	0.161***	0.154***	0.004
	(8.043)	(5.915)	(0.157)
roa	-0.006*	-0.001	-0.005
	(-1.901)	(-0.187)	(-1.541)
roe	-0.001	-0.000	0.000
	(-0.583)	(-0.352)	(0.002)
top10	-0.002***	-0.002*	0.000
	(-2.751)	(-1.782)	(0.066)
fixed_assets	-0.202	0.056	-0.257*
	(-1.607)	(0.341)	(-1.763)
growth	-0.001	-0.002	0.003
	(-0.048)	(-0.102)	(0.156)
gdp	0.016***	0.004	0.012**
	(3.818)	(0.662)	(2.394)
m2	0.016***	0.006	0.010*
	(3.290)	(0.941)	(1.756)
Industry	control	control	control
_cons	-3.498***	-2.960***	-0.498
	(-5.007)	(-3.242)	(-0.617)

"*": p<0.1, "**": p<0.05, "***": p<0.01

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From the estimated results in columns (1) and (2), we can see that the estimated coefficients of the core explanatory variable before "sec" are (-0.067) and (-0.075), respectively, and both of them are significant at the level of 1%, which means that the accounts receivable securitization significantly reduces the leverage ratio of enterprises. As Ge (2011) said, since the securitized assets are removed from the balance sheet of the initiating enterprise, the scale of the balance sheet of the initiating enterprise will not increase, especially the debt level of the enterprise.

The significant difference between current leverage ratio and non-current leverage ratio can also be explained by the fact that the securitization of accounts receivable assets improves the asset liquidity of enterprises. So far, our hypothesis one has been proved.

3.3.3. Heterogeneity Analysis

According to the hypothesis 2, this paper makes a further heterogeneity analysis on the nature of enterprise property rights. Table 4 shows the results that the explained variables of non-state-owned enterprises and state-owned enterprises are enterprise leverage ratio, current leverage ratio and non-current leverage ratio respectively.

Table 4. Heterogeneity analysis results

	Lev (soe=0)	Lev (soe=1)	Lev_u (soe=0)	Lev_u (soe=1)	Lev_c (soe=0)	Lev_c (soe=1)
sec	-0.105***	-0.053**	-0.141**	-0.053**	0.034	-0.002
	(-2.938)	(-2.541)	(-2.193)	(-2.070)	(0.546)	(-0.111)
age	-0.057	-0.078	-0.208	0.024	0.172	-0.088
	(-0.308)	(-0.616)	(-0.622)	(0.154)	(0.528)	(-0.732)
size	0.188***	0.209***	0.103*	0.213***	0.079	-0.005
	(6.083)	(6.965)	(1.847)	(5.783)	(1.450)	(-0.191)
roa	-0.001	-0.003	0.004	0.001	-0.007	-0.003
	(-0.384)	(-0.579)	(0.656)	(0.109)	(-1.064)	(-0.702)
roe	-0.003**	-0.001	-0.002	-0.001	-0.000	-0.000
	(-2.150)	(-0.463)	(-0.936)	(-0.401)	(-0.078)	(-0.071)
top10	0.000	-0.006***	-0.000	-0.002	0.001	-0.003**
	(0.379)	(-3.950)	(-0.107)	(-1.192)	(0.411)	(-2.045)
fixed_assets	0.198	-0.270	0.101	0.062	0.082	-0.340*
	(1.242)	(-1.336)	(0.351)	(0.248)	(0.289)	(-1.768)
growth	0.004	0.054	-0.025	0.069	0.029	-0.005
	(0.227)	(1.566)	(-0.912)	(1.642)	(1.069)	(-0.156)
gdp	0.014**	0.011*	-0.009	0.011	0.024**	0.000
	(2.209)	(1.978)	(-0.785)	(1.509)	(2.066)	(0.056)
m2	0.014**	0.005	-0.009	0.011	0.023*	-0.006
	(2.097)	(0.803)	(-0.780)	(1.387)	(2.014)	(-0.867)
Industry	control	control	control	control	control	control
_cons	-4.004***	-4.047***	-1.191	-4.979***	-2.758*	0.852
	(-4.393)	(-4.104)	(-0.724)	(-4.105)	(-1.709)	(0.909)

"*": p<0.1, "**": p<0.05, "***": p<0.01

It can be seen from the table that the securitization of accounts receivable assets can significantly reduce the leverage ratio of enterprises, whether it is state-owned enterprises or non-state-owned enterprises. Through the comparison coefficient, it can be found that the deleveraging effect of securitization of accounts receivable assets on non-state-owned enterprises (α_1=0.105) is greater than that on state-owned enterprises (α_1=0.053), which also achieves the same result in the current leverage ratio. Therefore, hypothesis two has been

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proved. The above empirical results show that non-state-owned enterprises have a better de-leveraging effect by applying asset securitization than state-owned enterprises. This may be because, compared with state-owned enterprises, non-state-owned enterprises have lower debt capacity, so they need to rely more on the securitization of accounts receivable assets to achieve financial flexibility.

3.4. Robustness Test

This paper tests the robustness of the empirical results by changing the matching method. Limited by space, this part of the regression results will not be displayed. You can contact the author if necessary.

Firstly, this paper makes panel regression on unmatched data. Unmatched data includes 21,241 observations, and the results are basically the same as the previous ones, but the difference between state-owned enterprises and non-state-owned enterprises has decreased.

Then, this paper uses the "one-to-one" matching method to match the original data again, and a total of 152 observations are obtained. Regression and heterogeneity analysis were performed on the matched data. Results The regression results of the first step of the sample are still significant, but the heterogeneity regression may be due to the lack of regression results caused by the samples of non-state-owned enterprises. However, the regression results of state-owned enterprises are still remarkable.

3.5. Mechanism Analysis: State-Owned Enterprises and Non-State-Owned Enterprises

references at a time may be put in one set of brackets [3, 4]. The references are to be numbered in the order in which they are cited in the text and are to be listed at the end of the contribution under a heading References, see Table 1.

3.5.1. A test

Table 5. Analysis of sample difference between state-owned enterprises and non-state-owned enterprises

Variable	Sample group	Observation	Mean	St. D	P-value
lev	soe=0	60	0.631	0.117	0.4503
	soe=1	72	0.647	0.135	
lev_u	soe=0	60	0.532	0.126	0.7938
	soe=1	72	0.538	0.137	
lev_c	soe=0	58	0.102	0.076	0.6597
	soe=1	72	0.109	0.113	
age	soe=0	60	3.023	0.292	0
	soe=1	72	2.742	0.431	
size	soe=0	60	24.278	0.813	0.0003
	soe=1	72	24.891	1.028	
roa	soe=0	60	2.659	4.257	0.6588
	soe=1	72	2.929	2.688	
roe	soe=0	60	7.712	12.451	0.8017
	soe=1	72	8.139	6.631	
top10	soe=0	60	60.073	9.548	0.0002
	soe=1	68	69.058	0.165	
fixed_assets	soe=0	60	0.155	0.161	0.3404
	soe=1	72	0.127	0.165	

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In order to further analyze the heterogeneity of asset securitization of accounts receivable between state-owned enterprises and non-state-owned enterprises, we divide the enterprises that implement asset securitization of accounts receivable into state-owned enterprises and non-state-owned enterprises, and test some of their characteristics. The test results are shown in Table 5.

It can be seen that in the sample test, there are significant differences in the shareholding ratios of the top ten shareholders. Next, the interactive items are added to the model for further analysis.

3.5.2. Shareholding Ratio of Top 10 Shareholders

The model of adding the interactive term of the top ten shareholders' shareholding ratio is as follows:

$$Lev_{it} = \alpha_0 + \alpha_1 Sec_{it} + \alpha_2 Age_{it} + \alpha_3 Size_{it} + \alpha_4 Roa_{it} + \alpha_5 Roe_{it} + \alpha_6 Top10_{it} + \beta_3 Top10_{it} \times Sec_{it} + \alpha_7 Fixed\_assets_{it} + \alpha_8 Growth_{it} + \alpha_9 GDP_t + \alpha_{10} M2_t + \alpha_{11} Ind_i + \varepsilon_{it}$$

$$Lev\_u_{it} = \alpha_0 + \alpha_1 Sec_{it} + \alpha_2 Age_{it} + \alpha_3 Size_{it} + \alpha_4 Roa_{it} + \alpha_5 Roe_{it} + \alpha_6 Top10_{it} + \beta_3 Top10_{it} \times Sec_{it} + \alpha_7 Fixed\_assets_{it} + \alpha_8 Growth_{it} + \alpha_9 GDP_t + \alpha_{10} M2_t + \alpha_{11} Ind_i + \varepsilon_{it}$$

$$Lev\_c_{it} = \alpha_0 + \alpha_1 Sec_{it} + \alpha_2 Age_{it} + \alpha_3 Size_{it} + \alpha_4 Roa_{it} + \alpha_5 Roe_{it} + \alpha_6 Top10_{it} + \beta_3 Top10_{it} \times Sec_{it} + \alpha_7 Fixed\_assets_{it} + \alpha_8 Growth_{it} + \alpha_9 GDP_t + \alpha_{10} M2_t + \alpha_{11} Ind_i + \varepsilon_{it}$$

Table 6. Regression results after adding the interactive term of the top ten shareholders' shareholding ratio

	Lev	Lev_u	Lev_c
sec	-0.044*	0.09	-0.135
	(-0.732)	-1.209	(-1.981)
age	-0.048	0.015	-0.063
	(-0.523)	-0.139	(-0.622)
size	0.158***	0.149***	0.01
	-7.255	-5.568	-0.395
roa	-0.016***	-0.007*	-0.009**
	(-4.535)	(-1.677)	(-2.203)
roe	0.003**	0.001	0.003*
	-2.533	-0.362	-1.857
top10	-0.002*	0.001	-0.002**
	(-1.681)	-0.552	(-2.117)
sec×top10	-0.001**	-0.003**	0.002
	(-0.872)	(-2.631)	-2.105
fixed_assets	-0.075	-0.08	0.006
	(-0.711)	(-0.620)	-0.048
growth	0.008	0.032	-0.025
	-0.348	-1.185	(-0.992)
gdp	0.009**	0.007	0.003
	-2.448	-1.458	-0.581
m2	0.005	0.007	-0.002
	-1.161	-1.279	(-0.354)
Industry	control	control	control
_cons	-3.080***	-3.394***	0.299
	(-4.570)	(-4.105)	-0.396

"*": p<0.1, "**": p<0.05, "***": p<0.01

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We focus on the coefficient β_3 in front of the interaction term. If $\beta_3 > 0$, it means that the interaction between the securitization of accounts receivable assets and the shareholding ratio of the top ten shareholders improves the leverage ratio of enterprises. If $\beta_3 < 0$, it means that the interaction between the securitization of accounts receivable assets and the shareholding ratio of the top ten shareholders reduces the leverage ratio of enterprises.

Table 6 is the regression result after adding the interactive item of the shareholding ratio of the top ten shareholders ($Top10_{it} \times Sec_{it}$). We can see that after adding the interactive item of "Top Ten Shareholders' Shareholding Ratio× Accounts Receivable Securitization ", the coefficient significance of the explanatory variable of accounts receivable asset securitization in the model with "leverage ratio (Lev_{it})" as the output decreased from 1% to 10%, but it was still significant. However, the coefficient in the model with "current leverage ratio (Lev_c_{it})" as the output result is no longer significant. However, it is worth noting that the interactive term of "Top Ten Shareholder's Shareholding Ratio× Accounts Receivable Securitization " is significant in the models of "leverage ratio (Lev_{it})" and "current leverage ratio (Lev_c_{it})", which shows that the shareholding ratio of major shareholders is an important mechanism in the heterogeneity analysis of state-owned enterprises and non-state-owned enterprises.

4. Conclusion

This paper studies the effect of accounts receivable securitization on enterprise deleveraging. Although theoretically, asset securitization can reduce the asset-liability ratio of initiating enterprises, there are still many uncertainties in actual operation. Our findings are as follows: First, securitization of accounts receivable significantly reduces the leverage ratio of enterprises. After distinguishing between current leverage ratio and non-current leverage ratio, it is found that securitization of accounts receivable significantly reduces the current leverage ratio of enterprises; Secondly, compared with state-owned enterprises, the deleveraging effect of securitization of accounts receivable on non-state-owned enterprises is more significant; After the robustness test, it is found that the above results are still significant. Finally, this paper analyzes the mechanism of heterogeneity between state-owned enterprises and non-state-owned enterprises, and finds that the shareholding ratio of major shareholders plays an important role in the mechanism.

At present, there are many reasons that hinder the development of asset securitization of accounts receivable. Since this paper proves that the deleveraging effect of asset securitization of accounts receivable is remarkable through empirical research, it is necessary to put forward corresponding suggestions for other obstacles to the development of asset securitization.

For example, standardize and improve the information disclosure standards of enterprise asset securitization. Enterprise regulators and capital market regulators should strengthen the supervision of information disclosure of listed companies' financial statements, and try their best to avoid using accounts receivable asset securitization as a tool to whitewash financial statements.

For another example, encourage the establishment of qualified institutions to participate in enterprise asset securitization. In the process of capital market construction, risk pricing is very important. At this time, an intermediary is urgently needed to meet the needs of investors with different risk preferences in the market, effectively realize the balance and matching of risks and benefits, and resolve the financial risks of the economic system. China's investment banks are absent in the process of securitization of accounts receivable, and their role needs to be improved.

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