

## Research on Financing Constraints of Small And Medium-Sized Technological Enterprises

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**Abstract:** Technology-Based Small And Medium-Sized Enterprises As An Important Subject of Scientific And Technological Innovation, Can Effectively Promoting The Transformation of Scientific And Technological Achievements Into Real Productivity, But Small And Mid-Sized Enterprise of "High Risk, High Investment, High Return" Characteristics With The Traditional Financing Model Mismatch, And Because of The Different Level of Regional Financial Development, It Faces The Financing Constraints Are Also Different, This Article Embarks From The Theory of Information Asymmetry And Credit Rationing Theories, Root Cause Analysis of The Financing Difficulty of Small And Mid-Sized Enterprise Theory, Combined With The Current Small And Mid-Sized Enterprise Financing Situation, Explore The Mechanism of Small And Mid-Sized Enterprise Produce Financing Constraints.

### 1. Introduction

The 2017 National Conference On Financial Work Pointed Out That One of The Important Tasks In Financial Work In The Future Is To "Serve The Real Economy", Guide The Development of The Financial Industry To Coordinate With Economic And Social Development, Promote Financing Facilitation, Reduce The Cost of The Real Economy, And Improve The Efficiency of Resource Allocation. At Present, With The Increase of Credit, Medium - And Long-Term Liquidity Demand of Financial Institutions Is Also Increasing. By Appropriately Reducing The Required Reserve Ratio And Replacing Part of The Central Bank's Lending Funds, Financial Institutions Can Increase Their Sources of Funds To Support Small And Micro Businesses, Private Enterprises And Innovative Enterprises, Enhance The Vitality And Resilience of Economic Innovation, And Promote The Development of The Real Economy.

Small And Medium-Sized Enterprises Are An Important Source of Fostering New Economic Drivers And Play An Important Role In Promoting Economic Growth, Increasing Employment And Stimulating Innovation. By The End of 2017, There Were About 28 Million Legal Persons of Small And Micro Enterprises In China, And More Than 65 Million Individual Industrial And Commercial Households, Accounting For More Than 90% of All Market Entities. Small And Medium-Sized Enterprises Contribute More Than 60% of Gdp, More Than 50% of Tax Revenue And 80% of Urban Jobs. Small And Medium-Sized Enterprises Have Completed 65% of Invention Patents And Over 80% of New Product Development, And Are Important Carriers of Mass Entrepreneurship And Innovation. Compared With Large And Medium-Sized Enterprises, Smes' Corporate Governance Structure Is Not Perfect, Financial Management Is Not Standardized, And Their Ability To Resist Risks Is Relatively Weak. According To Statistics, The Average Life Span of Small And Medium-Sized Enterprises In China Is About 3 Years, And About 1/3 of The Small And Medium-Sized Enterprises Continue To Operate Normally After The Establishment of 3 Years. According To The Statistics of The People's Bank of China, Small And Medium-Sized Enterprises Get Loans For The First Time On Average After 4 Years And 4 Months. Small And Medium-Sized Enterprises Have To Survive An Average Death Period of 3 Years Before They Can Get Financial Support From Bank Credit.

## **2. Literature Review**

### **2.1 Definition of Financing Constraint**

Fazzari Et Al. (1988) Studied This Problem For The First Time And Gave A Definition: Financing Constraint Refers To The Phenomenon That Under The Condition of Imperfect Capital Market, The External Financing Cost of An Enterprise Is Higher Than The Internal Financing Cost, Resulting In Excessive Dependence On Internal Capital For Enterprise Investment, Which Leads To Investment Lower Than The Optimal Investment Level. Stiglit And Weiss(1981), Based On The Theory of Information Asymmetry And Optimally Ordered Financing, Proposed That The Existence of Information Asymmetry Made The Internal Financing And External Financing of Enterprises Unable To Replace Each Other, And There Were Differences Between The Internal And External Financing Costs, As Stiglit And Weiss(1981), As The External Financing Costs Were Higher Than The Internal Financing Costs. When The Internal And External Financing Costs Vary Greatly, Enterprises Can Only Rely On Internal Financing For Investment, Which Leads To The Problem of Financing Constraints. Mm Theory Is That If We Do Not Consider Corporate Income Tax And Bankruptcy Risk, And In A Complete Capital Market Medium Under The Condition of A Series of Assumptions, The Total Cost Has Nothing To Do With The Value of The Company, Company's Capital, The Change of The Corporate Capital Structure Will Not Affect The Company's Weighted Average Total Cost of Funds, Enterprises Outside Money Can Replace Internal Funds. That Is To Say, The Value of An Enterprise Has Nothing To Do With Its Capital Structure, And Its Investment Behaviors And Decisions Will Not Be Limited By Internal Financial Factors.

### **2.2 Study on Financing Constraints**

Canepa And Stoneman (2007) Believe That Compared With Ordinary Enterprises, High-Tech Enterprises Will Face Greater Difficulties In Financing. Czarnitzki (2006) Believes That When An Enterprise Is In External Financing, The Better Its Credit Status And Credit Rating Are, The Lower The Cost of External Financing Will Be. Sugirin (2009) Believes That In Daily Production And Operation Activities, The Endogenous Financing of Most Small And Medium-Sized Enterprises Is Basically Unable To Meet Their Own Financing Needs, So They Face Financing Constraints. Kenneth, Vinh And Isabel (2012) Believe That Small Enterprises Face Credit Constraints, While Large State-Owned Enterprises Basically Do Not Face Credit Constraints. Bhaumik Et Al. (2015) Believe That When An Enterprise Is Faced With Financing Constraints, Its Investment Expenditure Is Highly Sensitive To Cash Flow.

Gu Qun (2016) Using The Shenzhen Stock Exchange From 2008 To 2013 In High And New Technology Enterprise of Small And Medium-Sized Enterprises Board As A Sample For Empirical Analysis, Found That Small And Mid-Sized Enterprise Has Strong R&D Investment - Cash Flow Sensitivity, Is Financing Constraints of Small And Mid-Sized Enterprise And Supply Chain Finance Can Alleviate The Degree of Financing Constraints, In Regions Where The Higher The Level of Financial Development, Calming Effect. Liang Liang And Zhang Yingming (2016) Selected 72 Technology-Based Smes On The Sme Board For Correlation Analysis And Regression Analysis, And Found That The Expansion of Company Scale Can Significantly Improve The Financing Ability of Technology-Based Smes. Li Xiaoguang, Ran Guanghe And Zheng Wei (2017) Believe That The Resource Mismatch Effect Caused By The Distortion of Financial Factors Intensifies The Financing Constraint of Enterprises And Thus Inhibiting The Growth of Enterprise Innovation Investment. Luo Jun (2018) Believes That Financing Constraints Affect Technological Innovation of Private Enterprises Through Three Channels: R&D Capital Investment, Human Capital Accumulation And International Technology Spillover. With The Easing of Financing Constraints, These Three Channels Gradually Enhance The Promotion of Independent Innovation of Private Enterprises And Weaken The Promotion of Imitation Innovation.

### 3. Theoretical Basis

#### 3.1 Information Asymmetry Theory

Asymmetric Information Theory Is An American Economist, Gram Rove (George Akerlof) Published In 1970, The Famous Writings Mentioned For The First Time, Refers To The Market Economy Activities, All Kinds of Personnel To The Understanding of The Relevant Information Is Different, Have Full Information of The Staff, often In A Dominant Position, And Personnel Information Is Scarce, Are At A Disadvantage Position. In The Financial Market With Asymmetric Information, Borrowers Generally Have More Information About Investment Projects Than Borrowers, As Well As The Motivation To Repay The Loans, Which often Leads To The Increase of Potential Risks of Market Transactions, Leading To Adverse Selection And Moral Hazard.

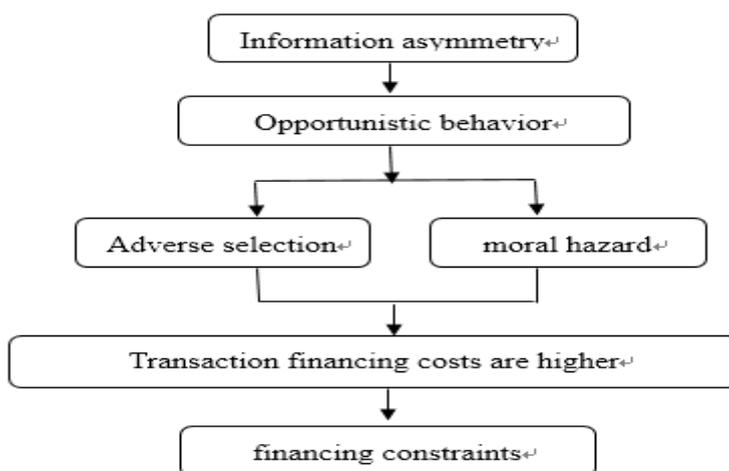


Fig.1 Asymmetric Information Theory

#### 3.2 Credit Rationing Theory

The Earliest Research On Credit Rationing Can Be Traced Back To Adam Smith's Wealth of Nations, Who Discussed Credit Rationing When He Expounded On The Maximum Amount of Usury. After That, The Academic Circle Carried Out In-Depth Research, The Most Representative of Which Was Stiglitz And Weiss's Article Credit Rationing In Incomplete Information Market Published In American Economic Review In 1981, Which Proposed The Credit Rationing Model (S-W Model). The Model Shows That Borrowers With Asymmetric Information Between Commercial Banks, Banks Can't Reasonable And Effective Evaluation of The Credit Status of Enterprises, To Reduce The Bank Loan Risk, May Be To Some Limitations Such As The Limit of Borrowers, With The Improvement of Corporate Default Risk, Financial Structure And Small And Medium-Sized Enterprise Transaction Costs More Than Expected Return of Risk-Adjusted, Banks Will Not To The Enterprise Credit Rationing.

### 4. Analysis of the Financing Status of Small and Medium-Sized Technology Enterprises

#### 4.1 Investment in Scientific and Technological Innovation

R&D Investment Is An Important Indicator To Measure The Level of A Country's Scientific And Technological Development. To Some Extent, It Determines The Success Or Failure of Innovation. With The Increase of China's Overall National Strength And The Awareness of Independent Innovation, R&D Investment Is Also Increasing, Which Is Mainly Reflected In The Following Two Aspects :(1) The Total Amount of R&D Investment Is Increasing; (2) R&D Input Intensity (I.E. R&D Input /Gdp) Shows A Trend of Steady Increase. In Terms of The Total Investment In R&D, The Total Investment In 2011 Was 868.7 Billion Yuan, And The Total Investment In 2017 Was

1760.6 Billion Yuan, Doubling The Total Investment In 6 Years. From The Perspective of R&D Input Intensity, The Proportion of R&D Input In Gdp In 2011 Was 1.78%, Which Increased To 2.13% In 2017. In Addition, The R&D Input Intensity Showed An Increasing Trend Year By Year With The Change of Time, Which Was Consistent With China's Policy of Encouraging "Mass Entrepreneurship And Innovation".

Table 1 R&D Expenditure Billion

Year	R&D Expenditure	Basic Research	Application Research	Test Development	R&D Expenditure /Gdp(%)
2011	8687	411.81	1028.4	7246.8	1.78
2012	10298.41	498.81	1161.97	8637.63	1.91
2013	11846.6	554.95	1269.12	10022.5	1.99
2014	13015.63	613.54	1398.53	11003.56	2.02
2015	14169.88	716.12	1528.64	11925.13	2.07
2016	15676.75	822.89	1610.49	13243.36	2.11
2017	17606.13	975.49	1849.21	14781.43	2.13

#### 4.2 Technological Innovation Output

The Number of Scientific And Technological Papers Published Has Increased From 1.5 Million In 2011 To 1.7 Million In 2017. The Number of Scientific And Technological Works Has Increased From 45,472 In 2011 To 54,204 In 2017. Remarkable Achievements Have Been Made In Basic Innovation. In Terms of The Number of Patent Applications And The Amount of Authorization, The Number of Patent Applications In 2011 Was 1.633 Million, Which Increased To 3.698 Million In 2017, An Increase of 1.26 Times And An Annual Growth Rate of 21%. In 2011, The Number of Patents Granted Increased From 960,000 To 1.836 Million In 2017, An Increase of 0.9 Times. In A Word, Both The Number of Patent Applications Accepted And The Number of Patent Applications Granted Increased Rapidly, Reflecting The Continuous Improvement of China's Innovation Output.

Table 2 Specialized Innovation Output

Year	Technology Works	Technological Achievements	Number of Patent Applications Received	Number of Rights Granted To Patent Applications
2011	45472	59792	1633347	960513
2012	46751	58779	2050649	1255138
2013	45730	55284	2377061	1313000
2014	47470	53140	2361243	1302687
2015	52207	52477	2798500	1718192
2016	53284	51723	3464824	1753763
2017	54204	44208	3697845	1836434

#### 4.3 The Allocation of Credit Resources is Out of Proportion

China's Non-Financial Enterprises Have Structural Problems In Their Leverage Ratio. Enterprises With High Leverage Ratio Are Concentrated In Industries Such As Industry, Materials, Energy And Public Utilities. The Leverage Ratio of State-Owned Enterprises Is Far Higher Than That of Private Enterprises. State-Owned Enterprises Are At The Upstream of The Profit Chain And Monopolize Important Production Resources, While Private Enterprises Are At The Downstream of The Profit Chain And The Profit Situation Is Not Optimistic. Therefore, Bank Credit Is More Inclined To State-Owned Enterprises.

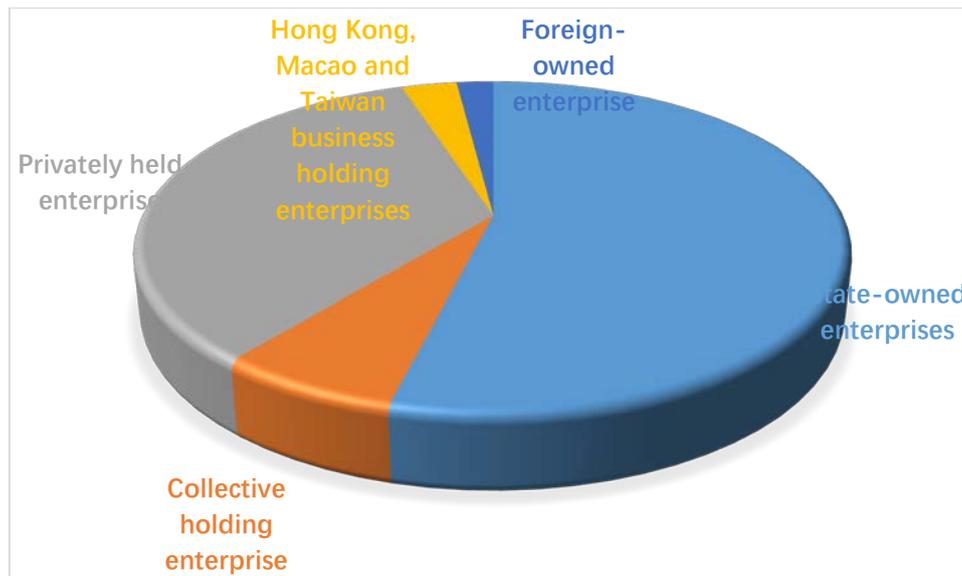


Fig 2 Proportion of Credit Resources

## 5. Conclusion

Faced By Small And Mid-Sized Enterprise Financing Constraints Are Restricting Enterprise Technology And The National Science And Technology Innovation Process, The Important Factors In Different Industries And Different Parts of The Small And Medium-Sized Enterprise Financing Constraints Faced By Degree Is Different, Generally High Level of Financial Development Area, The Lower The Degree of Financing Constraints, Therefore, To Improve The Level of Financial Development, Focus On Ease The Small And Medium-Sized Enterprise Financing Constraints

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