Do Financial Factors Affect Firms' Employment? Evidence from Chinese Manufacturing Firms

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1. Introduction

There has been a large microeconomic literature that finds evidence that liquidity constraints of various kinds help to explain investment expenditure, controlling, at least partially, for current and expected shifts in product demand (see Gertler and Gilchrist, 1993; Hubbard, 1998; and Bond and Van Reenen, 2007 for surveys). Just like fixed capital investments firms' employment decisions could be influenced by firms' financial positions, since changes in the latter provides incentives to managers to adjust labour costs as well as the investment in human capital. This issue is closely related to the important role played by monetary policy in economic fluctuations in developed and emerging economies in recent years.

This study focuses on the employment behaviour of companies faced with changes in financial conditions associated with tight monetary policy or other factors. We shall investigate a number of issues. First of all, we like to find out whether a firm's employment behaviour is influenced by financial factors at all. What types of financial factors may or may not have any influence on firms' employment? A limited number of studies on this topic suggest that financial pressure may be reflected on firms' employment (e.g. Nickell and Nicolitsas, 1999). Second, we will further investigate whether the employment of different type of firms may be affected differently by financial factors. Sharpe (1994) finds the employment growth of highly leveraged firms exhibits stronger cyclical fluctuations. This gives us motivation to partition firms into different groups and carry out some comparison. However, our focus of firm heterogeneity is on firm's ownership and locations, which will enable us to avoid imposing *a priori* criteria for classifying firms into groups associated with their financial health. Third, if financial factors do play a role in determining firm's employment, we are interested to see whether employment responds to changes of firm's financial conditions in the same way as fixed capital investment.

We use a panel of about 20,000 Chinese firms covering the period of 2000-2005. To this end this study will contribute to the literature in a number of aspects. It will enrich the literature on the relationship between firm's employment and financial factors, which is relatively thin and limited. Surprisingly there has been little research directly studying this relationship to economies such as the US or the UK, and virtually none in the context on any developing economies. To the best of our knowledge, this is also the first research applying such a large panel data to study this topic. We find significant financial effects on firms' employment on some types of firms, and these effects are opposite to the financial effects on firms' fixed capital investment and also in contrast to the findings for the UK companies by Nickell and Nicolitsas (1999), which finds positive effect of financial factor on employment.

In order to address our research questions, we first discuss briefly the theoretical background in section 2, and then introduce our theoretical and empirical models in section 3. We describe our data and summarise some intuitive features of our sample in section 4. Section 5 shows our regression results and analyses them. Section 6 concludes and discusses some policy implications.

2. Theoretical Background

Information asymmetries between lenders and borrowers induce a wedge between the cost of internal funds (such as firms' own cash flow) and external funds (such as equities and bank loans). Firms' managers can only be imperfectly monitored by investors, thus investors must be compensated by a higher rate of return for the possibility that the manager is not maximising the shareholders' interests. This is obvious in the case of unsecured external financing, for example, loans made based on the lender's judgement of the borrower's credit worthiness and future income prospects. It is also clear that even securely collateralised external borrowings are likely to be more expensive than internally generated funds, because evaluating the collaterals and monitoring the position of the loans will incur extra costs on the lender. Besides, bankruptcy and liquidation are costly to lenders. These factors raise the direct cost of borrowing and make the lenders require a further premium for the return from the loan. As a consequence, firms' investment activities are adversely affected by the rise in borrowing costs. The impacts will be particularly significant for those firms which have unfavourable conditions in the market, such as small and lacking of proof of their own credit worthiness, and highly indebted. An increased availability of internal funds lowers the costs of capital and therefore will have impact on the real economic decisions by allowing more investment than would be if managers used external finance. Many researchers have found evidence to support this hypothesis for fixed capital investment (e.g. Fazzari, Hubbard and Petersen, 1988; Bond and Meghir, 1994), and a limited number of papers have found similar effects on firms' investment in employment. For example, Sharpe (1994) finds that highly leveraged firms exhibit more employment responsiveness over the business cycles, while Cantor (1990) finds that both employment and capital investment are more volatile at more highly leveraged firms.

This argument gives rise to the implications for the relative responsiveness of different types of firms to fluctuations in their financial positions. Financially constrained firms may have more volatile capital investment, inventory and employment patterns. In the event of negative demand shocks, such as an economic downturn, firms must find extra funds to finance their variable inputs. A firm in a healthy financial position may have adequate internal cash flow or ready access to external funds, to smooth production by adjusting their inventory stock and avoid the large adjustment costs associated with firing employees (Heisz & LaRochelle-Côté, 2004). When hit by a demand shock, a drop in sales may lead firms to cut back investment and reduce inventories, even though they may have some offsetting effects from a lowered interest payment or other expenses, which is the typical monetary policy during an economic downturn. Similar to fixed capital investment if a firm has difficulty in raising external funds, its employment and inventories should be more

sensitive to the availability of internal funds. Constrained firms may tend to keep a high level of cash flow to meet their interest payment, and as a cushion to finance their investments and pay their employees' wages. When the debt position and liquidity worsen and the hazard of bankruptcy looms, firm managers may not only suspend investment on various kinds but probably also devote more efforts to reduce costs and raise efficiency.

Our investigation here is concerned with the response of employment to the changes of a firm's financial position. When borrowing costs rise, existing interest payments rise, cash flow decreases, or firms' net worth shrinks, firm's investments of all kinds may be reduced, including the hiring of new employees. A lower level of employment for the firm may also reduce its potential costs of bankruptcy, as employees may be entitled to various forms of compensation for redundancy. Our main aim is to investigate the direct impact of financial factors on firms' employment decisions controlling for the effects of actual or expected changes in product demand. This study is motivated by Sharpe (1994) and Nickell and Nicolitsas (1999). The former examines the cyclicality of the employment of highly leveraged firms caused by imperfections of capital market. The latter explores the employment, wages and productivity behaviour of firms following a *ceteris paribus* increase in financial pressure, which is more directly related to our work.

3. Empirical Methodology

3.1 Theoretical Framework

Following Nickell and Nicolitsas (1999) the empirical employment model that we estimate can be derived from a basic production function for firm *i*

$$Y_i = A_i f(N_i, K_i)$$

where *Y* is the output, *N* the number of employees, *K* firm's capital stock and *A* production efficiency (technology). If we assume imperfect competition in the market and ignore financial factors, the equilibrium level of employment can be expressed as

$$Y_i = A_i f(N_i, K_i) = W_i(1+t)/P_i \quad _i$$

where W_i is the wage expense of firm *i*, which we assume is determined prior to hiring, *t* the payroll tax rate, P_i the price of output goods, and $\square_i = 1 - \sigma^{-1}$, where σ is a demand elasticity. The right hand side of the equation may vary systematically over business cycles due to the influence of φ_i. Therefore, we can expect the equation to be influenced by current and future expected demand. The equilibrium employment n_{it} can then be rewritten in a log-linear form

$$n_{it} = \alpha_0 + \alpha_1 k_{it} + \alpha_2 (w_{it} - p_{it}) + \alpha_3 d_{it} + \gamma_i + \gamma_t \qquad (1)$$

where n_{it}, k_{it}, w_{it}, p_{it} are the logarithms of the number of employees, capital stock, wages and price respectively, and d_{it} is a demand effect associated with φ_i for firm *i* at

time *t*. γ_i is a firm specific effect controlling for individual firm's characteristics which are invariant over time, such as efficiency. γ_t is a time effect capturing all the factors common to all firms, such as business cycles and the payroll tax rate.

By a standard quadratic adjustment cost model, we may expect that the actual current employment is determined by previous employment and the current expectation of future equilibrium employment. To specify an observable model of employment, we need to define the stochastic processes of all the (time-variant) variables in equation (1). Assuming we have the following simple autoregressive AR(1) processes

$$
\begin{aligned}
& k_{it} = a_{0i} + k_{i,t-1} + \varepsilon_{1it} \\
& w_{it} - p_{it} = b_{0i} + b_1(w_{i,t-1} - p_{i,t-1}) + \varepsilon_{2it} \qquad \text{where } \varepsilon_{1it}, \varepsilon_{2it}, \varepsilon_{3it}, \varepsilon_{4it} \sim iid \\
& d_{it} = c_{0i} + c_1 d_{i,t-1} + \varepsilon_{3it} \\
& \gamma_t = \gamma_{i,t-1} + \varepsilon_{4it}
\end{aligned}
$$

a reduced form employment equation based on eq. (1) takes the following form

$$n_{it} = \beta_0 + \beta_1 n_{i,t-1} + v_1 k_{it} + v_2(w_{it} - p_{it}) + v_3 d_{it} + v_i + v_t + \varepsilon_{it} \qquad (2)$$

where the *v* parameters include the parameters set out for the *k*, *w-p*, and *d* processes above. Then we can augment financial factors f_{it} into the equation to investigate the possibility of their impacts on firm's employment.

$$n_{it} = \beta_0 + \beta_1 n_{i,t-1} + v_1 k_{it} + v_2(w_{it} - p_{it}) + v_3 d_{it} + v_4 f_{it} + v_i + v_t + \varepsilon_{it} \qquad (3)$$

This equation may be generalised, since the processes generating *k*, *w-p* and *d* may be more complex than the simple AR(1) models, which makes it necessary to consider more lags in the equations for these variables. Employment may also depend on the changes in demand as well as levels of demand. Moreover, in reality the quadratic adjustment cost assumption may not hold. Thus, eq. (3) might be generalised as follows

$$
\begin{aligned}
n_{it} = {} & \beta_0 + \beta_1 n_{i,t-1} + v_1 k_{it} + \sum_{j=0}^{1} v_{2j}(w_{i,t-j} - p_{i,t-j}) + v_2' E_t(w_{it+1} - p_{it+1}) \\
& + \sum_{j=0}^{1} v_{3j} d_{i,t-j} + v_3' E_t d_{i,t+1} + v_4 f_{it} + v_i + v_t + \varepsilon_{it}
\end{aligned} \qquad (4)
$$

where E_t denotes the expectation operator at time *t*. In practice when we use published firm level information on the future values of some of the variables, we effectively take the leads of these variables.

The financial factors that appear in our models are intended to capture the premium on borrowing costs or firms' financial positions. We apply a variety of financial variables, including firm's cash flow normalised by capital stock, leverage (firm's total liabilities to total assets ratio), interest coverage ratio (cash flow to the sum of cash flow and interest payment), borrowing ratio (interest payment over cash flow), interest burden (interest payment to total liabilities ratio) and collateral (firm's total

fixed assets to total assets ratio). Interest rate changes are crucial to the cost of a firm, which also suggests using flow variables will be suitable. These financial variables we use can capture the effects of interest payment change as well as more directly measure a firm's net worthiness. Including these financial variables in our employment regressions is aimed at showing whether financial factors add any explanatory power to the standard employment equations. The interest payment related variables also directly show the effects of monetary policy on firms' employment decisions.

3.2 Empirical Models

In this employment model, the firm-specific variables, including financial variables, will have some endogeneity problems, as they are likely to be influenced by employment, wage and demand shocks. We apply the following regression model generated from eq. (4). We use firm's real sales to approximate output, which are included to control demand.

$$n_{it} = n_{i,t-1} + k_{it} + w_{i,t+1} + \Delta w_{it} + w_{i,t-1} + s_{i,t+1} + s_{it} + s_{i,t-1} + f_{it} + v_i + v_t + \varepsilon_{it} \qquad (5)$$

The lead variables of wages and sales are included to control for future expectations. To overcome the endogeneity problem we instrument the regresors in eq. (5) with deeper lags on employment, sales, wages, wage growth, capital stock and the financial variables. We also use year dummies and firm dummies in our regression equations as well as in instrument sets to control for time effects and firm specific fixed effects.

To further investigate whether the employment decisions of any particular types of firms are influenced by financial factors, we split our sample firms according to their ownership types and geographical locations. Ownership differences provide very different incentives to the firm managers. Besides, different ownership may also be associated with significantly different benefits and pension schemes to the workers, which are directly related to firm's labour costs, and different employment flexibility, i.e. restrictions on hiring and firing workers. Since we use a large panel of Chinese firm data it is worthwhile to look at the geographical differences across firms. Regional differences are highly important in China. Firms located in different areas may receive distinctive policy treatments from central and local governments, including labour regulations. For example, the minimum wages vary across the Chinese provinces. Therefore, we define dummy variables to indicate firms' ownership types and locations, and interact them with financial variables in eq. (5).

3.3 Estimation Methods

All the equations are estimated by system generalised method of moments (GMM) approach developed by Arellano and Bond (1991) and Blundell and Bond (1998). It controls for firm specific fixed effects and possible endogenous regressors simultaneously, and is superior to the first-differenced GMM in terms of reducing finite sample bias and root mean squared error (Blundell and Bond, 1998, and Blundell, Bond and Windmeijer, 2000). The validity of this method depends on the absence of second-order serial correlation in the first-difference residuals, which can be tested by *m2* statistics. We use two and/or three lags of each of the regressors as

the instruments, of which the appropriateness can be tested by Hansen/Sargan statistics (or *J* statistics).

4. Data and Summary Statistics

Our data source is the published annual accounting reports from the ORIANA database, collected and managed by the Bureau Van Dijk Electronic Publishing (BvDEP). It contains balance sheet, and profit and loss information for 23,865 Chinese firms, over the period 1998-2005. The information in 1998 and 1999 is rather limited and since we take lags and leads of our variables, effectively we end up with observations ranging from 2001 to 2004. We only keep the manufacturing and unlisted firms in our sample. Manufacturing firms make up the majority of our sample (20,460; 85.7%). To let our work be comparable with most of the literature, we limit our focus on the manufacturing sector only. Listed firms only make a minor part of our data (6.5%) and most of them have significant numbers of missing values in our key variables. Besides, the ownership information for these firms is unavailable. Finally, to control for the potential bias caused by outliers we eliminate observations in the one percent tails for each of our regression variables. Excluding the observations with missing values, our final dataset is an unbalanced panel, contains 16,294 unlisted firms operating in the manufacturing sector in the entire economy, and correspondents to 28,839 firm-year observations. The maximum number of observations is 8089 in year 2004, and the minimum under 5663 in 2001. 2002 and 2003 have 7344 and 7743 observations respectively. Detailed definitions of all the variables may be found in the data appendix.

Ownership information comes from China's National Bureau of Statistics, which provides a continuous measure of ownership composition. It measures the fraction of paid-in-capital contributed by six categories of investors, namely the state, foreign investors, Hong Kong, Macao and Taiwan investors, corporate and legal entities, individual and collective investors. Because our data has some miscoding problems and also for our research purposes, we combine the foreign investors, and Hong Kong, Macao and Taiwan investor together and rename the group as foreign firms. This is reasonable since China's legal environment treats these two categories of firms in almost the same way, but distinctively from domestic firms. We also join the firms owned by corporate and legal entities, and individuals together and define them as private firms, again due to the economic and legal similarities between these two groups. Finally, following (Guariglia, Liu and Song, 2008, update) we use a firm's largest average ownership share of paid-in-capital by investors over the period of 2000-2005 to classify out sample firms into state owned, foreign, collective and private four ownership groups.

We also classify our firms into three regional groups, namely east, central and west[1], according to which province the firm is located.

1 We define the East region to include the following 11 provinces and municipalities: Beijing, Fujian, Guangdong, Hainan, Hebei, Jiangsu, Liaoning, Shandong, Shanghai, Tianjin and Zhejiang. The Central region includes the following 8 provinces: Anhui, Heilongjiang, Henan, Hubei, Hunan, Jiangxi, Jilin and Shanxi. The Western region includes the following 12 provinces and municipalities: Chongqing,

Tables 1a and 1b show some descriptive statistics of our sample firms. There are totally 28,839 observations remaining in the sample when the outliers of all the regression variables and the firm-years with missing values are dropped. More than three quarters of our sample firm-years are located in the eastern part of the country, and about 9.9% and 12.3% of firm-years are in the central and western areas respectively. On average our sample firm-years have about 981 employees. Measured by either number of employees or total assets firms in the central region are much larger than firms in the west and east. Consequently it is not surprising that central firms bear with the highest wage bills. However, the eastern firms are able to generate sales nearly as high as firms in the central despite the fact that they are the smallest in size on average, which may indicate that firms in the eastern region are the most efficient. This is confirmed by the figures showing that firms located in the east have distinctively higher mean values of return on assets, return on sales and labour productivity than firms in the central and western areas. These findings may suggest that regional effects may play a significant role in determining firms' behaviour in our sample. The financial variables also show notable differences across regions. Companies operating in eastern regions tend to keep a much higher level of cash flow, but lower leverage, borrowing ratio, interest burden and collateral than their central and western counterparts, which may indicate they less rely on debt. The firms in central regions have higher levels of cash flow than the firms in western regions, highest leverage, borrowing ratio, interest burden and collateral, but a lower coverage ratio than firms in both east and west. The firms in the west have the lowest cash flow and medium mean values of all other financial indicators.

When we distinguish the sample firm-years according to their ownership types, we find that more than one third of the firm-years are foreign owned, about 46.9% are private, and around 11.5% and 6.5% firm-years are controlled by the state and collectives respectively. It is obvious that state owned enterprises (SOE) are much larger than foreign, collective or private firms in terms of number of employees or total assets. The latter three types of firms have similar number of employees, but the collective firm-years have a substantially lower level of total assets, which may imply that collective firms in the sample are relatively the most labour-intensive. Indeed, SOEs have the highest capital-labour ratio, the collective firms have the lowest, and foreign and private firms have intermediate levels of the ratio. The SOEs have to pay out the highest wage costs, but provide the lowest wage increases on average. Foreign firms pay the second highest wage bill and give the highest wage growth, although their number of employees is the smallest, which may indicate that the labour reward might be the best in foreign owned firms in terms of cash payment. Private firm-years have lower wage expenses and growth than foreign firms, but higher than collective firms. The SOEs produce the highest sales but seem to be the least productive firms since their return on assets, return on sales and labour productivity are substantially lower than those of other three types of firms. Collective firms have the highest return on assets, while foreign firms have the highest return on sales and labour productivity.

The SOEs in our sample maintain a much lower level of cash flow than other firms, less than 40% of foreign and collective firms and less than half of private ones. This is

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Gansu, Guangxi, Guizhou, Inner Mongolia, Ningxia, Qinghai, Shaanxi, Sichuan, Tibet, Xinjiang, and Yunnan.

consistent with the hypothesis that firms which are able to raise external borrowing easily do not need to keep much internal funds, but it might be also a reflection of their low profitability. SOEs are traditionally believed to be financially unconstrained. In fact, those SOEs do have the highest leverage and borrowing ratio but the lowest interest coverage ratio during our sample period. Coverage ratio is the highest in foreign firms. Interest burden is heavier among collective and private firms than among state and foreign firms. Collateral is the highest in SOEs and similar in other firms, which may enable the SOEs to secure more borrowing than others.

Table 2 gives us a further picture of the distribution of our sample firms. In the eastern region of the country our sample firms are dominated by foreign and private firms equally. In the central and western parts private firms take up the largest proportion (56% and 59% respectively), followed by SOEs (25% and 28% respectively), and the foreign and collective firms only have much smaller shares in either areas.

5. Results

5.1 Baseline Specification

We begin with estimation results of eq. (5) which are reported in Table 3. The idea of augmenting our empirical employment model with six different financial indicators is to examine the response of firm's employment decisions in response to changes in financial effects, controlling for existing and expected demand, and also to find out what types of financial factors can affect firms' employment. Particularly the borrowing ratio and interest burden will have implications on the transmission channel of monetary policy (e.g. Nickell and Nicolitsas, 1999). Our models capture the employment dynamics very well. Lagged employment, current capital stock, the lead of wages, current wage growth and future sales are highly significant in explaining firm's employment in all six specifications. Among them, except for the lead of sales, all other variables have positive effects in determining firm's employment, which is as expected. Considering together the negative effects of firm's future sales, positive effects of current sales and completely insignificant effects of past sales on the employment of our sample firms, we may infer that these firms view the current high levels of demand as the reason to increase their current employment, but respond to expected future high levels of sales by reducing current employment. This may be because they want to cut their current labour costs in order to finance their future labour needs. These results are in contrast to the findings in Nickell and Nicolitsas (1999), which shows positive future sales effects on employment from a panel of UK manufacturing firm data.

Among the financial variables only the coverage ratio plays a negative and significant role in our employment model. It has a coefficient of -0.514, which is large in magnitude and may imply that in general when firms' interest coverage improves by one percent, the firms tends to cut down their number of employees by about 0.5 percentage point. This result is opposite to the findings in the fixed capital or inventory investment and financial constraints literature, which mainly finds positive relationship between firm's investment and financial variables, such as coverage ratio (e.g. Guariglia and Mateut, 2006; Carpenter, Fazzari and Petersen, 1998). The

coverage ratio is often used as an alternative measure of financial indicator to cash flow. In fact, in our results cash flow variable also shows negative but insignificant signs. Our results may indicate that in response to financial factor changes firms make hiring or firing employee decisions very differently from adjusting their fixed capital investment. If firms are financially constrained, they may respond to an improvement in their financial position, such as increase in cash flow or coverage ratio, by increasing their capital investment, but they may also respond to the same changes by reducing their labour investment. *J* and *m2* tests in Table 3 show that our models do not suffer from gross misspecification and our instrument sets are valid. Overall, results from five out of our six equations suggest that our sample firms' employment decisions are not significantly influenced by financial factors.

5.2 Ownership Effects on Firms' Employment

We then try to find out whether the employment of any particular ownership type of these sample firm-years are sensitive to changes in financial factors. Table 4 presents the results of an extended model where we interact four types of ownership dummies with our six financial variables. All six equations pass the *J* and *m2* tests. We define variables SOE_{it}, $Foreign_{it}$, $Collective_{it}$ and $Private_{it}$ equal to one if the largest average ownership share in a firm over the years 2000-2005 is state, foreign, collective and private respectively, and zero otherwise. Again those non-financial variables, employment, capital, wage, wage growth, and sales are highly important determinants of firm's current employment. Some interesting results emerge. When we compare our results by columns, it appears that interest burden does not play a significant role for any ownership types of our sample firms, and all other five financial variables have some influences to one or two types of firms. This may suggest that financial factors are important to firms with certain types of owners, although such effects are not observable in general. When we compare the results in Table 4 by rows, it seems SOEs' employment decisions are not influenced by any financial ratios that we apply, but other three types of firms' employment responses to changes in one or more kinds of financial indicators. More specifically, foreign owned firms have negative sensitivity of employment to cash flow and leverage; collective firms' employment is positively affected by their leverage; and private firms' employment also responds positively to their cash flow, coverage ratio, borrowing ratio and collateral.

In China state companies are important means for the government to maintain the employment level in the economy, and therefore the employment regulation does not give them with much hiring and firing flexibility. Also traditionally state companies are not strongly subject to financial constraints. Due to both reasons it is expected that employment of SOEs does not fluctuate with changes in their financial conditions. To attract foreign investments and encourage economic development, foreign, collective and private firms are given much more flexibility in their employment. These firms are known to have many temporary/casual and short-term contracted workers. Besides, they are found by some authors to be financially constrained (e.g. Chow and Fung, 1998; Héricourt and Poncet, 2007). Thus, it is also not surprising to find these firms to react to financial changes by adjusting their numbers of employees. Especially the private firms' employment is very much constrained by financial factors. When their financial position strengthens, they are then able to increase their employment to expand production capacity.

5.3 Regional Effects on Firms' Employment

Next we separate our sample firm-years into three regional groups. The regional heterogeneity has been found to be important in many aspects of the Chinese economy, such as economic institutions (e.g. Du, Lu and Tao, 2008), foreign direct investment (e.g. Yu, Tan and Xin, 2008), firm performance (e.g. Weiss, 2008), and etc. Table 5 shows the results of the models with interactions between financial variables and regional dummies. None of the specifications have second-order serial correlation problem and all the instrument sets are valid. Same as before, non-financial variables including lagged employment, capital stock, leaded wage, wage growth, and leaded and current sales are highly significant in determining firm's employment. Financial variables do not seem to have much effect on firms in different regional groups. The employment of firms in the western region is not influenced by any of our six measures of financial factors. Central firms' employment responds to the interest burden they face. When the ratio increases by one percent, which means the firm's financial position is worse off, central firms will strongly increase their employment by 9 percent. Eastern firms respond to increases in coverage ratio and collateral, which indicates improvement in the firm's financial position, by significantly reducing their employment.

5.4 Robustness Check

We check the robustness of our results by adding industry and time interacted dummies, and excluding the distressed firms, which have negative cash flow. Our results remain to be similar. Table 6 and 7 report the results of robustness check for the full sample of firm-years by the two methods respectively. When we add the industry and year interacted dummies to both regression equations and instrument sets, the magnitude and significance of the results as shown in Table 6 are very similar to those in Table 3. Particularly, cash flow, coverage ratio and collateral have negative coefficients, but only coverage ratio is significant, and leverage, borrowing ratio and interest burden have positive but insignificant effects.

Distressed firms which have negative cash flow may behave rather differently from firms in good shape, as their sole purpose of operation may be generating as much cash flow as possible by cutting costs and improving efficiency to keep the firm alive. Hence, their employment may not be as responsive to changes in financial factors as un-distressed firms. Allayannis and Mozumdar (2004) use negative cash flow observations to approximate the distressed firms and find that these firms exhibit lower sensitivity of cash flow to fixed investment than non-distressed firms. When we only keep those firms with positive cash flow, the numbers of observations in the sample are roughly reduced by 4000 to 4500 in each regression, and the results as presented in Table 7 again are not altered much.

We also run the three kinds of robustness tests for our sample splitting regressions as in Table 4 and 5, and obtain similar results as well. However, for the concision of the paper we do not report the large amount of figures here.

6. Further Analyses on Private Firms

We have found some statistically and economically significant financial effects on private firms' employment decisions. The private firms do not enjoy the state support or preferential policies as their state and foreign counterparts do. They operate in a more free-market-like environment and are disadvantaged. Therefore, it is interesting to further investigate employment behaviours of particular types of private firms facing financial pressure.

6.1 Size Effects

Firm size has been well documented by a large body of literature to have an effect on firms' borrowing costs due to the fact that small firms suffer more information asymmetry problem than large ones (e.g. Carpenter, Fazzari, and Petersen, 1994). However, Chow and Fung (1998) found that small manufacturing firms in Shanghai are less liquidity-constrained than their larger counterparts in financing their fixed investment. Thus, it is interesting to compare how small versus large firms make employment decisions in response to the influence of financial factors.

Table 8a gives some descriptive statistics on the firms with annual sales less or more than 300 million yuan, which is the official benchmark used by China's National Bureau of Statistics (NBS) to define medium and small enterprises, and large firms. Firm-years below this benchmark take up to about 80% of our sample. They are much smaller in terms of employee number, total assets and sales. Their average wage cost is about a third of that of large firms, but the wage growth is almost the same. They are also less profitable and less productive than the large ones. Small firms have lower cash flow-capital ratio, leverage and coverage ratio, higher borrowing ratio and collateral, and same interest burden as the large firm-years. It seems that small firm years in our sample on average do not have a particularly worse financial position than large ones. Estimation results in Table 9 show that actually small firms' employment is less subject to financial factor influence. Large firm-years attract significant and negative coefficients from coverage ratio, borrowing ratio and collateral. Small firm years only have significant effects from collateral, and the magnitude of the coefficient is smaller than the coefficient on large firms, taking the standard error into account. The negative sign of the coefficients on collateral is consistent with the capital-labour substitution effect which has been verified by the relevant literature (e.g. Chirinko, Fazzari and Meyer, 2004). When our sample firms increase their collateral, they have to reduce they labour cost accordingly. Non-financial variables still perform well and both *J* and *m2* tests confirm the appropriateness of our model.

The above results for our private firm sample are robust to alternative measurement. When we use firms' total assets to measure size and define the top 20% as large firms and bottom 80% as small firms, as in line with Table 9, the results remain similar.

6.2 Industrial Types

We suspect that among these private manufacturing firms whether they are in a labour-intensive or capital-intensive industry would matter for their employment decisions. In the labour-intensive industries investment in labour may be more important, whereas in the capital-intensive industries investment in fixed assets ought

to be more crucial for firms' performance. Hence, we expect that employment of the firms in the labour-intensive industries may be more sensitive to financial factors than that of firms in capital-intensive industries should financial factors exert influence on firms at all. Table 8a also presents the descriptive statistics for firms in labour-intensive industries against those in capital-intensive industries. Four-digit industry information is provided by the NBS of China. In our private firm sample labour intensive firm years are marginally more than half, 6918 out of 12,956 observations. On average, they are smaller and less productive than capital intensive firms, but their wage growth is higher. Their cash position is not as good as capital intensive firms, as they have lower cash flow-capital ratio and coverage ratio. They are more heavily in debt too, as their leverage, borrowing ratio and interest burden are higher. Their collateral is more than the capital intensive firms.

Regression results in Table 10 suggest that our labour intensive firm years do respond to changes in financial factors by adjusting their employment. When their cash flow increases, leverage decreases, or collateral decreases, they would increase employment. Such financial effect is not observable for firms in capital intensive industries. The results make sense and may suggest that the employment of firms in labour intensive industries are credit constrained, since their employment decisions are significantly dependent on their availability of cash flow, and the reduction in their leverage and collateral.

6.3 State or Foreign Shares

We also explore whether a considerable state or foreign stake in the company would exert an influence on the relationship between the employment of private firms and financial factors. Descriptive statistics in Table 8b show some interesting and obvious difference between firms with 25% or more state or foreign shares and firms without. About 5% and 10% of our private sample firm years have more than 25% of state and foreign shares in their company respectively. Private firms with large state shares are much bigger than others in terms of employ number and total assets, and to a less extent, total sales. Their wages growth and return on assets, however, are the lowest. Private firms with a big chunk foreign shares display the best profitability and productivity, whereas the other two groups of firm years has similar and lower return on sales and labour productivity. Firm years with state shares also have the highest leverage, borrowing ratio and collateral, and lowest cash flow-capital ratio and coverage ratio. Firm years with foreign shares have the opposite, i.e. the lowest figures in the former groups of financial variables and the highest in the latter group. The rest of the firm years group has the intermediate number of all these ratios. Interest burden are almost identical across all three groups. It seems that those private firms with a big state stake have much common feature as the SOEs and those with a big foreign stake look more like foreign firms as we discussed in section 5.2 above.

Estimation results in Table 11 gives interesting suggestions. Those private firms with 25% or more state share do not significantly adjust their employment in response to changes in their financial position, where as firms with 25% or more foreign shares and the rest of the firms do. In particular, when the borrowing ratio and interest burden increase, firms with foreign shares reduce their employment. When the coverage ratio and collateral increase, firms with neither 25% of state or foreign shares reduces their employee numbers.

Our results may indicate that state ownership helps our sample firms to relive adverse financial influence on their employment decision. Other private firms' employment is more vulnerable to financial constraints. `

7. Conclusion and Policy Implications

We have used a panel of more than 16,000 Chinese unlisted firms over the year 2000-2005 to investigate the impact of changes in companies' financial positions on their employment behaviours. Our sample firms with state ownership do not perform as well as foreign, collective or private firms. The firm-years located in the eastern area of the country generally perform the best relative to those firms in the central and western regions. Applying six financial ratios, i.e. cash flow, leverage, coverage ratio, borrowing ratio, interest burden, and collateral, we find that in general an increase in these variables except coverage ratio do not have much significant effect on our sample firms' employment.

Our results have two main implications. The first one is on the pattern of the influence of financial factors on firms' employment decisions. The financial factors measured by our six indicates, however, do exert an effect on the employment of certain types of firms, including firms with foreign, collective and private ownerships, and firms located in the east and central parts of China. These results are as expected. Non-state firms are more financially constrained than state companies, and their employment are given by the Chinese labour regulations more flexibilities. China's regional development policies also give the firms in eastern areas which is dominated by non-state sectors much more favourable environment, including labour flexibility. The severe competitiveness in the region also results in scarcity of financial resources. Thus, it is sensible to see the employment of these types of firms is affected by their financial conditions. We also find that large private firms' employment are more responsive to changes in financial factors than small private firms. The employment of private firms in the labour intensive industries exhibit higher sensitivity to financial influence then those in the capital intensive industries. More interestingly, the employment of private firms with 25% or more state shares is not affected by their financial position significantly, whereas private firms with 25% or more foreign shares and the rest of the private firms do have to adjust their employment in response to financial influences.

The second important implication is on how the financial variables exert an influence on firm's employment. Our results show that firms' employment react negatively to improvements in their financial positions, which is opposite to the reaction of firms' fixed capital investment to changes in financial conditions. These interest rate related ratios, i.e. coverage ratio, borrowing ratio and interest burden, also suggest that there is a direct impact of interest rate on firms' employment, which represents a significant monetary policy channel. However, such channel is only limited to some non-state firms. This effect is obviously important since employment cut by firms may straight lead to unemployment in the economy. Such interest rate effects on employment can certainly not be ignored. Especially, during an economic downturn when credit are substantially reduced due to the loss of confidence, firms would be more financially

constrained than in a economic boom, which may directly lead to firms' decision of job cut and worsen the unemployment situation in the economy.

Our results also indicate that to improve the overall efficiency and maximise the employment level in the economy Chinese authority may need to relax the labour restrictions on SOEs and the financial constraints on non-SOEs, particularly those large non-state employers in the labour intensive sector. It might be beneficial to the long-term growth of the Chinese economy.
non-SOEs

Data Appendix

The basic data source of the firm level data is the Orianna database. The ownership information is from China's National Bureau of Statistics (NBS), and the deflators are from *China Statistical Yearbooks* (various issues), which are also published by the NBS. We use the provincial capital goods deflator to deflate the capital variable and the provincial gross domestic product (GDP) deflator to deflate other variables. The construction of our variables is as follows

Employment: it is the total number of employees at the balance sheet date of the company.

Capital stock: it is measured by firm's total tangible fixed assets.

Wages: it is firm's total wage expenditure in the accounting year.

Wage growth: it is the annual growth of firm's wage expenditure.

Sales: we use real sales, which is deflated by GDP deflator, as a proxy for output.

Cash flow: = net income + annual depreciation. The regression variable is the cash flow / tangible fixed assets.

Leverage: = total liabilities / total assets

Coverage ratio: = cash flow / (cash flow + interest payment)

Borrowing ratio: = interest payment / cash flow

Interest burden: = interest payment / total liabilities

Collateral: = tangible fixed assets / total assets

Return on assets: = net income / total assets

Return on sales: = net income / sales

Labour productivity: net income / number of employees

We trim the one percent of observations on both tails of distribution to remove outliers from our variables in each regression. Therefore, the numbers of observations and firms are slightly different in every regression.

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Table 1a: Descriptive Statistics

	All firm-years	Firm-years sorted by firm location		
		East region	Central region	West region
emp	980.83 (1067.38)	924.90 (998.53)	1335.56 (1406.79)	1050.16 (1113.90)
w	13.88 (17.25)	13.77 (16.86)	14.88 (18.72)	13.79 (18.39)
Δw	0.250 (0.200)	0.255 (0.201)	0.239 (0.198)	0.231 (0.194)
Real total assets	268.10 (424.67)	251.69 (400.49)	351.38 (547.95)	305.16 (210.84)
Real sales	261.45 (374.98)	267.97 (378.94)	275.13 (391.30)	209.04 (329.36)
ROA	0.056 (0.094)	0.060 (0.099)	0.042 (0.077)	0.036 (0.068)
ROS	0.040 (0.094)	0.042 (0.089)	0.033 (0.090)	0.035 (0.123)
LP	20.580 (65.821)	22.155 (70.233)	16.415 (54.765)	13.936 (39.019)
$CF_{it}/K_{i,t-1}$	0.413 (0.585)	0.447 (0.609)	0.315 (0.507)	0.277 (0.441)
LEV	0.629 (0.259)	0.610 (0.253)	0.698 (0.270)	0.690 (0.268)
COV	0.863 (0.199)	0.877 (0.186)	0.808 (0.233)	0.820 (0.235)
BR	0.250 (0.476)	0.218 (0.431)	0.378 (0.606)	0.355 (0.581)
IB	0.017 (0.019)	0.016 (0.193)	0.021 (0.020)	0.020 (0.018)
COLL	0.365 (0.178)	0.356 (0.177)	0.400 (0.178)	0.397 (0.181)
Number of observations	28839	22454	2849	3536

Notes: The table reports the sample means. Standard deviations are presented in parentheses. The subscript *i* indexes firms, and the subscript *t*, time, where *t*=2001-2004. *emp* represents the logarithm of firm's number of employees; *w*, the logarithm of firm's total wage expenses; *Δw*, firm's wage growth; *ROA*, firm's return of assets (net income/total assets); *ROS*, firm's return on sales (net income/sales); *LP*, labour productivity (net income/number of employees); *CF/K*, firms' cash flow over total fixed tangible assets; *LEV*, firm's leverage (total liabilities/total assets); *COV*, firm's coverage ratio (cash flow/(cash flow + interest payment)); *BR*, borrowing ratio (interest payment/cash flow); *IB*, interest burden (interest payment/total liability); and *COLL*, firm's collateral (tangible fixed assets/total assets) The measure of wages, real assets, real sales is million RMB *yuan* (approximately the exchange rate of USD : RMB = 1:6.8). The East region includes the following 11 provinces and municipalities: Beijing, Fujian, Guangdong, Hainan, Hebei, Jiangsu, Liaoning, Shandong, Shanghai, Tianjin, and Zhejiang. The Central region includes the following 8 provinces: Anhui, Heilongjiang, Henan, Hubei, Hunan, Jiangxi, Jilin and Shanxi. The West region includes the following 12 provinces and municipalities: Chongqing, Gansu, Guangxi, Guizhou, Inner Mongolia, Ningxia, Qinghai, Shaanxi, Sichuan, Tibet, Xinjiang, and Yunnan.

Table 1b: Descriptive Statistics

	Firm-years sorted by firm ownership			
	SOE	Foreign	Collective	Private
emp	1593.26 (1481.21)	894.09 (983.04)	916.15 (978.73)	903.95 (969.87)
w	21.68 (22.11)	15.08 (17.83)	9.579 (10.868)	11.61 (15.28)
Δw	0.191 (0.173)	0.269 (0.206)	0.233 (0.202)	0.254 (0.199)
Real total assets	494.74 (661.26)	243.55 (395.17)	179.84 (326.02)	241.35 (401.14)
Real sales	314.62 (432.32)	279.78 (395.29)	226.28 (334.56)	239.37 (347.05)
ROA	0.021 (0.049)	0.062 (0.101)	0.078 (0.138)	0.056 (0.085)
ROS	0.021 (0.143)	0.045 (0.100)	0.038 (0.064)	0.042 (0.070)
LP	10.033 (34.596)	31.578 (96.444)	14.510 (30.176)	15.545 (39.292)
$CF_{it}/K_{i,t-1}$	0.186 (0.269)	0.499 (0.684)	0.476 (0.682)	0.397 (0.526)
LEV	0.747 (0.272)	0.533 (0.250)	0.648 (0.250)	0.667 (0.239)
COV	0.785 (0.257)	0.942 (0.150)	0.842 (0.206)	0.828 (0.194)
BR	0.443 (0.639)	0.102 (0.313)	0.299 (0.551)	0.304 (0.483)
IB	0.019 (0.016)	0.010 (0.017)	0.022 (0.024)	0.021 (0.020)
COLL	0.412 (0.171)	0.365 (0.184)	0.361 (0.173)	0.353 (0.175)
Number of observations	3257	9949	1846	13276

Notes: Firm's ownership type is determined by firm's largest share which is measured by paid-in-capital. Please see *Notes* to Table 1a.

Table 2: The Number of Firms with Different Ownerships in Different Regions

Number of observations (%)	SOE	Foreign	Collective	Private
East	1578 (7.1%)	9445 (42.7%)	1411 (6.4%)	9671 (43.8%)
Central	704 (25.3%)	254 (9.1%)	257 (9.3%)	1563 (56.3%)
West	975 (28.3%)	250 (7.3%)	178 (5.2%)	2042 (59.3%)

Notes: Please see *Notes* to Table 1a and 1b.

Table 3: The Effects of Financial Factors on Firms' Employment

Dependent Variable: emp_{it}	System GMM					
$emp_{i,t-1}$	0.374*** (0.071)	0.364*** (0.073)	0.410*** (0.071)	0.419*** (0.074)	0.404*** (0.076)	0.461*** (0.061)
k_{it}	0.217*** (0.074)	0.205*** (0.052)	0.214*** (0.059)	0.243*** (0.062)	0.170*** (0.057)	0.271*** (0.081)
$w_{i\,t+1}$	0.194** (0.091)	0.204** (0.090)	0.336*** (0.106)	0.349*** (0.106)	0.297*** (0.093)	0.280*** (0.102)
Δw_{it}	0.193*** (0.066)	0.173** (0.072)	0.156** (0.070)	0.188** (0.074)	0.148** (0.067)	0.094 (0.069)
$w_{i,t-1}$	0.057 (0.094)	0.044 (0.091)	-0.037 (0.098)	-0.064 (0.099)	0.024 (0.094)	-0.057 (0.092)
$S_{i,t+1}$	-0.238* (0.125)	-0.296** (0.135)	-0.373** (0.159)	-0.391*** (0.148)	-0.394*** (0.134)	-0.315** (0.136)
S_{it}	0.197 (0.168)	0.311* (0.168)	0.293 (0.190)	0.196 (0.185)	0.466*** (0.168)	0.346 (0.171)
$S_{i,t-1}$	0.023 (0.140)	-0.039 (0.138)	0.037 (0.149)	0.142 (0.152)	-0.133 (0.145)	-0.088 (0.134)
$CF_{it}/K_{i,t-1}$	-0.061 (0.076)					
LEV_{it}		-0.020 (0.113)				
COV_{it}			-0.514** (0.237)			
BR_{it}				0.093 (0.112)		
IB_{it}					1.428 (2.042)	
$COLL_{it}$						-0.330 (0.296)
Sample size	30855	30764	30767	30697	30635	30917
J (p-value)	0.718	0.803	0.845	0.921	0.464	0.773
m2 (p-value)	0.789	0.797	0.733	0.829	0.878	0.554

Notes: The figures reported in parentheses are asymptotic standard errors. The system GMM results reported are one-step estimates. Time dummies and industry dummies are included in all specifications. Standard errors and test statistics are asymptotically robust to heteroscedasticity. The *J* statistic, or Sargan/Hansen test, is a test of the overidentifying restrictions, asymptotically distributed as chi-square under the null of instrument validity. Here we always report the Hansen statistics. *m2* is a test for second-order serial correlation in the first-difference residuals, asymptotically distributed as standard normal, $N(0,1)$, under the null of no second-order serial correlation. *m2* test also can be used as a further check on the model specification and on the legitimacy of variables dated *t*-2 and/or earlier as instruments. If the instruments are acceptable, the p-values of *J* test and *m2* test should be both greater than 0.05 Instruments are $emp_{it,}$ k_{it}, w_{it}, Δw_{it}, S_{it}, the financial variable in each regression all lagged two or three periods, time dummies, and industry dummies. Please also see *Notes* to Table 1a. ∗, ∗∗, and ∗∗∗ indicate significance at the 10%, 5%, and 1% level respectively.

Table 4: Ownership Effects on the Relationship between Financial Factors and Firm's Employment

Dependent Variable: emp_{it}	$CF_{it}/K_{i,t-1}$	LEV_{it}	COV_{it}	BR_{it}	IB_{it}	$COLL_{it}$
$emp_{i,t-1}$	0.421***	0.461***	0.499***	0.438***	0.715***	0.535***
	(0.064)	(0.056)	(0.056)	(0.066)	(0.156)	(0.052)
k_{it}	0.167***	0.135***	0.093*	0.178***	-0.212	0.110*
	(0.059)	(0.044)	(0.049)	(0.053)	(0.178)	(0.062)
$w_{i\,t+1}$	0.189**	0.215***	0.269***	0.285***	-0.269	0.235***
	(0.079)	(0.077)	(0.086)	(0.087)	(0.372)	(0.083)
Δw_{it}	0.158***	0.100**	0.044	0.153**	0.261**	0.018
	(0.056)	(0.044)	(0.055)	(0.061)	(0.132)	(0.052)
$w_{i,t-1}$	0.114	0.064	0.134	-0.027	0.399	0.049
	(0.078)	(0.076)	(0.081)	(0.097)	(0.351)	(0.077)
$S_{i,t+1}$	-0.167	-0.194*	-0.169	-0.425***	0.402	-0.161
	(0.105)	(0.113)	(0.125)	(0.143)	(0.420)	(0.108)
S_{it}	0.109	0.305**	0.004	0.215	0.070	0.211
	(0.153)	(0.148)	(0.152)	(0.159)	(0.280)	(0.141)
$S_{i,t-1}$	0.010	-0.118	0.079	0.155	-0.131	-0.056
	(0.126)	(0.123)	(0.122)	(0.123)	(0.279)	(0.109)
$f_{it}\times SOE_{it}$	-0.166	0.041	-0.036	0.152	10.584	0.087
	(0.244)	(0.084)	(0.210)	(0.108)	(9.036)	(0.308)
$f_{it}\times Foreign_{it}$	-0.185**	-0.198*	-0.164	-0.138	1.716	-0.305
	(0.079)	(0.111)	(0.197)	(0.257)	(12.143)	(0.232)
$f_{it}\times Collective_{it}$	-0.024	0.258**	0.413	-0.219	13.661	0.455
	(0.138)	(0.129)	(0.257)	(0.221)	(18.265)	(0.315)
$f_{it}\times Private_{it}$	0.181**	0.031	0.466**	0.257*	9.759	0.494**
	(0.090)	(0.090)	(0.213)	(0.141)	(6.312)	(0.228)
Sample size	30855	30764	30767	30697	30635	30917
J (p-value)	0.371	0.251	0.223	0.539	0.758	0.061
m2 (p-value)	0.781	0.419	0.225	0.682	0.952	0.221

Notes: The table reports one-step system GMM results. *f* stands for financial variables which include the 6 ratios shown in the first row of the table. SOE_{it} is a dummy variable equal to 1 if the largest average share measured by paid-in-capital over the period of 2000-2005 of firm *i* is owned by the state at time *t*, and equal to 0 otherwise. Similarly, $Foreign_{it}$ equal to 1 if the largest average share of firm *i* is owned by foreign, Hong Kong, Macao, or Taiwan investors at time *t*, and equal to 0 otherwise. $Collective_{it}$ equal to 1 if the largest average share of firm *i* is owned by collective investors at time *t*, and equal to 0 otherwise. $Private_{it}$ equal to 1 if the largest average share of firm *i* is owned by corporate and legal entities or individual investors at time *t*, and equal to 0 otherwise. Please also see *Notes* to Table 1a and 3.

Table 5: Regional Effects on the Relationship between Financial Factors and Firm's Employment

Dependent Variable: emp_{it}	$CF_{it}/K_{i,t-1}$	LEV_{it}	COV_{it}	BR_{it}	IB_{it}	$COLL_{it}$
$emp_{i,t-1}$	0.468***	0.380***	0.466***	0.475***	0.424***	0.479***
	(0.067)	(0.070)	(0.067)	(0.064)	(0.071)	(0.060)
k_{it}	0.157**	0.187***	0.191***	0.225***	0.151***	0.255***
	(0.067)	(0.051)	(0.059)	(0.063)	(0.053)	(0.082)
$w_{i\,t+1}$	0.110	0.229***	0.398***	0.275**	0.310***	0.300***
	(0.082)	(0.083)	(0.109)	(0.122)	(0.088)	(0.103)
Δw_{it}	0.153***	0.171**	0.175***	0.128**	0.153**	0.133**
	(0.056)	(0.068)	(0.064)	(0.058)	(0.064)	(0.065)
$w_{i,t-1}$	0.129	0.038	-0.035	-0.045	0.036	-0.021
	(0.084)	(0.090)	(0.096)	(0.103)	(0.088)	(0.091)
$S_{i,t+1}$	-0.071	-0.320**	-0.361**	-0.287*	-0.398***	-0.303**
	(0.109)	(0.127)	(0.147)	(0.160)	(0.127)	(0.127)
S_{it}	0.166	0.327**	0.206	0.226	0.488***	0.328
	(0.136)	(0.166)	(0.186)	(0.170)	(0.160)	(0.172)
$S_{i,t-1}$	-0.090	-0.028	0.107	0.030	-0.151	-0.099
	(0.131)	(0.131)	(0.147)	(0.142)	(0.134)	(0.133)
$f_{it}\times East_{it}$	-0.101	-0.033	-0.542**	-0.090	-0.384	-0.553*
	(0.070)	(0.112)	(0.223)	(0.148)	(2.115)	(0.317)
$f_{it}\times Central_{it}$	0.018	0.110	-0.226	0.207	8.973**	-0.540
	(0.134)	(0.123)	(0.279)	(0.176)	(3.906)	(0.531)
$f_{it}\times West_{it}$	0.004	-0.001	-0.116	-0.072	4.246	0.287
	(0.110)	(0.117)	(0.306)	(0.142)	(4.270)	(0.575)
Sample size	30855	30764	30767	30697	30635	30917
J (p-value)	0.183	0.865	0.917	0.259	0.661	0.881
m2 (p-value)	0.397	0.825	0.864	0.583	0.999	0.586

Notes: $East_{it}$ is a dummy variable equal to 1 if firm *i* is located in any of the eastern provinces or municipalities defined in Footnote 1 at time *t*, and equal to 0 otherwise. $Central_{it}$ is a dummy variable equal to 1 if firm *i* is located in any the central provinces at time *t*, and equal to 0 otherwise. $West_{it}$ is a dummy variable equal to 1 if firm *i* is located in any the western provinces or municipality at time *t*, and equal to 0 otherwise. Please also see *Notes* to Table 1a, 3 and 4, and Footnote 1.

Table 6: Robustness Check—Including Industry & Time Dummies Interacted

Dependent Variable: emp_{it}	System GMM					
$emp_{i,t-1}$	0.376*** (0.071)	0.371*** (0.072)	0.416*** (0.070)	0.429*** (0.073)	0.405*** (0.077)	0.464*** (0.062)
k_{it}	0.197*** (0.070)	0.186*** (0.053)	0.204*** (0.058)	0.226*** (0.059)	0.162*** (0.056)	0.260*** (0.079)
$w_{i\,t+1}$	0.178** (0.090)	0.143 (0.108)	0.330*** (0.105)	0.338*** (0.104)	0.290*** (0.093)	0.284*** (0.105)
Δw_{it}	0.191*** (0.065)	0.176** (0.070)	0.151** (0.069)	0.176** (0.072)	0.150** (0.066)	0.088 (0.068)
$w_{i,t-1}$	0.072 (0.094)	0.086 (0.097)	-0.035 (0.099)	-0.058 (0.099)	0.030 (0.095)	-0.063 (0.095)
$S_{i,t+1}$	-0.221* (0.124)	-0.209 (0.160)	-0.370** (0.159)	-0.382*** (0.146)	-0.386*** (0.134)	-0.335** (0.143)
S_{it}	0.220 (0.170)	0.298* (0.175)	0.330* (0.197)	0.248 (0.186)	0.478*** (0.175)	0.414** (0.180)
$S_{i,t-1}$	-0.003 (0.141)	-0.096 (0.147)	0.006 (0.149)	0.095 (0.149)	-0.147 (0.147)	-0.124 (0.133)
$CF_{it}/K_{i,t-1}$	-0.072 (0.075)					
LEV_{it}		0.006 (0.118)				
COV_{it}			-0.528** (0.237)			
BR_{it}				0.107 (0.109)		
IB_{it}					1.708 (2.012)	
$COLL_{it}$						-0.331 (0.297)
Sample size	30855	30764	30767	30697	30635	30917
J (p-value)	0.552	0.452	0.805	0.817	0.340	0.722
m2 (p-value)	0.731	0.523	0.663	0.978	0.817	0.533

Notes: All the regressions are the same as those in Table 3 except including the industry and time interacted dummies, which range from year 2001-2004 and 9 industrial sectors, in both regression equations and instrument sets. Please also see *Notes* to Table 1a and 3.

Table 7: Robustness Check—Un-distressed Firms Only

Dependent Variable: emp_{it}	System GMM					
$emp_{i,t-1}$	0.397*** (0.074)	0.401*** (0.070)	0.376*** (0.072)	0.393*** (0.073)	0.448*** (0.077)	0.468*** (0.065)
k_{it}	0.193*** (0.073)	0.160*** (0.049)	0.161** (0.063)	0.197*** (0.059)	0.158*** (0.054)	0.213*** (0.081)
$w_{i\,t+1}$	0.252** (0.123)	0.240** (0.115)	0.359** (0.146)	0.277** (0.132)	0.282** (0.114)	0.313** (0.123)
Δw_{it}	0.192** (0.077)	0.153** (0.071)	0.203** (0.080)	0.179** (0.077)	0.117 (0.079)	0.090 (0.074)
$w_{i,t-1}$	-0.025 (0.114)	-0.003 (0.108)	-0.025 (0.128)	-0.030 (0.119)	-0.018 (0.097)	-0.100 (0.111)
$S_{i,t+1}$	-0.321* (0.190)	-0.313* (0.183)	-0.399* (0.218)	-0.347* (0.198)	-0.315* (0.178)	-0.372** (0.188)
S_{it}	0.308 (0.187)	0.356* (0.199)	0.363 (0.239)	0.326 (0.224)	0.401** (0.186)	0.370* (0.195)
$S_{i,t-1}$	0.039 (0.143)	-0.021 (0.142)	0.043 (0.174)	0.034 (0.168)	-0.098 (0.157)	0.003 (0.128)
$CF_{it}/K_{i,t-1}$	-0.030 (0.081)					
LEV_{it}		0.041 (0.121)				
COV_{it}			-0.985*** (0.359)			
BR_{it}				0.057 (0.106)		
IB_{it}					1.453 (1.923)	
$COLL_{it}$						-0.119 (0.294)
Sample size	26389	26296	26346	26342	26176	26429
J (p-value)	0.414	0.325	0.701	0.595	0.192	0.570
m2 (p-value)	0.842	0.860	0.788	0.761	0.674	0.755

Notes: All the regressions are identical as those in Table 3. The un-distressed firms are defined as those with positive cash flow, and distressed firms are those with negative cash flow. Therefore, the sample firm-years which have negative cash flow are excluded. Please also see *Notes* to Table 1a and 3.

Table 8a: Descriptive Statistics on Private Firms

	Size		Industrial types	
	Small	Large	Labour-intensive	Capital-intensive
emp	674.17 (565.39)	1562.38 (1256.29)	867.11 (870.46)	851.32 (813.42)
w	7.80 (7.58)	22.12 (19.98)	9.61 (11.30)	12.14 (14.12)
Δw	0.256 (0.202)	0.255 (0.199)	0.261 (0.205)	0.249 (0.196)
Real total assets	122.79 (147.05)	583.01 (506.17)	190.82 (293.08)	251.18 (355.41)
Real sales	111.72 (78.44)	625.42 (381.97)	205.74 (261.49)	234.30 (301.11)
ROA	0.053 (0.080)	0.070 (0.088)	0.056 (0.089)	0.057 (0.073)
ROS	0.039 (0.070)	0.051 (0.059)	0.037 (0.060)	0.048 (0.075)
LP	10.081 (21.601)	33.50 (64.37)	12.225 (30.026)	18.124 (42.334)
$CF_{it}/K_{i,t-1}$	0.367 (0.455)	0.474 (0.553)	0.359 (0.441)	0.424 (0.518)
LEV	0.664 (0.234)	0.671 (0.219)	0.672 (0.236)	0.658 (0.226)
COV	0.820 (0.193)	0.831 (0.161)	0.813 (0.191)	0.834 (0.181)
BR	0.324 (0.521)	0.274 (0.420)	0.337 (0.533)	0.286 (0.464)
IB	0.022 (0.021)	0.022 (0.018)	0.023 (0.022)	0.020 (0.019)
COLL	0.357 (0.173)	0.340 (0.173)	0.380 (0.179)	0.324 (0.162)
Number of observations	10249	2707	6918	6038

Notes: Small firms are those with annual sales no more than 300 million yuan, and large firms are those above. Labour intensive industries include food, drink and tobacco; textiles, clothing and leather; wood and furniture; paper, printing and publishing; stone, clay, glass, and concrete products; and metals and metal goods. Capital intensive industries include chemicals, petroleum and man-made fibers; electrical machinery and computer equipment; transportation equipment; and other electronic equipment. Please also see *Notes* to Table 1a.

Table 8b: Descriptive Statistics on Private Firms

	Private firms with state/foreign shares		
	25% or more state shares	25% or more foreign shares	Others
emp	1340.51 (1173.98)	746.73 (715.33)	843.89 (826.25)
w	17.37 (16.581)	11.45 (13.05)	10.31 (12.35)
Δw	0.201 (0.180)	0.264 (0.199)	0.258 (0.202)
Real total assets	415.88 (509.47)	238.02 (369.06)	204.66 (299.82)
Real sales	289.89 (303.73)	239.95 (309.89)	212.35 (275.33)
ROA	0.035 (0.048)	0.075 (0.084)	0.056 (0.083)
ROS	0.040 (0.077)	0.059 (0.066)	0.040 (0.067)
LP	13.001 (30.058)	27.242 (64.007)	13.668 (31.844)
$CF_{it}/K_{i,t-1}$	0.276 (0.355)	0.536 (0.605)	0.379 (0.465)
LEV	0.685 (0.235)	0.645 (0.221)	0.667 (0.232)
COV	0.800 (0.201)	0.853 (0.181)	0.820 (0.186)
BR	0.364 (0.546)	0.257 (0.444)	0.317 (0.506)
IB	0.021 (0.016)	0.021 (0.020)	0.022 (0.021)
COLL	0.374 (0.176)	0.319 (0.168)	0.356 (0.173)
Number of observations	691	1304	10956

Notes: Please also see Notes to Table 1a.

Table 9: Size Effects on the Relationship between Financial Factors and Private Firm's Employment

Dependent Variable: emp_{it}	$CF_{it}/K_{i,t-1}$	LEV_{it}	COV_{it}	BR_{it}	IB_{it}	$COLL_{it}$
$emp_{i,t-1}$	0.375*** (0.076)	0.379*** (0.078)	0.371*** (0.082)	0.300*** (0.104)	0.354*** (0.083)	0.381*** (0.079)
k_{it}	0.127* (0.066)	0.106* (0.059)	0.027 (0.050)	0.117* (0.064)	0.114** (0.058)	0.174*** (0.061)
$w_{i\,t+1}$	0.074 (0.105)	0.186*** (0.135)	0.108 (0.117)	0.355** (0.177)	0.305** (0.122)	0.154 (0.116)
Δw_{it}	0.122*** (0.061)	0.106 (0.067)	0.120** (0.056)	0.200*** (0.077)	0.099 (0.064)	0.099 (0.068)
$w_{i,t-1}$	0.234** (0.109)	0.143 (0.128)	0.241** (0.115)	0.053 (0.161)	0.076 (0.110)	0.150 (0.112)
$S_{i,t+1}$	0.089 (0.144)	-0.066 (0.196)	0.013 (0.162)	-0.299 (0.249)	-0.195 (0.166)	-0.020 (0.151)
S_{it}	0.060 (0.167)	0.186 (0.186)	0.170 (0.173)	0.066 (0.244)	0.144 (0.173)	0.283* (0.147)
$S_{i,t-1}$	-0.123 (0.133)	-0.081 (0.167)	-0.090 (0.144)	0.277 (0.220)	0.086 (0.178)	-0.251* (0.150)
$f_{it}\times Small_{it}$	0.058 (0.085)	-0.064 (0.172)	-0.487 (0.335)	0.147 (0.175)	-1.900 (2.290)	-0.577** (0.287)
$f_{it}\times(1-Small_{it})$	-0.053 (0.116)	-0.165 (0.204)	-0.589* (0.320)	-0.333* (0.172)	-4.179 (2.804)	-0.976*** (0.342)
Sample size	13835	13794	13804	13761	13762	13859
J (p-value)	0.229	0.301	0.271	0.817	0.665	0.251
m2 (p-value)	0.302	0.852	0.369	0.981	0.529	0.368

Notes: $Small_{it}$ is a dummy variable equal to 1 if firm *i* has an annual sales no more than 300 million *yuan* in year *t*, and equal to 0 otherwise. Please also see *Notes* to Table 1a, 3 and 4.

Table 10 : Relationship between Financial Factors and the Employment of Private Firms in Different Industrial Types

Dependent Variable: emp_{it}	$CF_{it}/K_{i,t-1}$	LEV_{it}	COV_{it}	BR_{it}	IB_{it}	$COLL_{it}$
$emp_{i,t-1}$	0.386***	0.418***	0.383***	0.357***	0.377***	0.418***
	(0.090)	(0.087)	(0.084)	(0.098)	(0.082)	(0.076)
k_{it}	0.216***	0.144**	0.081	0.133**	0.103*	0.220***
	(0.082)	(0.072)	(0.060)	(0.066)	(0.055)	(0.073)
$w_{i\,t+1}$	0.306**	0.431***	0.332**	0.373**	0.284***	0.210*
	(0.137)	(0.160)	(0.131)	(0.169)	(0.105)	(0.113)
Δw_{it}	0.064	0.056	0.068	0.131*	0.091*	0.073
	(0.073)	(0.077)	(0.067)	(0.074)	(0.053)	(0.068)
$w_{i,t-1}$	0.019	-0.073	-0.017	-0.006	0.074	0.075
	(0.134)	(0.142)	(0.132)	(0.165)	(0.099)	(0.118)
$S_{i,t+1}$	-0.128	-0.271	-0.220	-0.253*	-0.150	0.009**
	(0.182)	(0.217)	(0.172)	(0.228)	(0.138)	(0.128)
S_{it}	0.112	0.056	0.197	0.040	0.108	0.051
	(0.174)	(0.188)	(0.206)	(0.230)	(0.156)	(0.131)
$S_{i,t-1}$	-0.013	0.241	0.079	0.238	0.072	-0.076
	(0.170)	(0.209)	(0.151)	(0.196)	(0.156)	(0.133)
$f_{it}\times Labour_{it}$	0.226*	-0.422*	-0.191	0.074	-2.311	-0.814**
	(0.122)	(0.249)	(0.466)	(0.179)	(2.638)	(0.353)
$f_{it}\times Capital_{it}$	0.086	0.058	-0.588	-0.049	-0.594	-0.404
	(0.112)	(0.238)	(0.600)	(0.312)	(3.630)	(0.349)
Sample size	13835	13794	13804	13761	13762	13859
J (p-value)	0.352	0.819	0.491	0.587	0.332	0.742
m2 (p-value)	0.279	0.991	0.396	0.673	0.518	0.335

Notes: $Labour_{it}$ is a dummy variable equal to 1 if in year *t* firm *i* is in one of the following industrial types: food, drink and tobacco; textiles, clothing and leather; wood and furniture; paper, printing and publishing; stone, clay, glass, and concrete products; and metals and metal goods, and equal to 0 otherwise. $Capital_{it}$ is a dummy variable equal to 1 if in year *t* firm *i* is in one of the following industrial types: chemicals, petroleum and man-made fibers; electrical machinery and computer equipment; transportation equipment; and other electronic equipment. Please also see *Notes* to Table 1a, 3 and 4.

Table 11: Relationship between Financial Factors and the Employment of Private Firms with State or Foreign Shares

Dependent Variable: emp_{it}	$CF_{it}/K_{i,t-1}$	LEV_{it}	COV_{it}	BR_{it}	IB_{it}	$COLL_{it}$
$emp_{i,t-1}$	0.432***	0.374***	0.375***	0.382***	0.372***	0.387***
	(0.082)	(0.085)	(0.083)	(0.087)	(0.079)	(0.077)
k_{it}	0.154**	0.123**	0.052	0.109**	0.091*	0.200***
	(0.071)	(0.057)	(0.050)	(0.052)	(0.055)	(0.074)
$w_{i\,t+1}$	0.186*	0.279**	0.186	0.289***	0.236**	0.141
	(0.110)	(0.111)	(0.121)	(0.101)	(0.101)	(0.096)
Δw_{it}	0.062	0.110**	0.091*	0.127**	0.109**	0.104*
	(0.065)	(0.052)	(0.050)	(0.050)	(0.051)	(0.055)
$w_{i,t-1}$	0.114	0.061	0.142	-0.083	0.139	0.135
	(0.111)	(0.113)	(0.120)	(0.107)	(0.096)	(0.097)
$S_{i,t+1}$	-0.016	-0.114**	-0.074	-0.143	-0.113	0.061
	(0.154)	(0.153)	(0.178)	(0.133)	(0.136)	(0.124)
S_{it}	0.199	-0.007**	0.212	0.085	0.176	0.100
	(0.183)	(0.180)	(0.186)	(0.155)	(0.166)	(0.131)
$S_{i,t-1}$	-0.179	0.156	-0.052	0.077	-0.047	-0.163
	(0.135)	(0.180)	(0.152)	(0.145)	(0.155)	(0.137)
$f_{it}\times State_{it}$	0.516	0.072	-0.454	0.207	4.786	-0.415
	(0.350)	(0.206)	(0.370)	(0.213)	(4.463)	(0.364)
$f_{it}\times Foreign_{it}$	0.144	0.124	-0.274	-0.314*	-5.721*	-0.360
	(0.148)	(0.305)	(0.277)	(0.179)	(3.129)	(0.404)
$f_{it}\times Other_{it}$	0.086	-0.077	-0.488*	0.025	-.0.001	-0.796**
	(0.084)	(0.150)	(0.272)	(0.119)	(2.248)	(0.314)
Sample size	13835	13794	13804	13761	13762	13859
J (p-value)	0.279	0.960	0.509	0.493	0.679	0.629
m2 (p-value)	0.246	0.993	0.343	0.441	0.444	0.509

Notes: $State_{it}$ is a dummy variable equal to 1 if in year *t* firm *i* has 25% or more shares are state owned, and equal to 0 otherwise. $Foreign_{it}$ is a dummy variable equal to 1 if in year *t* firm *i* has 25% or more shares are foreign owned, and equal to 0 otherwise. $Other_{it}$ is a dummy variable equal to 1 if in year *t* firm *i* does not fall into either of the two groups above, and equal to 0 otherwise.