



# The Impact of Government-Backed Financing Guarantee Programs on Employment in SMEs: Evidence from China

Shihao Chen<sup>1, a</sup>, Guangwei Liu<sup>2, b</sup> and Mingxin Zhang<sup>3, \*</sup>

<sup>1</sup>School of Finance, Zhejiang Gongshang University, Hangzhou 310018, China

<sup>2</sup>School of Digital Science, Shanghai Lida University, Shanghai 201608, China

<sup>3</sup>Tailong Finance School, Zhejiang Gongshang University, Hangzhou 310018, China

<sup>a</sup>15105874658@163.com; <sup>b</sup>16110680050@fudan.edu.cn; \*sh\_zmx@163.com

**Abstract.** The study investigates the effect of Government-Backed Financing Guarantees (GFGs) on employment within small and medium-sized enterprises (SMEs), drawing on data from the Zhejiang Guarantee Group and non-publicly traded SMEs in China. Results indicate a substantial positive impact of GFG programs on SME employment, with notably pronounced benefits for private firms. Furthermore, the analysis confirms that GFGs bolster employment rates in firms by easing financial constraints and increasing firm revenues.

**Keywords:** Government-Backed Financing Guarantee; Employment; Inclusive Finance.

## 1 Introduction

Financing small and medium-sized enterprises (SMEs) is critical to economic growth, a topic well-documented in the academic discourse [1, 2]. Neumark, Wall, and Zhang (2011) [3] have underscored the essential role of SMEs in driving net job creation. Financial constraints significantly impede SME growth, as Yoshino and Taghizadeh-Hesary (2019) [4] have noted. SMEs encounter considerable obstacles in obtaining credit, largely due to the heightened credit risk perceived by financial institutions [5].

Rectifying information asymmetry is fundamental to enhancing SMEs' credit access and bolstering their credit profiles. Globally, governments have instituted financial guarantee programs in response. Empirical data from the United Kingdom [6] substantiates the efficacy of these programs in diminishing information asymmetry and lessening collateral requirements for SMEs. These policies adeptly manage the loan risk challenges that banks encounter [7].

China's government-backed financing guarantee (GFG) program operates under a market-oriented framework. This scheme facilitates access to bank loans for SMEs with suboptimal credit profiles by providing guarantees. It is imperative to acknowledge that both banks and guarantee agencies undertake comprehensive due diligence before adjudicating SME loan applications.

This study utilizes firm-level data to assess the impact of GFG on employment patterns within SMEs in Zhejiang Province. The results indicate a significant positive effect of GFG programs on SME employment, notably for private firms. Moreover, the analysis confirms that GFGs bolster employment rates in firms by reducing financial constraints and enhancing firm revenues.

## 2 Guaranteed Data and Study Design

### 2.1 Data

The study utilizes GFG data obtained from Zhejiang Guarantee Group Co., Ltd., covering guarantee businesses provided to firms and individuals in various parts of Zhejiang Province (except Ningbo City<sup>1</sup>) from 2015 to 2022. The dataset includes information on guarantee agency, rate, period, customer details, firm's social credit code, industry, financial information, loan provider, amount, proportion, and purpose. This data was matched with the database of National Equities Exchange and Quotations (NEEQ), which is a nationwide SME Share Transfer System.

### 2.2 Empirical Design

In this paper, we utilize a fixed-effect model to assess the influence of GFGs on firm employment. The regression model is as follows:

$$Employment_{it} = \beta_0 + \beta_1 GFG_{it} + \beta_2 Control_{it} + Firm_i + Year_t + \varepsilon_{it} \quad (1)$$

$Employment_{it}$  is the log of firm employment.  $GFG_{it}$  is a dummy variable represents whether the firm is in guarantee period.

This study considers GFG as a short-term mechanism. Specifically, a  $GFG_{it}$  is a dummy variable which was set to 1 during the effective period of the guarantee contract. If the company does not secure a new policy-guaranteed loan in the subsequent year, the  $GFG_{it}$  is set to 0. This design aims to accurately capture the immediate impact of GFGs on the financial position of firms. The contract guarantee period is typically 12 months, with a maximum of 24 months. But firms can apply for continued guarantees after the expiration date.

The guarantee rate ( $GFGfee_{it}$ , %) from the guarantee data is also used as an explanatory variable.  $Firm_i$  and  $Year_t$  represent the firm fixed effect and the year fixed effect, respectively. In this paper, standard errors are clustered at the firm level, and there is also an attempt to cluster standard errors at the city level and the industry level.

In this study, we control for various important characteristics of firms by including variables such as log of paid-in capital ( $Pic_{it}$ ), return on assets ( $Roa_{it}$ ), capital-to-labor ratio ( $C2L_{it}$ ), age of the firm ( $Age_{it}$ ), proportion of firm exports ( $EI_{it}$ ) and the cumulative shareholding ratio of the top five shareholders ( $Top5holders_{it}$ ). Additionally, we consider the financial status of firms by controlling for short-term liquidity (current ratio)

---

<sup>1</sup> Due to Ningbo's independence from other cities in Zhejiang Province and its unique financial and guarantee system, it is not included in the database. Therefore, the absence of the Ningbo sample will not impact the overall study presented in this paper.

( $CR_{it}$ ) and long-term liquidity (equity multiplier) ( $EM_{it}$ ). The data used in this analysis are sourced from the Wind database. Descriptive statistics of the main variables used in the regression analysis can be found in Table 1.

**Table 1.** Descriptive statistics of variables.

Variable	Mean	p50	SD	Min	Max	N
$Employment_{it}$	4.984	4.970	0.944	1.099	8.531	3197
$Revenues_{it}$	9.107	9.155	1.194	1.914	13.38	3197
$GFG_{it}$	0.0770	0	0.266	0	1	3197
$GFGfee_{it}$	0.0590	0	0.223	0	1.500	3197
$Pic_{it}$	8.107	8.132	0.826	6.217	10.03	3197
$CR_{it}$	2.312	1.570	2.280	0.360	14.86	3197
$EM_{it}$	2.292	1.779	1.758	1.012	14.45	3197
$Roa_{it}$	0.0590	0.0550	0.104	-0.292	0.382	3197
$C2L_{it}$	2.433	2.680	1.395	0	5.308	3197
$Age_{it}$	14.36	14	5.735	4	33	3197
$Top5holders_{it}$	85.22	92	19.72	0	100	3197
$El_{it}$	0.0960	0	0.231	0	1.052	3197

Table 1 displays the summary statistics for all variables employed in our analysis, complete with definitions and data sources elucidated in Appendix A. Notably, the values for all unbounded variables have undergone winsorization at the 1st and 99th percentiles to curb the influence of outliers. The sample values exhibit general consistency with those documented in comparable literature. In particular, our sample shows a mean value of 4.984% for the natural logarithm of firm employment and an average of 9.107% for the natural logarithm of firm revenue.

### 3 Empirical Regression Results and Analysis

#### 3.1 Baseline Regression Estimates

Table 2 presents the results of the benchmark regression analysis. Column (1) indicates that firms with access to GFGs experience an average employment growth rate of 0.066%, significantly higher than those without such guarantees. Column (2) reveals a positive association between higher guarantee rates and increased employment rates within firms. While Columns (3) and (4) echo the results of Column (1), the regression coefficient is reduced to 0.047% when standard errors are clustered at the city level. Nevertheless, this reduced coefficient maintains statistical significance at the 90% confidence level.

**Table 2.** Baseline regression results.

	(1)	(2)	(3)	(4)
Dependent variables				
	<i>Employment<sub>it</sub></i>	<i>Employment<sub>it</sub></i>	<i>Employment<sub>it</sub></i>	<i>Employment<sub>it</sub></i>
<i>GFG<sub>it</sub></i>	0.066** (0.031)		0.066** (0.032)	0.047* (0.024)
<i>GFGfee<sub>it</sub></i>		0.069* (0.039)		
Observations	3,157	3,157	3,157	3,009
R-squared	0.936	0.936	0.936	0.937
Control	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Notes: \*\*\*, \*\*, and \* are significant at the 1%, 5%, and 10%, respectively. Robust standard errors of columns (1) and (2) in parentheses are clustered at the firm-level. Robust standard errors of columns (3) in parentheses are clustered at the industry-level. Robust standard errors of columns (4) in parentheses are clustered at the city-level.

### 3.2 Robust Test

**Table 3.** Robust test: PSM method.

	(1)	(2)	(3)	(4)
Dependent variables				
	<i>Employment<sub>it</sub></i>	<i>Employment<sub>it</sub></i>	<i>Employment<sub>it</sub></i>	<i>Employment<sub>it</sub></i>
<i>GFG<sub>it</sub></i>	0.048* (0.027)		0.048 (0.031)	0.048** (0.019)
<i>GFGfee<sub>it</sub></i>		0.043 (0.033)		
Observations	1,954	1,954	1,954	1,954
R-squared	0.942	0.942	0.942	0.942
Control	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Notes: \*\*\*, \*\*, and \* are significant at the 1%, 5%, and 10%, respectively. Robust standard errors of columns (1) and (2) in parentheses are clustered at the firm-level. Robust standard errors of columns (3) in parentheses are clustered at the industry-level. Robust standard errors of columns (4) in parentheses are clustered at the city-level.

In this study, we examine several key variables, namely paid-in capital ( $Pic_{it}$ ), return on assets ( $Roa_{it}$ ), capital-to-labor ratio ( $C2L_{it}$ ), firm age ( $Age_{it}$ ), firm export ratio

( $EL_{it}$ ), cumulative shareholding ratio of the top five shareholders ( $Top5holders_{it}$ ), current ratio ( $CR_{it}$ ), and equity multiplier ( $EM_{it}$ ). These variables are used as covariates in the propensity score matching (PSM) analysis to address the issue of endogeneity in the benchmark regression results. The regression results following PSM are detailed in Table 3.

After implementing the Propensity Score Matching (PSM) method, we observe that the GFG has a positive impact on firm employment. The estimated effect is 0.048%, lower than the initial estimate of 0.06% before PSM, indicating a potential overestimation in the original benchmark regression result.

Given the potential for a bidirectional causal relationship between firm employment rates and GFGs, which could lead to biased regression results, and the possibility that firms might apply for commercial financing guarantees that are unobservable, this paper employs the integration of local guarantee institutions in Zhejiang Province since the establishment of guarantees as an exogenous policy shock for instrumental variable regression. The design of the instrumental variable regression is as follows:

$$grt_{it} = \alpha_1 + \beta_2 IV_{pref, cnty, t} + \beta_3 Control_{it} + Firm_i + Year_t + \varepsilon_{it} \quad (2)$$

$$Employment_{it} = \alpha_2 + \beta_2 \widehat{GFG}_{it} + \beta_3 Control_{it} + Firm_i + Year_t + \varepsilon_{it} \quad (3)$$

The instrumental variable, denoted as  $IV_{pref, cnty, t}$ , is manually collected data on the integration process of Zhejiang Province's guarantees with local guarantee institutions, sourced from the official website of Zhejiang Province's guarantees. The modes of integration typically include capital injections, strategic cooperation, and joint ventures, constituting substantial supportive actions. Cities and districts that have undergone integration are assigned a value of 1, while those that have not are assigned a value of 0. Thus, the first-stage regression constitutes a Difference-in-Differences (DID) approach. The validity of this instrumental variable stems from two main drivers of the integration of local government guarantee institutions by Zhejiang Province's guarantees: negotiations and cooperation between Zhejiang Province's guarantees and local governments, and directives such as the "Notice on Doing a Good Job in the Supervision of Policy Financing Guarantee Institutions"<sup>2</sup> issued by China's Banking and Insurance Regulatory Commission among others. These factors, relative to the corporate behaviors examined in this paper, represent exogenous shocks. The support from provincial guarantees to local entities enhances the scope and capability of local guarantees, thereby increasing the likelihood of local firms receiving guarantee support.

Table 4 presents the results of the instrumental variable regression, with columns (1), (2), and (3) displaying the outcomes of the first-stage regression, second-stage regression, and reduced-form regression, respectively. It is observed that both the instrumental variable and the second-stage regressor's coefficients are significant, with the direction of the coefficients aligning with expectations. The integration of provincial guarantees significantly increases the likelihood of financing guarantees for firms listed on the NEEQ within the region (by approximately 80%). At the same time, GFGs notably enhance firm employment rates. The direction of the coefficients in the reduced-form regression also meets expectations. The coefficients of the second-stage regressor

<sup>2</sup> Notice on Doing a Good Job in the Supervision of Policy Financing Guarantee Institutions. Website: [https://www.gov.cn/zhengce/zhengceku/2020-08/12/content\\_5534333.htm](https://www.gov.cn/zhengce/zhengceku/2020-08/12/content_5534333.htm)

are larger than those of the baseline regression, but their significance is lower than that of the baseline results. The F-value in the first-stage regression, along with the Anderson-Rubin Wald test and the Stock-Wright LM S statistic, significantly reject the null hypothesis of a weak instrumental variable, further validating the reliability of the regression outcomes.

**Table 4.** Robust test: instrumental variable regression.

	(1)	(2)	(3)
Dependent variables	$GFG_{it}$	$Employment_{it}$	$Employment_{it}$
$GFG_{it}$		1.74* (0.037)	
$IV_{pref, cnty, t}$	0.860*** (0.029)		0.056* (0.032)
Observations	3157	3157	3,157
R-squared	0.677	0.1043	0.936
F value	888.16		11.64
Anderson-Rubin Wald test		3.10*	
Stock-Wright LM S statis-		3.24*	
Control	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Notes: \*\*\*, \*\*, and \* are significant at the 1%, 5%, and 10%, respectively. Robust standard errors in parentheses are clustered at the firm-level.

### 3.3 Heterogeneity Test

Private firms exhibit greater vulnerability to credit challenges in comparison to state-owned firms, leading to a predominant reliance on GFGs. Consequently, private firms tend to enhance productivity through job creation rather than production innovation, resulting in a higher volume of employment and an apparent increase in employment rates.

This study assesses the disparate impacts of GFGs on employment growth within firms, stratified by ownership type. The dataset bifurcates entities into private and state-owned for regression analysis. Insights from Table 5, Columns (1) and (2), demonstrate that GFGs significantly enhance employment, with a pronounced effect in private firms. The Fisher combination test [8] is applied to test the statistical significance of the differences in regression coefficients across these segments. However, the variance in coefficients is not statistically significant, suggesting that state-owned firms may equally experience employment growth attributable to GFGs.

**Table 5.** Heterogeneity test.

	(1)	(2)
Firm Heterogeneity	Private Firms	Non-Private
$GFG_{it}$	0.068** (0.032)	0.147 (0.123)
coefficient difference		0.079
Observations	2,923	206
R-squared	0.935	0.968
Control	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes

Notes: \*\*\*, \*\*, and \* are significant at the 1%, 5%, and 10%, respectively. Robust standard errors in parentheses are clustered at the firm-level.

## 4 Mechanism Analysis

External financing constraints substantially affect the magnitude and range of employment across labor markets. Readily available and economically viable external financing allows firms to quickly enhance their production capabilities, thereby boosting labor demand [9].

Amidst cash flow fluctuations, the management of working capital becomes critical, with its effectiveness hinging on the existing levels. Firms must deftly balance the marginal benefits against the costs of maintaining working capital. Sharper financing constraints, which heighten marginal costs, necessitate a more prudent level of working capital to optimize marginal returns. This study scrutinizes the hypothesis that GFGs act as cost-effective external financing conduits, spurring rapid increases in employment and production. The analysis adopts Ding et al.'s (2013) [10] variable-setting methodology and a mediating effect model, with the regression model specified in Equation (4).

$$Employment_{it} = \beta_0 + \beta_1 GFG_{it} \times FC_{it} + \beta_2 Control_{it} + Firm_i + Year_t + \varepsilon_{it} \quad (4)$$

The variable  $FC_{it}$  represents the ratio of working capital to fixed capital for firm  $i$  at time  $t$ . A higher value of  $FC_{it}$  indicates that the firm faces less financial constraint.

Column (1) of Table 6 indicates that firms facing greater financing constraints experience more substantial employment growth with the assistance of GFGs, thereby substantiating the notion that such guarantees can elevate firm employment rates by mitigating financing constraints.

Additionally, government-supported credit guarantee funds are conducive to generating greater economic benefits for businesses [11], which in turn fosters corporate investment and growth, thereby expanding labor demand. Consequently, this paper posits that GFGs can promote employment by increasing firm revenue. As evidenced by Column (2) of Table 5, GFGs significantly boost firm revenues. Hence, it is apparent that policy-driven financial guarantees can enhance employment through revenue augmentation.

**Table 6.** Mechanism analysis.

Dependent variables	(1)	(2)
	<i>Employment<sub>it</sub></i>	<i>Revenues<sub>it</sub></i>
<i>GFG<sub>it</sub> × FC<sub>it</sub></i>	-0.224** (0.095)	
<i>GFG<sub>it</sub></i>	0.077** (0.033)	0.123** (0.056)
<i>FC<sub>it</sub></i>	-0.048 (0.086)	
Observations	3,157	3,157
R-squared	0.937	0.883
Control	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes

Notes: \*\*\*, \*\*, and \* are significant at the 1%, 5%, and 10%, respectively. Robust standard errors in parentheses are clustered at the firm-level.

## 5 Conclusion

This paper offers novel insights into the impact of GFGs on firm employment. Firstly, GFGs have significantly bolstered internal employment within firms, surpassing the average annual growth in employment, particularly for private firms. Secondly, these guarantees support employment by alleviating financial constraints and stimulating revenue growth within firms.

## Reference

1. John Chlid, Joanna Karmowska, Oded Shenkar.: The role of context in SME internationalization – A review. *Journal of World Business* 57 (1), (2022):
2. Wellalage Hewa Nirosha, Fernandez Viviana.: Innovation and SME finance: Evidence from developing countries. *International Review of Financial Analysis* 66 (C), 101370 (2019).
3. Neumark David, Wall Brandon, Zhang Junfu.: Do small businesses create more jobs? New evidence for the United States from the national establishment time series. *Review of Economics and Statistics* 93(1), 16-29 (2011).
4. Yoshino Naoyuki, Taghizadeh-Hesary Farhad.: Optimal credit guarantee ratio for small and medium-sized enterprises financing: Evidence from Asia. *Economic Analysis and Policy* 62 (C), 342-356 (2019).
5. Jeon H J, Sohn S Y.: The risk management for technology credit guarantee fund. *J Oper Res Soc* 59(12), 1624-1632 (2017).
6. Cowling Marc.: The Role of Loan Guarantee Schemes in Alleviating Credit Rationing in the UK. *Journal of Financial Stability* 6(1), 36-44 (2010).
7. Beck Thorsten, Klapper Leora F, Mendoza Juan Carlos.: The typology of partial credit guarantee funds around the world. *Journal of Financial Stability* 6(1), 10-25 (2010).
8. Cleary Sean.: The relationship between firm investment and financial status. *Journal of Finance* 54(2), 673-692 (1999).



9. Marco Pagano, Giovanni Pica.: Finance and Employment, CSEF Working Papers 283, Centre for studies in Economics and Finance (CSEF), University of Naples, Italy (2011).
10. Ding Sai, Guariglia Alessandra, Knight John.: Investment and financing constraints in China: Does working capital management make a difference? *Journal of Banking and Finance* 37(5), 1490-1507 (2013).
11. Jingwen Yang, Zili Tang, Qingcui Yuan, Bing Xu.: The economic and social benefits of the government-backed credit guarantee fund under the condition of an economic downturn. *Technological Forecasting & Social Change* 166, 120632 (2021).

**Open Access** This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

