SME Financing from Demand Side

Study based on World Bank Enterprise Survey on China

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Abstract

As widely recognized by economists, that financing is crucial to SME growth. Now in China SME's contribution to GDP is already close to high-income country level, however loans granted to SMEs were disproportional. Various studies found constrains in SME financing access from both supply and demand side. This paper, using World Bank's Enterprise Survey on the demand side, found that there is self-selection problem during the application process. Large number of firms are abundant with cash, thus less likely to apply for loans. While firms with better latest sales, are expected to take in loans to sustain their growth. The finding calls for reduction of SME financing costs via competition and financial sector reforms.

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I.   Introduction

By 2011, Chinese SMEs already accounted for 95% by numbers, employed 80% labor force, marked up to 60% of GDP share (OECD 2014). That is almost equivalent level as high-income countries (median GDP share: 65%, World Bank 2003). For that reason, SME is vital both socially and politically. Nonetheless according to World Bank's Enterprise Surveys financial access is the biggest obstacle to firms growth. There were few researches focused on Chinese SME financing, this paper made some effort by using the Enterprise Survey. From the survey summary (*Table 1 of Appendix*), some observations were made:

> i. Lack of demand, shown in 58.5% of surveyed firm claiming no need for credits.

> ii. Firm surveyed posted lower proportion of banking financing, majority of their investment financed by internal channel. This could be the result of bank discriminations or could be a result of self-selection.

> iii. 77.6% of the loans requiring for collaterals regardless the channel. Collateral/loan value ratio is an indicator for borrowing cost, the interest rate is also important, however not observed in firm surveys. The ratio is a level comparable to Canada and Belgium, while in Finland, only 20% (OECD 2014).

These distinguishing facts of China were ignored by former researches, or did not apply to their countries of concern. The vacancy is with great importance. Thus this paper proposed with following questions and hypothesis:

> i. Which firms has the demand for loans? **Hypothesis 1**: firms that, located in more developed area, in heavy industry, having better financial performances, get higher chance of having loan demands to finance their future growth.

> ii. Who applied for loans? **Hypothesis 2**: Contrary to hypothesis 1 of loan demands, it is assumed that if firm was with better financial performances, less likely to apply for the loan, since they could finance themselves with retained profits.

> iii. Who eventually get the loans? **Hypothesis 3**: Firms that, more established, larger, financially better performed are positively related to better chance to get granted.

The findings suggest self-selection problem during the application process. Large numbers of firms are abundant with cash, thus less likely to apply for loans. While if the firm has better sales, they are inclining to apply for and obtain financing to sustain growth.

This paper organized as follows: following section provides brief review on SME financing in China. Section 3 reflects theories and researches. Then followed by methodology (Section 4). Empirical results are in Section 5. Lastly, in Section 6, the paper concludes with more discussion on its implications, limits, and suggestions.

II.   SME Financing in China

World Bank's definition of SME is widely used by researchers: in practice if firm's number of employees less than 300, it counted as SME. The dataset this paper based on falls into such category: the sampled firms averaged at 235 employees with a median of 60. Despite the size, they are critical for economic growth: not only contribute to GDP but also set the dynamics by providing employment, spreading innovation and entrepreneurship. In China, SME did not flourish until the transformation towards market economy started in 1978. During the 1970s to 1980s, SME were in the form of collective enterprises, or TVEs (township and village enterprises) which sheltered under local governments protection. Since then, more and more private SME firms were benefited from gradual market liberalization and reform policies in various sectors. They experienced rapid growth since, and have been contributing a lot towards the spectacular GDP growth. Only by 1990, SMEs have grown into as a major share of Chinese economy (Wang 2004). Only realized this irreversible trend, Nee & Opper (2012) argues, did Beijing recognized their legal status and put on policies promoting them.

Despite such efforts due to the limitation of financial reforms, argued by Lin and Li (2001), the financing market are controlled by state players and in favor of lending to state-owned giants. State-owned commercial banks are dominating the market, the big four SOCBs have 75% of all capital in the economy while they are not keen to lend to SME (XU et al. 2013), 85% of all bank loans were to the big SOEs (The Diplomat 2013). During 2009-2011, in which time the credits were abundant due to the 4 trillion CNY 'stimulus program' reacting to the global financial crisis- even though, less than half of business loans went to SME. Afterwards, in 2013-2014, it was down to 40% (Peterson Institute 2012, OCBC 2014, *see Appendix Figure 1*). This picture was seriously disproportional considering SMEs are responsible for half of China's output (*Appendix Figure 2*).

Alternatives, for example the stock and bond markets, were also unsuccessful (Pistor & Xu 2005). Analysts say, as a result, SME turned to and rely heavily on informal financing, P2P financing, and shadow banking, Tsai (2002) estimates that counted for 1/4 of all financial transactions, which casting doubts on non-performing loans and their riskiness. Ayyagari et al. (2006) identified finance as the most important factor for firm's growth. Such underdeveloped financial sector would negatively affect SME growth.

III. Theory and Literature Review

Established theory of financing difficulties for small firms is the Finance Gap Hypothesis that focused more on the supplier side of loans. This gap emerges when SME were too small to go public and under-developed to get formal/informal-channel lending. OECD further pointed out the relation of this hypothesis to the principal/agent problem, asymmetric information etc. Finance Gap Hypothesis states that under credit rationing by the lenders, SME lending is considered as costly and risky. Like any business economy of scale would reduce costs, SME lending however is not the case. The costs could be reduced by competition in competitive financial market, while in China such competition were highly limited, due to the de facto oligopoly of financing source and supply by the state-owned players. Further, smaller companies tend to have less transparency in their financial reports, and they are facing high level of uncertainty: more than half small businesses bankrupts within four year into operation (IFC 2010). Larger firms in China with large number of employment were backed-unemployment threats the governing of Communist Party. Giant SOE enjoys soft budget constraints and is almost certainly ensured a bailout in case of failure (Opper 2014). OECD (2006) further suggested such gap could also be explained within the institutional economics.

The gap was noticed as early as 90s. Cressy & Olofsson (1996) pooled range of important papers that later had become corner stone of researches on the topic. They found: 1.) Constraints on demand and supply side, their existence preserved even controlled for firm management factors. 2.) Giant enterprises and smaller ones differ in their financial structure, growth prospects, scope of products, etc., shifts the market power to the supplier side, making SMEs suffering more severely from "financial scale disadvantages". While Berger & Udell (2006) were arguing for institutional causal chain from financial infrastructures to the market and discussed information gathering during lending process. Moreover, the authors are for larger financial institutions, even for developing nations, due to better information gathering and lower overall cost.

Empirically, there are abundant literatures based on different data which confirmed such gap around the world. For instance, Beck, Kunt & Peria (2008) using banking survey data from World Bank, confirmed so in 45 countries. More specifically on China, Lin & Li (2001), based on data from Nation Bureau of Statistics suggested the early planning era's bias

towards large SOEs continued, which resulted in SME financing difficulty. Also, Ge & Qiu (2006) structured their research on firm survey from the Chinese Academy of Social Sciences, found in China the informal channel primarily trade credit plays a significant role. However the author also pointed out that most trade credits were more costly than bank loans. Nee & Opper's research using survey on Shanghai Stock Exchange, found financial status are insignificant in influencing loan access, while firm size, innovation activity, and location do, politicized capitalism are also significant.

It is universal that SMEs are struggling in getting credits from various formal and informal channels. Nevertheless, constrains from supply side cannot fully explain the financing obstacles, since many smaller firms simply have not any demand. Cole (2008) firstly tackled on the problem of need vs. no-need of loans by firms and sets the model which used by later researchers. Kuntchev et al. (2013) not only considered the non-demand fact, but also went further; they detailed four ordinal categories from "no credit constrained" to "fully credit constrained". The framework by these two authors has provided the basis for later demand-side financing researches and made it possible for comparisons.

These literatures, however, did not include China. A comprehensive survey only done until the 2012 Enterprise Survey. Further, previous studies on credit rationing from banks cannot fully explain the SME financing difficulty resulted from self-selection. A third limitation was that they did not differentiate firms who do not have credit demands, firms who have but did not apply, and those who applied. Thus, this paper based on such logics, would use the latest China data from the ES to examine which firms actually has needs for loans/credit, which ones succeed and which of them failed in the loan applications.

IV. Econometrics Methodology

Using logistic regressions on three groups of the surveyed firms, the hypothesis raised from the beginning of this paper could be test empirically.

IV.i.Data

Empirical research with a large firm-level dataset was too difficult to conduct before the World Bank's Enterprise Survey. Based on accepted and universal methodologies, the survey also ensured its data quality (in terms of questionnaire settings, data gathering, rejection rate etc), and it provided possibility to do cross-country comparisons. The 'Global methodology' they used from 2006 as a standardized survey method, provided possibility of cross-country, multi-years comparisons; China among more recent target countries, being surveyed in 2012 provided a relatively more recent dataset. It interviewed 2700 firms from 19 different sectors located in 25 cities, which is a very detailed sample carrying good indicating information covers majority parts of Eastern China. On this specific topic, it not only contains detailed information on firm characteristics (which could be controlled), but also covers various financial indicators. Detailed data source for different variables within the ES questionnaire dataset, see Appendix Table 2.

IV.ii.Model

As the discussion on limits of former studies, to solve the problem, the surveyed firms are classified by their demand for loans (no demand vs firms with loan demand); then within firms need loans, applicants vs. non applicant for various reasons (as Cole labeled them as 'discouraged firms'). Lastly, whether the applicants get the loans or not (denied or approved by lender), detailed breakdown see Appendix Figure 3. This paper would not differentiate whether the loans come from banks or other channels since majority of the firms in Enterprise Surveys got their loans from informal channel. This paper would test three logistic regressions, since the dependent variable in investigation are binary: demand or not, applicant or not and are approved or not). Using the logistic estimations with the reporting of robust standard errors and outputting the odds ratios (Verbeek 2012), the estimations are easily readable, the model specification is: $Y \sim B (n_i , \pi_i)$ which is binary, as 0 for non-observation, 1 otherwise, depending on the dependent variable.

Logit (π$_i$) = X$_i$' β$_i$, the logit of the probability of **Y** taken **1**, where X is vector of covariates and beta the vector of regression coefficients. Based on Verbeek (2002), the effect on probability of increasing a predictor by one unit while others constant can be calculated: **dπ$_i$/ dx$_{ij}$ = β$_j$π$_i$(1 − π$_i$).** Using maximum likelihood or ML, estimations could be done. The odds ratio could be obtain just by **exp(beta estimation)**. The odds ratio, which enables direct reading on the magnitude of effect (Verbeek 2012), here in the binary logistic regression, means the constant effect of a predictor X on the likelihood of the dependent variable's outcome. When it is greater than 1.00, indicates the firm with such explanatory variable (characteristics) are more likely to need credit, to apply, or eventually get the loans. For example, an odds ratio of 1.123 mean that one unit change in this independent variable (controlled for other variables) would increases the odds of dependent variable change from 0 to 1, by a factor of 1.123 (or a 12.3% increase). On the other hand, if the odds ratio was smaller than 1.00, it would decrease the possibility of that dependent variable.

IV.iii. Variables

As mentioned earlier, this paper followed the Cole (2008) framework to differentiate the three groups of firms by introducing three models with three dependent binary variables. They are **need variable** for distinguish firms' demand or no for loans. **Applicant variable** for application for loans or need but did not apply. **Result variable** for the result of loan applicants. Three categories of explanatory variables were taken into consideration, here is a summary of them, their detailed data source from the Enterprise Survey, see Appendix Table 2.

> **Firm's characteristics:** age (established firms suggest they are more successful), size (in terms of employment), legal status, location;
>
> **Macro indicators:** the competitiveness the main market is (higher competitive the market is, company may facing lower margins may need financing), and in what sector the firm operates (in three categories, loan value needed from high to low, term of loans from long to short :heavy industry, light industry, services);
>
> **Performance variables (with main interest):** including the utilization of production capacity, sales growth, sales in latest year, sales 3 years ago, sales per employee, and gross margin (for the reasons stated in the hypothesis, these are the variables with mail interest).

V. Results

V.i. Descriptive Statistics and Pair-wised Differences

By three groups as discussed earlier, Table on the next page presents the mean values for each variable, along with group differences (contrast column = need-no need, app- non-applicant, approval - denial) as the descriptive statistics. Besides that are the significant levels indicating pair-wised t-tests' significance.

First, from the full sample, surveyed firms averaged at 15.9 years, our sample has a mean of 235 employees. High proportion (70%) of firms had external audit. Majority of them located in eastern costal region and are specialized in light industry (very few in services), more of them are sole proprietorship or limited partnership. In terms of performances, have positive sales growth but negative gross margin.

Secondly, Need vs non-need firms. Overall, the ratio of firms with loan demands to without such demands is 60%:40%. Firms who need loans are more likely to be shareholding non-listed firms. Loan-needing firms also more likely to locate in Eastern region and in heavy industry. The contrasts of sales indicators are significant, suggesting that higher-performance firms are more likely to have financing demands. Actually, all three groups share the same findings on sales indicators.

In the applicants compared to non-applicants, firms with more sales number are more likely to apply for credits. Similar findings were found for the legal status, region and market. However, in this group, senior firms, with auditors, are more likely to actually apply for a loan. The findings are in accordance with conventional wisdom. Sales indicators differences also significant in the group of firms got approval vs. deny of loans. Better financial performances gets higher approval rate. Being audited also improved the approval of loan applications. Additionally, nearly 95% of firms applied were granted.

Though conflicting results in firm ages and sizes, however, firms who need loans are more likely associated with higher sales, being audited; firms who are more likely to apply and more likely to get the loans also share these similar characteristics. This supports the credit rationing theory. Another fact to be notes is that more than half of the non-applicants saying they do not need loans simply because they have sufficient capital.

Table 1: Descriptive Statistics And Pair-Wised Difference

Variables	full sample	no need	have need	contrast		need	non-applicant	applicant	contrast		applicant	denial	approval	contrast	
age	15.942	16.539	15.655	-0.404		15.655	14.900	16.879	1.024	***	16.879	14.654	17.330	2.226	
size1 5-19	0.301	0.346	0.279	-0.042	**	0.279	0.359	0.151	-0.191	***	0.151	0.077	0.125	-0.147	**
size2: 20-99	0.416	0.394	0.427	0.027		0.427	0.429	0.442	0.045	**	0.442	0.423	0.375	-0.039	**
size3: 100+	0.283	0.260	0.294	0.014		0.294	0.213	0.407	0.146	***	0.407	0.500	0.500	0.146	***
Auditor	0.658	0.697	0.639	-0.028		0.639	0.488	0.819	0.176	***	0.819	0.423	0.841	0.176	***
legalstat: listed	0.017	0.028	0.011	-0.001		0.011	0.000	0.020	0.017	***	0.020	0.000	0.023	0.017	***
legalstat : shareholding	0.047	0.028	0.057	0.020	**	0.057	0.056	0.050	-0.011		0.050	0.052	0.045	-0.011	
legalstat: sole	0.560	0.559	0.560	-0.020		0.560	0.615	0.487	-0.187	***	0.487	0.526	0.455	-0.187	***
legalstat: partner.	0.065	0.083	0.057	-0.041	***	0.057	0.043	0.070	-0.024	*	0.070	0.000	0.068	-0.024	*
legalstat: limited partner.	0.300	0.295	0.302	0.025		0.302	0.282	0.342	0.161	***	0.342	0.421	0.386	0.161	***
legalstat: others	0.012	0.008	0.013	0.016	**	0.013	0.003	0.030	0.043	***	0.030	0.000	0.023	0.043	***
region1:East	0.631	0.547	0.672	0.126	***	0.672	0.631	0.693	0.107	***	0.693	0.684	0.625	0.107	***
region2: South-east	0.245	0.287	0.224	-0.038	***	0.224	0.272	0.181	-0.059	***	0.181	0.210	0.273	-0.059	***
region3: north-east	0.052	0.051	0.053	0.008		0.053	0.030	0.095	0.004		0.095	0.105	0.057	0.004	
region4: middle-west	0.072	0.114	0.051	-0.096	***	0.051	-0.066	-0.030	-0.052	***	-0.030	0.000	0.045	-0.052	***
competitiveness	0.010	0.016	0.008	-0.002		0.008	-0.003	-0.015	0.003		-0.015	0.052	0.011	0.003	
market1: heavy industry	0.218	0.193	0.230	0.075	***	0.230	-0.269	-0.161	0.009		-0.161	0.368	0.148	0.009	
market2: light industry	0.782	0.807	0.770	-0.067	***	0.770	0.731	0.839	-0.067	***	0.839	0.631	0.852	-0.067	***
market3 services	0.000	0.000	0.000	-0.008		0.000			0.057	***		0.000	0.000	0.057	***
capacity	0.869	0.870	0.869	0.004		0.869	0.883	0.842	-0.016	***	0.842	0.822	0.842	-0.016	***
sales growth	11.922	1.570	16.911	5.413		16.911	0.227	44.420	13.617	*	44.420	0.158	99.406	13.617	*
sales 2009	16.530	16.372	16.607	0.310	***	16.607	16.264	17.159	0.976	***	17.159	16.160	17.227	0.976	***
sales 2011	16.767	16.638	16.830	0.289	***	16.830	16.414	17.510	1.068	***	17.510	16.244	17.583	1.068	***
sales /person 09	12.429	12.308	12.487	0.182	***	12.487	12.399	12.703	0.338	***	12.703	12.413	12.655	0.338	***
sales / person 11	12.503	12.400	12.552	0.170	***	12.552	12.423	12.842	0.384	***	12.842	12.345	12.791	0.384	***
gross margin	-1.302	-1.281	-1.312	-0.078		-1.312	-1.314	-1.329	-0.056		-1.329	-1.444	-1.498	-0.056	
collateral											0.496	0.647	0.498	-0.109	
# observations	781					781	527		500		88			86	

n.b. *,**,*** indicates significance at 0.10, 0.05, 0.01 levels respectively. Column values are means for each variable, 'contrast' column presents mean difference between two group, stars indicates significant difference by pair-wised t-test. Variable definitions see table of variables & data source

V.ii.Logistic Regressions

Table next page tabulates results for three logistic regressions with the three dependent variable (Demand, applicant, result), on the same explanatory variables.

Noticeably, the diagnoses tests for the models show no or slightest problems such as mis-specification etc. For robustness, because of the often omitted variable situation, this paper has also done tests on models without these variables; results do not differ largely from models presented. In addition for robustness, the estimations also done by another round with the sampling weights suggested by the ES methodology for accuracy (this result would show in table 3 in the Appendix).

Firstly we look at the need columns on next page, when a firm indicating they have no demand for loans, need variable takes the value of 0, otherwise the need variable takes value of 1. On conventional confidence levels, the east region firms, heavy industry firms and high sales growth firms were significantly adds up the likelihood for demanding loans. Other variables less significant. This suggests that in more developed part of China or the SMEs with higher sales growth rate, would want loans to sustain their growth.

Then we move to the applicant columns of table 4: when a firm indicating they have applied for a loan APP = 1, non-applicants even if they have such demand: APP = 0. It seems that for the legal status variables, all their odds ratios are significantly less than 1, suggesting being different legal status does not increase the chance for the firm to apply. However, being in the east region of China, the odds ratio is as high as 5.106, it largely increases the firm's odds of application. Sales per employee also increase odds of loan applications, however, sales three years ago and the gross margin decreases the odds of loan applications. Firms with previous better performance and higher margins may suggest that they are abundant in funds thus less likely to apply for a loan.

Last part of the result columns, it takes value of 1 when get approval from lenders, 0 if being denied of a loan. Only the current financial year sales are significantly increasing the odds of get their loan application granted. At a lesser constrained significant level, result suggesting that more competitive the firm at, less likely to get approval of a loan. All other variables are insignificant, which may be due to limited observations.

Table 2: Logistic Regressions

Variables	Need (no need =0, need=1)			Applicant (non applicant=0, applied=1)			Result (denied=0, approved=1)		
	Odds Ratio	Robust Std.		Odds Ratio	Robust Std.		Odds Ratio	Robust Std.	
age	0.983	0.011	#	1.016	0.012	#	1.027	0.035	
size1 5-19	0.633	0.19	#	0.433	0.164	**	0.842	0.858	
size2: 20-99	0.934	0.216		0.858	0.222		1.165	0.762	
size3: 100+	(omitted)			(omitted)			(omitted)		
Auditor	0.768	0.145	#	3.475	0.876		0.422	0.392	
legalstat: listed	0.247	0.255	#	0.043	0.046	***		(omitted)	
legalstat : shareholding	1.313	1.211		0.095	0.077	***	0.389	0.462	
legalstat: sole	0.747	0.615		0.12	0.084	***	1.328	0.968	
legalstat: partner.	0.427	0.37		0.083	0.065	***		(omitted)	
legalstat: limited partner.	0.64	0.528		0.165	0.117	**		(omitted)	
legalstat: others	(omitted)			(omitted)			(omitted)		
region1:East	2.682	0.79	***	5.106	2.436	***	0.726	0.863	
region2: South-east	1.644	0.53	#	2.262	1.169	#	0.67	0.783	
region3: north-east	2.034	0.902	#	9.887	5.746			(omitted)	
region4: middle-west	(omitted)			(omitted)			(omitted)		
competitiveness	0.4	0.338		1.81	1.83		0.197	0.223	#
market1: heavy industry	1.556	0.338	**	1.061	0.291		0.556	0.396	
market2: light industry	(omitted)			(omitted)			(omitted)		
market3 services	(omitted)			(omitted)			(omitted)		
capacity	1.062	0.792		0.022	0.02		1.74	3.826	
sales growth	1.001	0	***	1	0		0.739	0.274	
sales 2009	1.535	0.465	#	0.353	0.121	***	0.169	0.242	
sales 2011	0.695	0.215		3.703	1.358		12.761	18.957	*
sales /person 09	0.94	0.263		2.136	0.674	**	0.726	0.643	
sales / person 11	1.335	0.407		0.607	0.207	#	1.098	1.115	
gross margin	0.881	0.105		0.614	0.087	***	0.964	0.377	
collateral	0.042	0.075	*	0.001	0.002	***	0	0.002	#
constant	0.983	0.011	#	1.016	0.012	#	1.027	0.035	
# observations	781			754			164		
log pseudo likelihood	-467.3392			-346.8073			-48.1143		
Pseudo R2	0.0513			0.2030			0.1818		

*,**,*** *indicates significance at 0.10, 0.05, 0.01 levels respectively. # indicates significance at 0.20 level. Variable definitions see table on data source. Values are odds ratio with robust standard errors obtained from respective three logistic regressions. NEED, APP, RESULT are the binary dependent variables in their own regression.*

Table 3: OLS Regression on Collateral/Loan Value Ratio

Variables	Coef.	Robust Std.	t	
age	-0.009	0.007	-1.29	#
size1 5-19	0.000	(omitted)		
size2: 20-99	-0.216	0.196	-1.1	
size3: 100+	-0.261	0.177	-1.47	#
Auditor	-0.183	0.108	-1.7	*
legalstat: listed	0.650	0.324	2.01	**
legalstat : shareholding	0.072	0.335	0.22	
legalstat: sole	0.442	0.259	1.71	*
legalstat: partner.	0.284	0.413	0.69	
legalstat: limited partner.	0.412	0.235	1.75	*
legalstat: others	0.000	(omitted)		
region1:East	-0.700	0.322	-2.17	**
region2: South-east	-0.864	0.340	-2.54	**
region3: north-east	-0.360	0.356	-1.01	
region4: middle-west	0.000	(omitted)		
competitiveness	-0.659	0.226	-2.91	***
market1: heavy industry	-0.220	0.158	-1.39	#
market2: light industry	0.000	(omitted)		
market3 services	0.000	(omitted)		
capacity	-0.050	0.373	-0.13	
sales growth	-0.000	0.000	-0.13	
sales 2009	0.213	0.123	1.73	*
sales 2011	-0.170	0.127	-1.34	#
sales /person 09	-0.216	0.105	-2.06	**
sales / person 11	0.141	0.128	1.1	
gross margin	-0.095	0.090	-1.05	
constant	1.531	0.966	1.58	#

# of obs =144   F(21, 122) = 7.37 Prob > F=0.0000
R-squared =0.1695   Root MSE = .60745

*,**,*** *indicates significance at 0.10, 0.05, 0.01 levels respectively. # indicates significance at 0.20 level.*
Variable definitions see table of data source.

Moreover, in table 3 on previous page, this paper provided OLS estimation on collateral requirements. Evidence suggested that being audited, located in developed part of China, competitiveness of the market and per person sales, are all negatively correlated to the collateral to loan value ratio, which was also in line with traditional theories on that better performance gets better treatment from lenders.

In all, the following table 4 were made to tabulate the results of the logistic regressions, taken only results that are significant at at least 0.10 level of confidence. Each cell will be filled in the significant affecting characters to the corresponding likelihood (+,- suggesting increasing/ decreasing of that likelihood, odds ratio > or < 1, respectively), when conflicting results observed, results from the higher confidence level or from the weighted models were taken.

Table 4. Summary of Findings

	Likelihood of Demand for Loans	Likelihood of Apply for Loans	Likelihood of being granted of Loans
Firm Character.	Location East (+) Being listed in stock market (+, with very low confidence level)	Having external audit (+ high) All legal statuses (-)	*Insignificant*
Macro Character.	In heavy industry market (+)	*Not significant*	Within a competitive market (-), low confidence level
Performance Character.	Sales growth (+ very close to 1)	Utilization of capability (-) Gross Margin (-) Latest sales (+)	Latest sales (+, high)
Sum. (average portrait of firms within each group)	More dynamic firms in more dynamic macro environment are more likely to have demand for loans.	More cash-abundant firms with more honest financial reports are expected to be self-dependent.	1 Latest sales apparently an important indicator for lenders to consider, other indicators less so. 2 Considering the fact that 95% of the loan applicant got loans successfully, the criteria for a firm to get a loan should be similar to the average image of a loan applicant. 3 Being audit, associated with less collateral requirement from lender; Collateral requirements suggests that better performed firms have lower borrowing costs.

VI. Discussion and Conclusion

From this particular set of survey data, evidences show that from the demand side, the main credit access problem Chinese SMEs facing occurs when they are in the process of making application decisions, 74% of them as 'discouraged firms'. The main findings are:

1. More revenues attained, they could finance themselves, thus lower the chance to apply for new loans; 2.latest sales numbers as proxy of potential growth in the near future, have positive effect on loan applications, since the owner would have to find ways to finance the immediate presented higher production activity. 3. for those who applied majority of them successfully obtained the loans, and if they have good sales number, they are with even better odds.

These results are largely in line with original hypothesis: financial performance variables are negatively related to odds of application, however positively to the possibility of having loan demand & being granted. The intuition behind the findings is that a firm considered with more cash are less likely to need or apply for a loan; However, if any firm applied for loans then it's on the supplier-side selection: based on the findings, latest sales as indicator of growth potential, is the evaluation indicator lenders are looking at.

VI.i.Implications

This paper found limited evidence confirming the popular belief that SME financing gap happened because of discrimination by the lender. First, the financing difficulties happened mainly because large share of firms did not apply for a loan, despite the existence of needs. Second, main reason they did not apply was that such firms abundant in funds, other reasons mainly concerned on the costs and denial rates. Thirdly, even when a firm applied for loans, majority of them would go for informal means, very few go to banks- whether it is because of general perception of discrimination is unknown from this survey.

Aiming to the problems, financial market improvement (competition, efficiency) could drive down the costs for the lenders, resulting in lower rates offered to the SMEs. In China's context, more investment and funding channels, and liberalization of financial sector are needed (McKinsey 2006). Last year State Council took measures such as ''credit channeling" or "guidance window" to promote SME financing. China's central bank PBoC was gradually

relaxing interest rate limit and adjusting official rates in the event of financing difficulties. More recently during the National People's Congress, Zhou Xiaochuan, the Chair of PBoC signals the removal of upper limit of interest rate in 2015, he also suggests liberalization of the financial sector. Beck & Kunt (2006) concludes that in countries without well-developed financial sector, special tools like leasing or factoring, are with effectiveness, even though, the author ask for information share and competitiveness in the financial system.

VI.ii.Limitation and Suggests

This paper used the ES from World Bank, which conducted a huge sampling, however, like many surveyed data, it suffered from problems of: 1.) subjective scale data: questions on financial should be and can be quantified, however were not. Rather, based on interviewee's perception which is inaccurate. Smaller private firms who do not regularly post their financial status and may not be honest when answering sensitive questions. 2.) frequency of data: the survey was yearly based, so that shorter term of loans, which often the case for SMEs, were not observed. 3.) location selection: with only one city in the West, very few in the middle, it could generate biased results. Regional variable was often omitted by the econometric software or insignificant. 4.) There were too few observations of firms who get loans, as seen in the many insignificant variables of the tests. These factors contributed to a low level of robustness. 5.) Survey setup, some of the questions were ask on latest value and reflection for earlier year (such as sales, no. of employees), while others not (such as costs). This inconsistency prevents time-span changes in the firm behaviors.

Further studies could be done with different variables to further test the firms by regions, size or other characteristics. Studies could take other surveys or data source into consideration, for example, longer time series data, or vertically, include more macro factors such as economic conditions, or more detailed firm level data, for example, the most important indicator of lending- the interest rate offered by the lender. The researches, then, could control for more factors, and give more accurate and detailed results.

One could also use a more complicated model such as Kuntchev et al. (2013). Their model category firms not binary, but into ordinal order of degree of credit constrains. Using that model, as the authors suggest, not only evaluate firms' credit access behavior but also enables researchers to assess the financing constrains facing different firms.

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Appendix

Appendix Table 1: International Comparison China - Survey Firm

Indicator	China	East Asia & Pacific	All Countries
Percent of firms with a bank loan/line of credit	25.3	35.0	35.3
Proportion of loans requiring collateral (%)	77.6	79.8	77.4
Percent of firms not needing a loan	58.5	47.9	44.3
Percent of firms using banks to finance investments	14.7	20.9	25.4
Proportion of investments financed internally (%)	89.6	74.7	71.7
Proportion of investments financed by banks (%)	4.5	12.8	14.9
Proportion of investments financed by supplier credit (%)	1.9	2.5	4.5
Proportion of investments financed by equity or stock (%)	3.2	4.6	4.5
Percent of firms using banks to finance working capital	22.1	25.8	30.9
Proportion of working capital financed by banks (%)	6.4	12.1	12.3
Proportion of working capital financed by supplier credit (%)	4.4	4.1	10.4

 # Source: http://www.enterprisesurveys.org/data/exploreeconomies/2012/china#finance

Appendix Table 2: Variables, Definition and Data Source

Label	Definition	Data source from the ES
Dependent Variables		
need	Need variable, binary on the need of loans, used in logistic regression	Take value of 0 when K17=1, full sample except those k17 =1 are no need
app	Applicant variable, binary on the application for loans, used in logistic regression	From the need loans firms, those who answered in k16=1 then is an applicant otherwise no.
result	Result variable, binary variable on the approval or rejected, used in logistic regression	K20 =1, approved , result =1 while k20 =2 rejected, result taken value of 0
collateral	log of collateral requirement/loan value ratio, provided that the result of loan application was approved, used in OLS regression	K125a & k11
Independent Variables		
performance indicators		
capacity	percentage of how much of the full capacity of production has been utilized.	f1
salesgrth	growth rate of sales from the two period the survey asked.	Measured as (sales2011-sales 09)/sales09; D2 & N3
sales09	sales in the financial year of 2009, log of 2009 sales	Log of sales 09. N3
sales11	sales in the financial year of 2011. log of 2011 sales	Log of sales 11. D2
unitsale09	sales per employee. log of (2009 sales/2009 employee number)	N3/L1 logged
unitsale11	sales per employee. log of (2011 sales/2011 employee number)	D2/L2 logged
GM	Gross Margin variable. log of: (Revenue-COGS)/Revenue; GM: Gross Margin; COGS:Cost Of Goods Sold;	N2 combined as costs, D2 as rev.
firm characteristics		
age	established age of the firm, number of years	As measured as 2015 minus establish year (b5)
size	dummy variable of the firm size in terms of how many total employees it has	Using surveys own category, 5-19 employees; 20-99; 100+. question A6
audit	Has outside auditor or not. Theory states that smaller firms are less transparent and less honest, being audit could be an indicator. binary variable	If the firm had any external auditors (k21)
legalstat	Legal status, dummy variable	Registered legal status, using own category of the survey, b1
region	In which region the firm located, dummy variable	From the city question, a2, divided into four groups, middle west. NE, E, Detailed See figure 4.
market characteristics		
comptt	if the firm in a competitive market or not, binary variable	# of competitors in main market, e2b (>50 as competitive, var take value of 1, <50:0)
market	industry sector, heavy/light or services. dummy variable	Industry sector, converted sectors of A4 into 3 types: heavy industry, light industry and service

 # Data source: ES (World Bank 2012) Letter & number labels are the ES survey's question number. Missing ob.'s were dropped
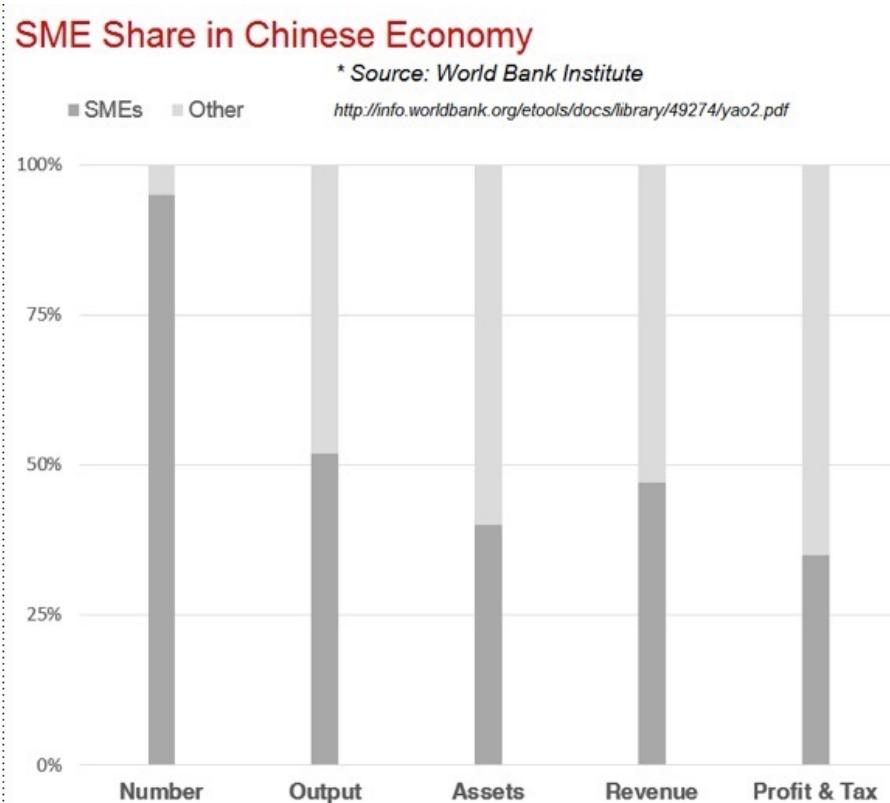
Appendix Table 3: Logistic Regressions with sampling weights.

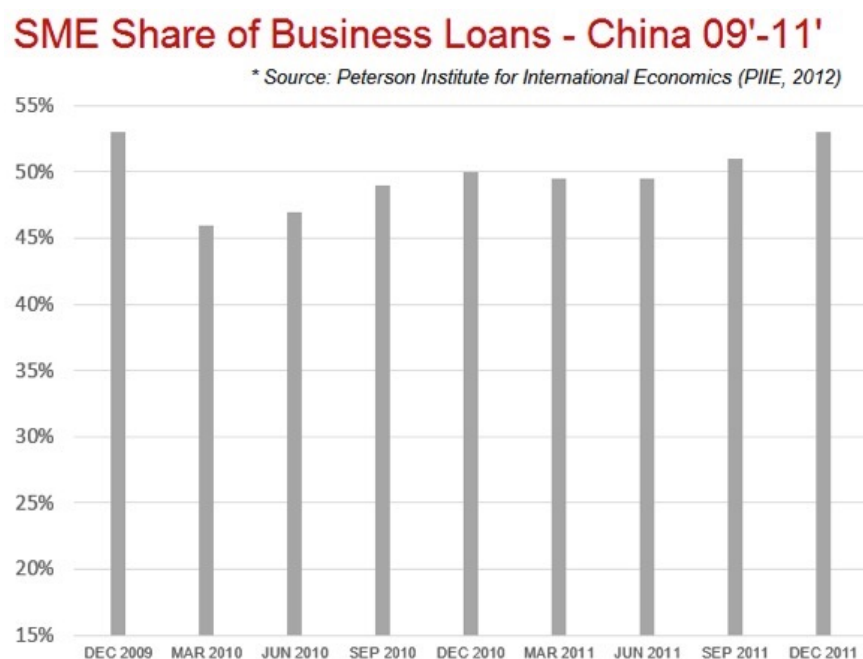|	NEED				APP				RESULT			
	Odds Ratio	Robust Std.	i).	ii).	Odds Ratio	Robust Std.	i).	ii).	Odds Ratio	Robust Std.	i).	ii).
age	0.975	0.020		#	1.009	0.025		#	1.074	0.068		
size1	0.570	0.274		#	0.549	0.371		**	0.471	0.627		
size2	1.048	0.377			1.161	0.575			0.929	0.840		
size3	(omitted)				(omitted)				(omitted)			
audit	0.710	0.216		#	3.915	1.297	*	**	1.244	1.413		
leglstat1	1.448	1.859		#	0.072	0.082	**	*	(omitted)			
leglstat2	2.287	2.708			0.030	0.029	**	*	0.724	1.452		
leglstat3	1.601	1.489			0.153	0.108	**	*	1.486	1.454		
leglstat4	1.092	1.100			0.061	0.053	**	*	(omitted)			
leglstat5	1.062	1.012			0.138	0.111	**	**	(omitted)			
leglstat6	(omitted)				(omitted)				(omitted)			
region1	1.232	0.689		***	1.373	1.246		*	3.901	5.498		
region2	0.841	0.498		#	0.634	0.614		#	5.338	7.720		
region3	1.215	0.901		#	3.730	3.734	#		(omitted)			
region4	(omitted)				(omitted)				(omitted)			
comptt	2.028	3.130			0.353	0.400			0.114	0.156	#	#
market1	1.125	0.411		**	0.769	0.349			0.989	0.906		
market2	(omitted)				(omitted)				(omitted)			
market3	(omitted)				(omitted)				(omitted)			
potencial	0.533	0.681			0.010	0.013	*		0.035	0.109		
salesgrth	1.001	0.001	*	***	1.001	0.001			1.248	1.100		
sales09	1.822	1.120		#	0.699	0.385		*	0.181	0.503		
sales11	0.542	0.354			2.618	1.462	*		8.860	26.781		*
unitsale09	1.206	0.662			1.585	0.827		**	6.576	19.621		
unitsale11	1.015	0.578			0.583	0.306		#	0.293	0.793		
GM	0.946	0.189			0.554	0.131	**	*	0.348	0.301		
_cons	0.537	1.500		*	0.002	0.006	**	*	0.000	0.000		#
# of obs.	781.0000				754.0000				164.0000			
Log pseudo likelihood	-138777.79				-86114.70				-7844.07			
Pseudo R2	0.0499				0.2337				0.1613			

Values are from regressions that with the medium sampling weights. Colums labelled as (i) were significant levels under regressions with sampling weights.

*,**,*** indicates significance at 0.10, 0.05, 0.01 levels respectively. # indicates significance at 0.20 level. Variable definitions see table on data source. Values are odds ratio with robust standard errors obtained from respective three logistic regressions. NEED, APP, RESULT are the binary dependent variables in their own regression.
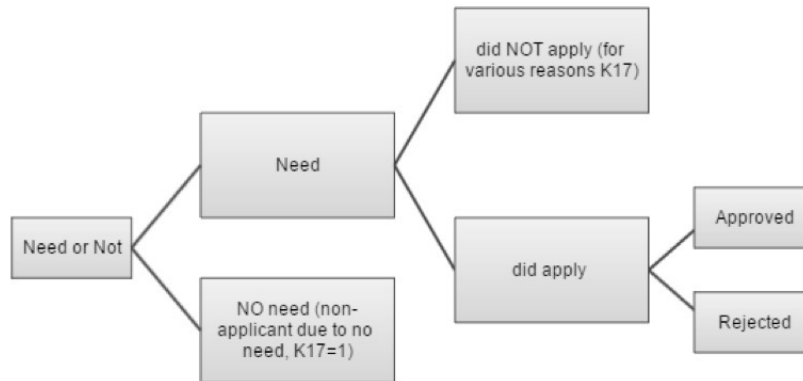
Appendix Figure 1: SME Share in Chinese Economy

SME Share in Chinese Economy

* Source: World Bank Institute
http://info.worldbank.org/etools/docs/library/49274/yao2.pdf

■ SMEs   Other

(Categories: Number, Output, Assets, Revenue, Profit & Tax)

Appendix Figure 2: SME Share of Business Loans - China

SME Share of Business Loans - China 09'-11'

* Source: Peterson Institute for International Economics (PIIE, 2012)

(Time axis: DEC 2009, MAR 2010, JUN 2010, SEP 2010, DEC 2010, MAR 2011, JUN 2011, SEP 2011, DEC 2011)

Appendix Figure 3: Tree of Loan Demand

Firms		Percentages
NEED Variable	NEED vs NO NEED	59,37% to 40,63%
APPLICATION Variable	Applied vs. not	25,86% to 74,14%
RESULT Variable	Granted vs. rejection	94,94% vs 5,06

Appendix Figure 4: Surveyed Cities on Map (left) vs. Economic Sections of China (right)
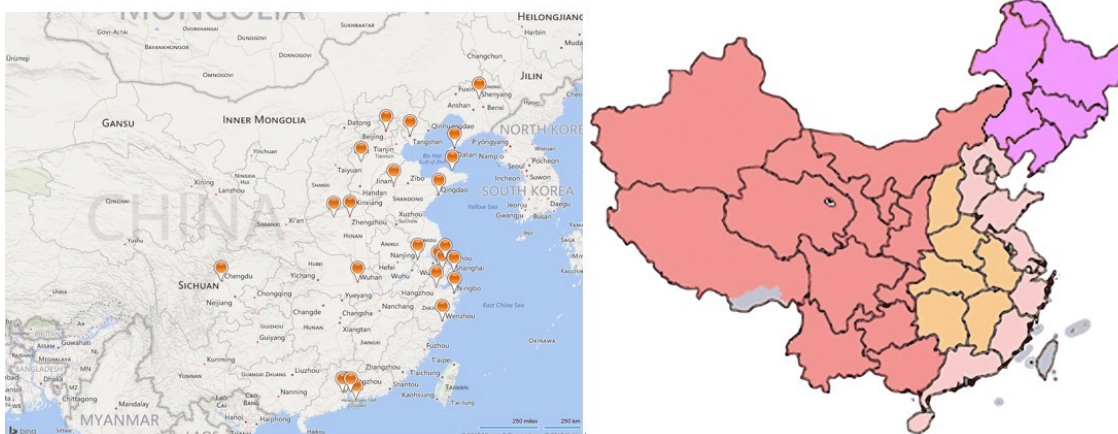
 # Credits: Microsoft Bing, Wikimedia.