Investment risk, return gap, and financialization of non-listed non-financial firms in China

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Abstract: This paper constructs a portfolio model allowing risks in both fixed and financial investments to capture non-financial firms’ financialization behavior. Using firm-level panel data from non-listed non-financial firms in China over the period from 1998 to 2009, we find that relatively risk in fixed investment and rates of return gap between financial and fixed investments play significant roles in financialization behavior for the whole sample firms. Further group-division analysis based on firms’ ownership and operating conditions reveal discrepancies between state-owned and private firms and between well-operated and insolvent firms.

Key words: financialization, investment risks, China

JEL classification code: E22, O16, G11

1. Introduction

Non-financial firms face a portfolio choice between real and financial assets. Given a certain amount of aggregate capital available for firms’ investments, there is a substitution effect between the real and financial assets (Tobin, 1965). Accordingly, the rise of the share of financial assets to aggregate capital, in contrast to the falling share of real assets, is referred to as financialization of non-financial firms\(^1\). Studies for developed economies in Stockhammer (2004), Crotty (2005), Epstein and Jayadev (2005), and Krippner (2005), and studies for Argentina, Mexico and Turkey in Demir

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\(^{1}\) In a broader sense, financialization in micro level reflects important changes in the structure of non-financial firms’ balance sheets, including the growth of income from financial subsidiaries and investment as well as growth in the transfer of earnings to financial markets in the forms of interest payments, dividend payments and stock buybacks; see Orhangazi (2008) and Davis (2016).
(2009) provide empirical evidence on the structural change in the portfolio allocation decision of non-financial firms. The impact of such structural change has been identified as adverse to real sector investments (Orhangazi, 2008; Demir, 2009; Barradas, 2017; Barradas and Lagoa, 2017; Tori and Onaran, 2018) and income inequality (Alvarez, 2015), and hence is destructive to real economic growth (Zhang, 2016; Moosa, 2017).

Since firms’ financialization generally exerts negative impact on real economic development, it is important to figure out reasons why non-financial firms prefer financial investment when they make their decisions of investment allocations. In this respect, Demir (2009) provides an important contribution to answer the question. In particular, Demir proposes a portfolio choice model to explain why non-financial firms in Argentina, Mexico and Turkey favor financial assets vis-à-vis fixed assets, among other things. His results appear to indicate that two main factors significantly drive the firms’ financialization behavior in the underlying countries: one is the rate of return gap between financial and fixed investments and another is the uncertainty related to fixed investments. The results seem to be reasonable since an intuitive impression is indeed that relatively higher return in financial assets motivates firms to do more financial investments, and relatively higher risk in fixed assets drives firms run away from fixed investments to financial investments.

However, Demir’s (2009) empirical analysis is based on a stylized portfolio choice model in which only fixed investments are assumed to have risks, whereas financial investments are assumed to be risk-free. As we will show in next section, this is a simplified (but not realistic) assumption which to a large extent was used to facilitate the derivation of a neat analytical expression describing the determinants of firms’ financialization behavior. Moreover, the risk measurement in Demir’s analysis is approximated by macroeconomic uncertainty, which is somehow deviate from the baseline definition of the fixed investment risk defined in the portfolio choice model.

This paper intends to fill these gaps remained in the literature. The contributions of our work to the literature are threefold. First, we relax the assumption of riskless financial investments in Demir’s portfolio choice model and derive an extended
model to capture firms’ financialization behavior. The extended model is not only analytically but also economically different from the simplified model in the literature. Second, in addition to macroeconomic uncertainty, we also measure investment risks by the baseline definition with the corresponding variations in the returns on the investments. Third, we examine the determinants of financialization of non-listed non-financial firms by dividing firms into different groups based on their institutional nature (e.g. state-owned enterprises versus private enterprises, and well-operated enterprises versus insolvent enterprises).

To address these issues, we analyze how financial and fixed investment risk and rates of return spreads influence financialization ratio. Our empirical analysis utilizes a unique dataset for non-listed non-financial firms in China over the period from 1998 to 2009 with annual frequency. The sample period is dictated by data availability. The dataset for China non-listed non-financial firms are obtained from Tai’an database in China. The non-listed firms play an important role in Chinese economy. In 2009, for example, the total assets of China's non-listed non-financial firms were three times more than that of listed firms.

We document that relative risk and risk-adjusted rates of return gap affect the firms’ financialization behavior in the extended portfolio choice model. Our results are relevant to the studies about liquidity and financial investment (Baum et al., 2006; Song and Lu, 2015; Yang et al., 2017) which provide alternative comprehensions about the impact of risk and return on firms’ financialization behavior. Our results also show that the larger size, less financial constraint, higher leverage, and higher current debt ratio also lead to a higher financialization level.

In addition to the full sample analysis, we also carry out group-division analysis based on firms’ ownership and operating conditions. The results are different between state-owned and private firms and between well-operated and insolvent firms. In particular, we find that state-owned firms only care about risk whereas private firms consider both risk and return in their respective investments. This discrepancy may be due to different promotion mechanisms between the state-owned and private firms. The empirical investigation on firms with different operating conditions also offers
different scenarios: the risk and return variables are insignificant in insolvent firms but significant in well-operated firms.

The organization of the paper is as follows: section 2 develops a portfolio model for firms allowing risks in both fixed and financial investments; section 3 describes data and variables used in our empirical analysis; section 4 provides empirical results for the baseline model, followed by section 5 with further group-division analysis for different types of firms; section 6 concludes the paper.

2. Baseline model

In this section, we develop a portfolio choice model to our analysis of financial investment behavior of non-listed non-financial firms in China. The portfolio choice for the firms is investment allocation between financial and fixed assets. By definition, fixed investment assets refer to the wealth invested in a long-term tangible piece of property that a firm owns and uses in the production of its income and is not expected to be consumed or converted into cash any sooner than at least one year's time. Financial investments, on the other hand, include various financial assets available in the financial markets. The model contains a pool of firms living in a country where they consume their returns from capital invested in one-period investment projects in both fixed and financial assets. Like Demir (2009), it is assumed that each type of assets can be considered as the sum of multiple investments. It is also assumed that there is a single homogeneous good and the population is normalized to one with a zero-growth rate.

Note that Demir (2009) follows Le and Zak (2006) and assumes firms’ financial investments are riskless. In reality, however, financial assets available for firms include both risk-free financial products such as T-bills and risk-bearing instruments such as stocks and investment funds. Therefore, unlike Demir (2009) however, we allow risks in firms’ financial investments. As it turns out that this different but more plausible assumption could lead to very different model representation from the existing literature.
Let $I_t^f$ be the financial assets investment at time $t$ with a return $r_t^f$. Firms can also invest $I_t^k$ in financial assets with a return $r_t^k$. In our model, both financial assets investment and fixed assets investment are risky. More specifically, the turns of $r_t^f$ and $r_t^k$ follows normal distributions with means and variances specified as follows:

\[
\begin{align*}
& r_t^f \sim N(E(r_t^f), Var(r_t^f)) \\
& r_t^k \sim N(E(r_t^k), Var(r_t^k))
\end{align*}
\]  

Also, both types of investments are undertaken from the beginning to time $t$ using the initial capital of $I_0$. The standard maximization by a representative firm of the expected utility from such investments provides us with the following problem:

\[
\max E \sum_{i=0}^{\infty} \beta^i U(I_t)
\]  

subject to

\[
I_t = (1+r_t^k)I_t^k + (1+r_t^f)I_t^f
\]  

and

\[
I_0 = I_t^f + I_t^k
\]  

The utility function is a constant absolute risk aversion utility function, viz.

\[
U(I_t) = -e^{-\alpha I_t}.
\]  

where

\[
\alpha \equiv \frac{U''(w_t)}{U'(w_t)}, \quad \forall t.
\]  

Note that in Demir’s (2009) setup financial assets investment is riskless and applying the stein’s Lemma the optimum allocation becomes a very simple expression, viz.

\[
I_t^* = \frac{E(r_t^k - r_t^f)}{\gamma Var(r_t^k)}.
\]  

where $\gamma$ is a function of second and first orders of the underlying utility function.

This result demands that the return of financial assets has no correlation with the return of fixed assets, i.e. $\text{corr}(r_t^f, r_t^k) = 0, \forall t$. And in the sample of this paper, the correlation coefficient between the return of financial assets and the return of fixed
assets is -0.001, which is corresponding with the irrelevant assumption.

In addition, the aggregate capital invested in the economy is the sum of financial and fixed capital, viz.

\[ K_i^a = I_i^k + I_i^f \]  

(8)

Rearranging Eq. (8) and substituting \( I_i^{k*} \) from Eq. (7) gives the equilibrium level of financial investment:

\[ I_i^f = K_i^a - \frac{E(r_i^k - r_i^f)}{\gamma Var(r_i^k)} \]  

(9)

or equivalently

\[ \frac{I_i^f}{K_i^a} = 1 - \frac{1}{K_i^a} \times \frac{E(r_i^k - r_i^f)}{\gamma Var(r_i^k)} \]  

(10)

We must emphasize that the neat representation of Eq. (10) was obtained by assuming financial assets investment is riskless. It shows that the financial investment ratio is related to the return gap between fixed and financial investments over the risk in fixed assets investment as well as the overall capital.

Demir (2009) claims that taking the natural log of both sides and approximating \( \log(1-x) \) with \( \log(-x) \) can get the following linear expression:

\[ \ln \left( \frac{I_i^f}{K_i^a} \right) = -\ln(E(r_i^k - r_i^f)) + \ln(\gamma) + \ln(Var(r_i^k)) + \ln(K_i^a) \]  

(10)

This is simply mathematically incorrect because \( \log(1-x) \) is not approximately equal to \( \log(-x) \), although under certain condition, \( \log(1-x) \) can be approximated to be \( -x \). Therefore, the essential equation of (11) in Demir (2009) is wrong and the corresponding empirical estimations are not reliable then.

Again, Eq. (10) was derived based on the unrealistic assumption that financial investment is riskless. Now we come back to our assumption that both fixed and financial investments are risky and we can obtain:

\[ E \left[ r_i^f - r_i^k \right] = \alpha \left[ Var \left( r_i^f \right) I_i^f - Var \left( r_i^k \right) (K_i^a - I_i^f) \right] \]  

(11)

and
\[ \frac{1}{K_i} = \frac{\text{Var}(r_i^f)}{\text{Var}(r_i^f) + \text{Var}(r_i^k)} + \frac{E[r_i^f - r_i^k]}{\frac{\text{Var}(r_i^f)}{\text{Var}(r_i^f) + \text{Var}(r_i^k)}}. \] 

(12)

In contrast to Demir’s Eq.(10), our Eq. (13) shows that the share of financial assets in aggregate capital is affected by the ratio of fixed investment risk to total risk and risk-adjusted rate of return gap between financial and fixed investments.

Based on theoretical model (13), we can write the corresponding econometric model for empirical analysis, viz.

\[ FR_{it} = c_{it} + \alpha_i \text{risk}_{it}^k + \alpha_j \text{gap}_{it}^{f-k} + \theta_j \text{size}_{it} + \theta_j \text{fc}_{it} + \theta_j \text{lev}_{it} + \theta_j \text{liqdr}_{it} + \epsilon_{it} \]  

where \( FR_{it} \) denotes the share of firms’ financial investment in aggregate capital to represent the financialization ratio of the company, \( c \) is a constant, \( \text{risk}_{it}^k \) refers to the ratio of fixed investment risk to total risk, and \( \text{gap}_{it}^{f-k} \) denotes the risk-adjusted rate and is calculated as \( E[r_i^f - r_i^k] / K_i \text{Var}(r_i^f) + \text{Var}(r_i^k)] \). In addition, we consider firms’ total assets (\( \text{size} \)), financial constraints (\( \text{fc} \)), leverage ratio (\( \text{lev} \)), and current debt ratio (\( \text{liqdr} \)) as control variables in the regression model (14). A detailed description for variable definitions, measurement, and calculations are provided in the following section.

Note that the empirical model (14) has not considered delivery lags and adjustment costs. Therefore, we also examine the following model in our empirical analysis, viz.

\[ FR_{it} = c_{it} + \alpha_i \text{risk}_{it}^k + \alpha_j \text{gap}_{it}^{f-k} + \theta_j \text{size}_{it} + \theta_j \text{fc}_{it} + \theta_j \text{lev}_{it} + \theta_j \text{liqdr}_{it} + \epsilon_{it}. \]  

(14)

3. Data and variables

3.1 Data source

Our data is for China’s non-listed non-financial firms from 1998 to 2009, maintained by Tai’an database. We remove those firms without complete information in terms of time dimension and obtain a total number of 9,962 non-listed firms over 1998-2009.

These 9,962 firms are non-financial firms in 38 industries categorized by China
Securities Regulatory Commission. Our full sample firms include 13 broad categories of secondary occupations with 252 in mining, 459 in electricity power generation, 320 in water resources, 840 in food processing and manufacturing, 744 in wood and furniture manufacturing, 1391 in textile and garment industry, 679 in chemical raw materials and chemical products manufacturing industry, 720 in rubber and plastics manufacturing industry, 2391 in equipment manufacturing industry, 146 in metal smelting industry, 559 in metal product industry, 714 in nonmetallic mineral products, and 747 in others (including 227 in recreation and sports appliance, 44 in petroleum processing industry, 36 in pharmaceutical industry, 161 in handicraft manufacturing industry, 20 in gas production and supply industry, 259 in waste management ).

3.2 Measurement and calculation of variables

We use some approaches of approximation to solve missing statistics in the database of non-listed firms. Variables with data for all years related to the models include total current assets, accounts receivable, inventory, total fixed assets, total assets, total current liabilities, long-term total liabilities, main business income, main business costs, main business tax, operating expenses, management expenses, financial expenses, operating profit, total profit, income tax payable, and value-added tax payable. Some other variables with partial observations also enter the empirical regressions, including long-term investment (1998-2007), annual average balance of fixed assets (1998-2007), intangible assets (1998-2007), investment income (2004-2009), subsidies income (1998-2007), non-operating income, non-operating expenses (2004-2009), cash inflows and outflows from operations, investment, and financing activities (2005-2007).

The share of financial investment

The share of financial investment to aggregate capital reflects the nature of firms’ financial investment behavior. The higher of this share, the more willing to invest in

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2 The classification is based on industry code standard in China.
financial assets are the underlying firms. According to Demir (2009) and Zhang et al. (2016) and China's accounting definition, financial assets should include: monetary funds, held-to-maturity investments, trading financial assets, investment real estate, available-for-sale financial assets, long-term equity investments. And dividends receivable and interest receivable. Based on the available data in the database of non-listed companies, this variable is defined and calculated as follows:³

Financialization ratio (FR) = (current assets - inventory + long-term investment - accounts receivable) / total assets.

Rate of return gap

As explained in Eq. (13), the rate of return gap in the regression model is calculated based on the rates of return on financial and fixed investments, the total risk, as well as the total asset. The rates of return on financial and fixed investments are defined as below:

\[ r_f = \frac{(\text{net return on investments} + \text{net income from fair value variations} + \text{exchange net gain} - \text{income from investment to joint venture and cooperative enterprise} + \text{interest income} - \text{interest expense})}{(\text{cash and cash equivalents} + \text{held-to-maturity investments} + \text{financial assets available for trading} + \text{investment real estate} + \text{financial assets available for sale} + \text{dividend receivable} + \text{interest receivable})} \]

and

\[ r_k = \frac{(\text{revenue} - \text{operating cost} - \text{tax and associate charge} - \text{period cost} - \text{asset impairment loss})}{(\text{long-term capital})}. \]

Considering the statistics caliber and the availability of data, the rates of return on financial and fixed investments are calculated as below:

³ We separate accounts receivable from financial investment in this formula. Because the size of accounts receivable is related to the bargaining power of enterprises. For a considerable number of enterprises, it could not be determined by themselves. It is even more unrecognizable as an investment decision after a portfolio selection. In another calculation formula in the robustness test, we add a part of the accounts receivable in the financial asset to conduct regression analysis again.
rf = (total profit – operating profit – non-operating income + non-operating cost -subsidy income) / (current assets - inventory + long-term investment - accounts receivable)

and

rk = (operating profit) / (long-term capital).

The risk-adjusted rate of return gap is then calculated by

\[
\frac{rf - rk}{K[Var(rf) + Var(rk)]}
\]

where the measurement of risk variables is described below. Here we treat the implementation value as the expected value in the main regression, because the expectation would have been affected by the profitability signals in annual data. We also use the lagged variable in auxiliary regression.

**Investment risks**

The risk variable in the regression model is the ratio of fixed investment risk to the sum of fixed and financial investments risks. To calculate this variable, we first obtain individual risk variables for financial and fixed investments respectively (\(Var(r_f)\) and \(Var(r_k)\)).

There are two classic methods for calculating the risk variables, which are based on the calculation of the rate of the returns on financial assets and return on fixed assets. The first is to calculate the variance of the return on investment of the time window of forward rolling. The idea of this method is intuitive, but the efficiency loss is also very intuitive: this calculation reflects the risk of the previous time window, possibly different from the current investment risks, and the observations of the previous five years cannot be used in the regression, which will affect the time span of the results. This paper selects the time window of five years (t-1 to t-5) to calculate the variance, and forms the benchmark empirical results of this paper.

The second is to use the GARCH model to estimate the conditional variance of the two yields using the return on financial assets and the rate of return on fixed assets over the full time periods. The conditional variances are measured by conditional variances from a GARCH(1,1) process based on the following equation:
\[ x_t = c + u_t, u_t \sim (0, \delta_t^2) \]
\[ \delta_t^2 = \beta_0 + \beta_1 \delta_{t-1}^2 + \theta u_{t-1}^2 \]  

(15)

where \( x \) is the return on financial (or fixed) investment, \( c \) refers to a constant in the mean equation of the GARCH model, and \( \delta_t^2 \) is the conditional variance of \( u_t \), and is used to measure financial (or fixed) investment risk. The length of total time window seems short, and the estimation of the GARCH(1,1) model may not be robust, so the regression result using GARCH to estimate the risk is mainly used as a robust test for the regression result of the rolling window calculation.

The risk variable \( \text{risk}_{it}^k \) in the regression model is then calculated as

\[ \text{Var}(r_t^k)/[\text{Var}(r_t^f) + \text{Var}(r_t^s)]. \]

**Control variables**

Financial constraints (\( fc \)) = net cash inflow from operating / total assets

Financial leverage ratio (\( lev \)) = total liabilities / total owners’ equity

Size (\( size \)) = natural log of total asset

Current debt ratio (\( liqdr \)) = current liabilities / total liabilities

**3.3 Description analysis**

We winsorize continuous explanatory variables in all samples at the 0.5% and 99.5% level to eliminate the effects of extreme and error values in the database. A statistical description of each explanatory variable is given in Table 1.

The mean value of the risk-adjusted rate of return gap is negative, indicating that the companies’ overall fixed-asset investment income exceeds the financial investment income. The average relatively investment risk of fixed assets was 0.7769, with a median of 0.9866, indicating that the risk of fixed asset investment of most non-listed non-financial companies is significantly higher than that of financial assets. It is also worth noting that most of the non-listed companies have a current debt ratio index close to 1, illustrating that most non-listed companies have a very small proportion of long-term liabilities in total liabilities.
In the perspective of all market (9962 companies in sample), the share of total financial assets in total assets and the return of financial and fixed assets are illustrated in Figure 1. During 2000-2004, the market financialization ratio has increased significantly, and at the same time, the increase in the return of fixed assets is also obvious. The level of market return of financial assets is lower than the level of fixed assets in the whole sample period, which tells us most production companies yield much more in fixed investment.

### Table 1 descriptive statistics of the variables in empirical analysis

<table>
<thead>
<tr>
<th>variables</th>
<th>Obs</th>
<th>mean</th>
<th>median</th>
<th>max</th>
<th>min</th>
<th>std</th>
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<tbody>
<tr>
<td>FR</td>
<td>109435</td>
<td>0.2254</td>
<td>0.1809</td>
<td>0.8337</td>
<td>0.0000</td>
<td>0.1812</td>
</tr>
<tr>
<td>(\gamma_{f-k})</td>
<td>53764</td>
<td>-0.0011</td>
<td>-0.0001</td>
<td>0.0097</td>
<td>-0.0495</td>
<td>0.0052</td>
</tr>
<tr>
<td>(r_{w})</td>
<td>53862</td>
<td>0.7769</td>
<td>0.9866</td>
<td>1.0000</td>
<td>0.0001</td>
<td>0.3390</td>
</tr>
<tr>
<td>size</td>
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<td>10.5315</td>
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<td>1.4477</td>
</tr>
<tr>
<td>fc</td>
<td>109425</td>
<td>0.0704</td>
<td>0.0245</td>
<td>1.2651</td>
<td>-0.2420</td>
<td>0.1686</td>
</tr>
<tr>
<td>lev</td>
<td>109435</td>
<td>0.5577</td>
<td>0.5561</td>
<td>1.7393</td>
<td>0.0088</td>
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<tr>
<td>liqdr</td>
<td>109247</td>
<td>0.8837</td>
<td>1.0000</td>
<td>1.0000</td>
<td>0.0000</td>
<td>0.2187</td>
</tr>
</tbody>
</table>

Note: Basic descriptive statistics of the variables of the firms used in empirical analysis are reported.

Figure 1 Market financialization ratio and investment returns

Source: Tai’an database for China’s non-listed non-financial firms; authors’ calculations.

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4 To calculate the financial level and the return on assets of the market in this figure, we sum up items at the market level and use weighted average value. For example, we define the financialization ratio of market as the sum of financial assets of all firms divided by the sum of financial assets of all firms in sample.
4. Empirical analysis for the baseline model

The specific impact of the explanatory variables on the ratio of financial assets to total assets (financialization ratio) is examined through regression analysis. Several econometric tests are needed to pin down the empirical specification of the panel data model. First, we use Breusch-Pagan (1980) LM test to check individual effect in the underlying model. We then examine whether a fixed or random effect estimation method is valid. Endogeneity issue also deserves attention. In particular, the key financial indicators on the right-hand side of the model may be endogenous. From the perspective of basic economic logic, the random disturbances that affect the ratio of financial assets to total assets are likely to affect the current financialization variables. Therefore, the perturbed term and these explanatory variables may be non-orthogonal (endogenous). Considering that the current random disturbance term factor cannot affect historical data, the lag terms of the key variables are reasonable instrument variables. Next in importance, there may be situations where the dependent variables may also affect the current financial constraint (net operating cash inflow ratio variable), which means that the financial constraint variable may also be an endogenous variable. Thus, regressions are divided into two endogenous cases: in case A the endogenous variables are risk, the adjusted rate of return gap; in case B the endogenous variables are risk, return gap and financial constraint. The IV regression results are reported in Table 2.

The validity of these instrument variables is checked by the cluster-heteroskedasticity-robust Hansen-J test and Stock-Yogo (2005) weak IV test. The p-value of Hansen-J test for model (1)-(4) cannot reject the joint null hypothesis (at 10% level) that the instruments are valid instruments and that the excluded instruments are correctly excluded from the estimated equation (Hayashi, 2000). And the results of Stock Yogo test for all four models in Table 2 rejected the null hypothesis of weak IV. We implement Kleibergen-Paap rk LM test (Kleibergen and
Paap, 2006), and the result of high significance verifies the product of the endogenous variables matrix and the IV matrix satisfies full rank requirement. We proceed to use heteroskedasticity-robust C-test of Hayashi (2000) to address whether key variables are endogenous. Note that the endogeneity test in Table 2 does not reject the null hypothesis that the underlying variables are exogenous, so the benchmark results in this paper are estimated using the conventional fixed effect panel estimation method and the results are reported in Table 3.

Paying attention to the impact of the key variables in Table 3 on the proportion of financial assets, we can find that the coefficients of the relative risk of fixed asset investment are positive and significant in the model (5)-(8). It shows that the relative risk in fixed investment has a significant role in promoting the financialization behaviors. At the same time, we can also observe that the risk-adjusted rate of return gap has a significantly positive (at 1% level) impact on the financialization ratio in the current period model (5) and (6). It shows that the lower the current return on financial assets relative to the current return on fixed assets, the more firms favor fixed investments. The economic connotation reflected is easy to understand: given a level of income, companies generally choose asset investment programs with lower risk; and given a level of risk, companies will always choose assets with higher returns. However, the risk-adjusted rate of return gap in the last year could not motivate more financial investment. The effect of return gap may be more sensitive to timeliness.

We also note that the size of the company, financial constraints and current debt ratio have a positive impact on the proportion of financial assets in model (5) and (6). Companies with less financial constraints have more funds and channels for investing in financial assets. Companies with higher current debt ratios will have more severe pressure to repay short-term debts and need to maintain a higher proportion of liquidity. Fazzari et al. (1988) define financial constraints as under-investment conditions caused by the high external financing cost in the incomplete market, suggesting that the effects of control variables on financialization ratio exist in the real and incomplete market in this paper but not in the ideal market.
Table 2 IV Estimation Results: Effects of rate of return gap and risk on financialization ratio

<table>
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<th>Dependent Variable:</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
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<td>FR(no receivables)</td>
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<td></td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
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<tr>
<th></th>
<th>Current-A</th>
<th>Current-B</th>
<th>Lagged-A</th>
<th>Lagged-B</th>
</tr>
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<td>0.024</td>
<td>0.025</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.035)</td>
<td>(0.034)</td>
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<td></td>
</tr>
<tr>
<td>$\gamma_{f-k}$</td>
<td>-0.144</td>
<td>-0.137</td>
<td></td>
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<tr>
<td></td>
<td>(0.266)</td>
<td>(0.267)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$risk_{-1}^k$</td>
<td></td>
<td></td>
<td>0.031</td>
<td>0.029</td>
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<td></td>
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<td>(0.064)</td>
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<td>$\gamma_{f-k}$</td>
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<td></td>
<td>-0.125</td>
<td>-0.133</td>
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<td>(0.004)</td>
<td>(0.004)</td>
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<tr>
<td>fc</td>
<td>0.043**</td>
<td>0.057*</td>
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<tr>
<td></td>
<td>(0.017)</td>
<td>(0.032)</td>
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<tr>
<td>lev</td>
<td>0.020</td>
<td>0.022</td>
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</tr>
<tr>
<td></td>
<td>(0.013)</td>
<td>(0.014)</td>
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</tr>
<tr>
<td>liqdr</td>
<td>0.025*</td>
<td>0.024*</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>(0.014)</td>
<td>(0.014)</td>
<td></td>
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<tr>
<td>size_{-1}</td>
<td></td>
<td>-0.013</td>
<td>-0.014</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>(0.009)</td>
<td>(0.009)</td>
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<td>fc_{-1}</td>
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<td></td>
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<td>(0.0015)</td>
<td>(0.016)</td>
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<tr>
<td>lev_{-1}</td>
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<td>-0.004</td>
<td>-0.003</td>
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<tr>
<td></td>
<td></td>
<td>(0.015)</td>
<td>(0.015)</td>
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<tr>
<td>liqdr_{-1}</td>
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<td>-0.007</td>
<td>-0.007</td>
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<td></td>
<td></td>
<td>(0.019)</td>
<td>(0.047)</td>
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</table>

Year Fixed Effects | Yes | Yes | Yes | Yes

<table>
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<tr>
<th></th>
<th>Observations</th>
<th>Instrument Variables(lags)</th>
<th>Kleibergen-Paap LM p-value</th>
<th>Stock and Yogo p-value</th>
<th>Hansen J p-value</th>
<th>Endogeneity test p-value</th>
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<td>15,842</td>
<td>risk, rgap (1-4)</td>
<td>0.000</td>
<td>&lt;0.05</td>
<td>0.391</td>
<td>0.166</td>
</tr>
<tr>
<td></td>
<td></td>
<td>risk,rgap,fc (1-4)</td>
<td>0.000</td>
<td>&lt;0.05</td>
<td>0.626</td>
<td>0.273</td>
</tr>
<tr>
<td></td>
<td>16,198</td>
<td>risk, rgap (2-4)</td>
<td>0.000</td>
<td>&lt;0.05</td>
<td>0.155</td>
<td>0.762</td>
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<tr>
<td></td>
<td></td>
<td>risk,rgap,fc (2-4)</td>
<td>0.000</td>
<td>&lt;0.10</td>
<td>0.247</td>
<td>0.904</td>
</tr>
</tbody>
</table>

Note: IV estimation results with clustering robust standard errors in parenthesis. (*),(**),(***) refer to significance at 1%, 5% and 10% level respectively. (-1) refers to lag-1. “Current” means that the model is estimated based on equation (14), while “Lagged” means that it is estimated based on equation (15). “A” refers to case A and “B” refers to case B. The instrument variables chosen are 1-4 order lags of endogenous variables for equation (14) and 2-4 order lags of endogenous variables for equation (15).
Our empirical results reveal that firms with large-scale assets have a higher financialization ratio. It seems that small firms should have more financial assets to resist operational risk theoretically, and the result in Table 3 conflicts with this intuition. But in the theory of dynamic risk management model (Rampini, Sufi and Viswanathan, 2014), small firms may enlarge operation scale and lack insurance to reduce long-term risk in a small size, although they face severer financial constraint.
The coefficient of size shows that small firms invest more on fixed assets with high profits and bear high current risk to contend for scale expansion.

To test the robustness of the baseline empirical results, we employ different alternative definitions of key independent variables. When we use lagged values of rates of return rather than current values to represent the expectation, or change the denominator of financial constraint from total assets to capital assets, main conclusions about risk and adjusted rate of return gap are keep robust.

However, when we change statistical caliber of financialization ratio and define financial assets including the accounts receivable, the coefficients of risk-adjusted rate of return gap become insignificant in the rolling estimation and significantly negative in the GARCH estimation. For further corroboration, we replace the dependent variable (i.e. FR) in model (5)-(8) with the share of accounts receivable in total assets and regress. The unreported result shows that the coefficients of rates of return gap are all significantly negative, which suggests that the effects of rates of return gap on accounts receivable totally contrary to the effect on the population of other financial assets in the conventional statistics caliber.

This result may be caused by the following properties of accounts receivable: (i) a large proportion of companies don’t have enough bargaining power to control the amount of accountsreceivable; (ii) most accounts receivable exist in the form with low liquidity and profitability, so firms tend to regard accounts receivable as fixed assets rather than financial asset in the rational portfolio choice process.

5. Further discussions

5.1 Use macroeconomic uncertainty as fixed investment risk

For robustness, we use macroeconomic uncertainty as the fixed investment risk that firms faced. These specifications are close to the Demir’s specification (2009) assuming that firms face macroeconomic in fixed assets only. The finding on the rate of return gap is robust to different macroeconomic risk as shown in model (9)-(14) in
Table 4. Economic growth ($GDP$) in last year is found to promote new fixed investment in model (10). The prosperity of the real economy represents a decline in the risk of fixed investment, but it appears that firms invest more when the economy is in the mid of rather than before the boom (see model (9)).

Table 4 | Macroeconomic uncertainty: Effects of macro-risks

<table>
<thead>
<tr>
<th></th>
<th>(9)</th>
<th>(10)</th>
<th>(11)</th>
<th>(12)</th>
<th>(13)</th>
<th>(14)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\gamma_k$</td>
<td>0.377***</td>
<td>0.376***</td>
<td>0.374***</td>
<td>0.371***</td>
<td>0.370***</td>
<td>0.375***</td>
</tr>
<tr>
<td>$\gamma_{iwp}$</td>
<td>0.084</td>
<td>0.084</td>
<td>0.084</td>
<td>0.084</td>
<td>0.084</td>
<td>0.084</td>
</tr>
<tr>
<td>$\beta_k$</td>
<td>0.023***</td>
<td>0.024***</td>
<td>0.024***</td>
<td>0.024***</td>
<td>0.024***</td>
<td>0.023***</td>
</tr>
<tr>
<td>$\alpha_k$</td>
<td>0.003</td>
<td>0.003</td>
<td>0.003</td>
<td>0.003</td>
<td>0.003</td>
<td>0.003</td>
</tr>
<tr>
<td>$\beta$</td>
<td>0.030***</td>
<td>0.030***</td>
<td>0.030***</td>
<td>0.030***</td>
<td>0.030***</td>
<td>0.030***</td>
</tr>
<tr>
<td>$\alpha$</td>
<td>0.009</td>
<td>0.009</td>
<td>0.009</td>
<td>0.009</td>
<td>0.009</td>
<td>0.009</td>
</tr>
<tr>
<td>$\beta_{fc}$</td>
<td>0.018***</td>
<td>0.018***</td>
<td>0.018***</td>
<td>0.017**</td>
<td>0.017**</td>
<td>0.017**</td>
</tr>
<tr>
<td>$\alpha_{fc}$</td>
<td>0.007</td>
<td>0.007</td>
<td>0.007</td>
<td>0.007</td>
<td>0.007</td>
<td>0.007</td>
</tr>
<tr>
<td>$\beta_{liqdr}$</td>
<td>0.026***</td>
<td>0.026***</td>
<td>0.026***</td>
<td>0.025***</td>
<td>0.025***</td>
<td>0.025***</td>
</tr>
<tr>
<td>$\alpha_{liqdr}$</td>
<td>0.007</td>
<td>0.007</td>
<td>0.007</td>
<td>0.007</td>
<td>0.007</td>
<td>0.007</td>
</tr>
<tr>
<td>$\gamma_{GDP}$</td>
<td>-0.124</td>
<td>0.026 ***</td>
<td>0.007</td>
<td>0.007</td>
<td>0.007</td>
<td>0.007</td>
</tr>
<tr>
<td>$\gamma_{GDP-1}$</td>
<td>-0.610***</td>
<td>0.091</td>
<td>0.091</td>
<td>0.091</td>
<td>0.091</td>
<td>0.091</td>
</tr>
<tr>
<td>$\gamma_{RiskInf}$</td>
<td>-19.077***</td>
<td>2.864</td>
<td>2.864</td>
<td>2.864</td>
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<td>2.864</td>
</tr>
<tr>
<td>$\gamma_{ICRG}$</td>
<td>0.341***</td>
<td>0.073</td>
<td>0.073</td>
<td>0.073</td>
<td>0.073</td>
<td>0.073</td>
</tr>
<tr>
<td>$\gamma_{ICRG-1}$</td>
<td>0.091</td>
<td>0.064</td>
<td>0.064</td>
<td>0.064</td>
<td>0.064</td>
<td>0.064</td>
</tr>
</tbody>
</table>

Note: Estimates with clustering robust standard errors in parenthesis. (*), (**), (***) refer to significance at 1%, 5% and 10% level respectively. (-1) refers to lag-1. $RiskInf$ is inflation uncertainty measured by GARCH(1,1). $ICRG$ is international country risk guide composite risk index in natural log transformed as: $ICRG$ scores can be interpreted as probabilities, which then allows a logistic transformation on the credit rating that is equal to ln($ICRG$/100)/(1-(ICRG/100)), and the data source is Baidu Library. $GDP$ is the real GDP growth rate measured by log differences.

Following Demir (2009), we use real GDP growth ($GDP$), inflation uncertainty ($RiskInf$) and risk index ($ICRG$) as the proxy variables of macroeconomic risk. Considering that the foreign exchange reform in 2005, the real exchange uncertainty ($RiskRer$) can not reflect macroeconomic risk.
Decreasing inflation risk has been found to increase financial investment shares in model (11) and (12), which is the same as the previous study on Argentina and Turkey (Demir, 2009). The previous literature explains that it is possible that the effect of decreasing macroeconomic uncertainty manifest that increasing returns in the financial market. This variable could be regarded as the macroeconomic financial investment risk relative to fixed investment. The coefficient of ICRG, international country risk guide composite risk index, is significantly positive in model (13), which support that the overall risk that the firms face promote the financialization.

5.2 State-owned enterprises versus private enterprises

We wonder if corporate ownership affects a company's investment decision in financial assets. Model (15) and (16) in Table 5 are regression analysis of state-owned enterprises (including state-owned absolute holdings, state-owned relative holdings) and private enterprises.6

Since the effects of individual traits such as corporate ownership cannot be obtained under the fixed panel effect, we regress after classification. The main conclusions of private enterprises are consistent with the results of the previous model: the relative risk item and adjusted rate of spreads are significantly positive. The coefficient of size is significantly positive, which means small firms give up some consideration on current risk and invest less on financial assets to pursue long-term operation.

However, the results about state-owned enterprises are obviously different from the benchmark models. The coefficient of the relative risk of fixed investment is still significantly positive, but the coefficient adjusted rate of return gap turns insignificant, while the size of firm is also insignificant. The results show that state-owned enterprises are insensitive to potential relative return gap in fixed assets and financial assets. On the contrary, SOEs usually care for risk when considering about the

---

6 We dropped the firms whose shareholding conditions change in 1999-2009 to ensure that the robustness of the empirical results would not be spoiled by statistical errors or share transfer. The sample in table 5 includes 5544 private firms and 1672 state-owned firms.
portfolio choice, partially because the senior executives of SOEs seek for stability rather than extremely high profits. Jin et al. (2016) interpret this principal-agent problem as the under-investment behavior of inactive senior executives. Liu et al. (2015) find that the poor performance of senior executives of state-owned enterprises will lead to their demotion, but excellent performance without considering social responsibility won’t lead to their promotion.

Table 5  Group-division: Ownership and operating conditions

<table>
<thead>
<tr>
<th>Dependent Variable:</th>
<th>(15)</th>
<th>(16)</th>
<th>(17)</th>
<th>(18)</th>
</tr>
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<tbody>
<tr>
<td>FR(no recivables)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOEs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>private</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Well-operated</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insolvent</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(risk^k)</td>
<td>0.026***</td>
<td>0.016***</td>
<td>0.022***</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>(0.007)</td>
<td>(0.004)</td>
<td>(0.003)</td>
<td>(0.014)</td>
</tr>
<tr>
<td>(\frac{f-k}{gap})</td>
<td>0.194</td>
<td>0.373***</td>
<td>0.384***</td>
<td>0.537</td>
</tr>
<tr>
<td></td>
<td>(0.228)</td>
<td>(0.115)</td>
<td>(0.085)</td>
<td>(0.468)</td>
</tr>
<tr>
<td>size</td>
<td>0.011</td>
<td>0.030***</td>
<td>0.022***</td>
<td>0.047***</td>
</tr>
<tr>
<td></td>
<td>(0.010)</td>
<td>(0.004)</td>
<td>(0.003)</td>
<td>(0.015)</td>
</tr>
<tr>
<td>(fc)</td>
<td>0.139***</td>
<td>0.013</td>
<td>0.023***</td>
<td>0.122***</td>
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<tr>
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<td>(0.030)</td>
<td>(0.012)</td>
<td>(0.009)</td>
<td>(0.036)</td>
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<td>(lev)</td>
<td>0.066***</td>
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<td>0.023***</td>
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<td>(0.008)</td>
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<tr>
<td>(liqdr)</td>
<td>0.039***</td>
<td>0.034***</td>
<td>0.023***</td>
<td>0.051**</td>
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<td>(0.012)</td>
<td>(0.009)</td>
<td>(0.007)</td>
<td>(0.025)</td>
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</table>

Year Fixed Effects Yes Yes Yes Yes
Observations 9,435 28,875 49,605 3,096

Note: Estimates with clustering robust standard errors in parenthesis. (*),(**),(***) refer to significance at 1%, 5%, and 10% level respectively. (-1) refers to lag-1. The values of risk in this table are calculated in rolling window.

The share of financial assets is not affected by the scale, because state-owned enterprises do not have enough incentives for dynamic risk management. Small-scale state-owned enterprises do not sacrifice their stability and overtake current risk to avoid future risks. However, we have no reason to criticize this characteristic of state-owned enterprises, because the dynamic risk management leads to excessive risk exposure at the overall level of the market. This situation may be explained as the behavior of state-owned enterprises of taking responsibility for society.

To be seen dialectically, it is necessary to see the lack of profitability and enterprise
efficiency in the process of state-owned enterprises resorting to stability, and to see the role of state-owned enterprises in the process of correctly arranging risks in the market.

5.3 Insolvent enterprises versus well-operated enterprises

We find that a small number of companies in the database have negative net assets in some years, and the non-listed companies will not delist from the market. China’s Bankruptcy Law stipulates that insolvency is not a clear dividing line for bankruptcy, and firms will be bankrupt when they are unable to pay its debts.

We select companies with negative owner's equity for more than 3 years in the 1998-2009 sample period and regard them as insolvent status. Two-thirds of these insolvent companies are state-owned and one-third are private. As usual, we study corresponding well-operated companies as in model (17) in Table 5, and the results are consistent with the baseline models in Table 3. The results of insolvent companies are shown in model (18). The financial investment decision of insolvent companies is not sensitive to the relative risk, the return gap, and the leverage ratio.

There are two possible reasons accounting for this finding. First, these enterprises under soft budget constraints can always get financial support in the case of poor operating conditions, and will not be eliminated despite inferior efficiency. Second, the principal-agent problem may lead to corruption and increase managing expenses. Traditional literature (Jensen and Meckling, 1976; Harris and Raviv 1991; Dewatripont and Tirole, 1994) conclude that liabilities can reduce agency cost and promote corporate performance, but empirical results show that high leverage prompt corruption of managers under soft budget constraints in China (Tian, 2004). Although there is no strong evidence showing which factor dominates this phenomena, existing studies suggest that soft budget constraint can lead to inefficiency.
6. Conclusions

This paper constructs a portfolio choice model for non-financial firms with risks in both fixed and financial investments. We use this model to explore the determinants of financialization behavior of non-listed non-financial firms in China. The empirical results suggest that China’s non-listed non-financial firms face a portfolio choice between fixed assets and financial assets. Both relative risk and the rates of return gap between financial and fixed assets significantly affect firms’ financialization level. The baseline results are easy to comprehend: firms make trade-offs between risk and profitability, so firms tend to invest more on financial assets if fixed investment maintains higher risk. We also find that the firms with a larger size, less financial constraint, higher leverage, and more current debt prefer to have more financial investment.

In relation to the fiercely debated issue of social concern on firms’ ownership in China, we categorize non-listed firms based on their ownership, and find that state-owned firms only care about risk whereas private firms consider both risk and return in their financial investment. This finding is consistent with the traditional observation on the operating nature of China state-owned enterprises. This group-division method also facilitates comparisons between well-operated and insolvent firms. The results show that insolvent companies’ financialization level is not affected by the risk and return gap variables. To some extent, this result indicates that firms with soft budget constraints behave differently from the well-operated firms.

For further research, it is intriguing to figure out how these characteristics of enterprises would affect the specific classification of financial investment in the future, for example, how to choose among long-term equity investment, transactional real estate investment or just keeping cash in hand. When considering this issue, companies not only make trade-offs between risks and profits, but also consider liquidity and dynamic risk management issues.
References


