An analysis of customer change, government support, and cash holdings

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Abstract
This paper uses a research sample listed manufacturing companies in China and systematically studies the impact of customer change and government support on corporate cash holdings and economic consequences. The empirical results show that there is a significant positive correlation between customer change and cash holdings, and the value of cash holdings is higher among enterprises with customer changes. This study enriches and expands the literature on customer relations and cash holdings, and we confirm the important practical significance of government support for the development of the manufacturing industry.

Keywords
Customer change, government subsidies, preferential taxation, cash holdings, manufacturing companies

Jel classification: G18; G30

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Introduction
Cash is regarded as the “blood” of an enterprise and has an important strategic impact on the healthy operation and sustainable development of the enterprise. Moreover, cash is a scarce resource that is easily used by agents.1,2 Therefore, corporate cash holdings and management have always been important analytical concerns.

According to statistics, the average ratio of cash to total assets of listed enterprises in the United States in 2011 was 20.45%,3 while the ratio of cash to assets of listed enterprises in China was 24.53% in the same year; this ratio has been rising year by year in both China and elsewhere. Accordingly, a natural question arises: why do enterprises give up investment opportunities and choose highly liquid assets, that is, cash, with low returns? The phenomenon that enterprises hold large amounts of cash has gradually become a hot topic in academic research.

Studying the cash holdings and management is especially important in the context of China’s enterprises that are undergoing innovation-based transformation. With the increasingly fierce competition among enterprises, the transformation strategy from “made in China” to “created to China” is a way for manufacturing industry in China to enhance its overall competitiveness. China’s enterprises are undertaking increasing innovation practices to boost the national economy over the recent 5 years. However, innovation investment has high risk and uncertainty, and cannot be long-lasting without long-term and stable financial support. Monetary guarantee is the key to enterprise innovation. Capital constraint has been recognized as bottleneck of enterprise innovation,4 thus enterprises must have sufficient cash reserves for technological innovation.5 The quality of cash holding and government support are believed to be critical for enterprises practicing innovation.6-8 Also with quality cash holding and robust government support, an enterprise is capable of securing...
enhancing production efficiency, developing new products.\textsuperscript{9,10} In other words, cash plays an essential role in promoting innovation.

Simultaneously, supply chain management, which aims to enhance the competitiveness of enterprises, is a hot field in recent years. As an important stakeholder of an enterprise, customers play the role of “hematopoietic function” and have a vital impact on cash flow.\textsuperscript{11} In recent years, academia has performed abundant research on the economic consequences of customer concentration and has yet to reach a consensus.\textsuperscript{12-14} Of all the research findings, two main points of view dominate. The first viewpoint states that customer concentration is an external governance mechanism that can help inter-enterprise information sharing and the integration of supply chain resources, thereby improving enterprise performance. The second viewpoint states that customer concentration will increase the risk faced by enterprises and thus deteriorate enterprise performance. Therefore, it is not perfect to use customer concentration as a measure of customer relationship, further distinction of customer relationship is needed.

Long-term cooperative relationship motivates customers to get involved in the operation activities of the enterprise,\textsuperscript{15} and the earning forecast of the enterprise will be more accurate.\textsuperscript{11} The suspension of cooperation and change of customer will deteriorate the value of relationship specificity investment. The higher degree of specificity, the greater cost and loss will be when it is reallocated for other purposes.\textsuperscript{16} And, the high conversion cost would lead to cash flow risk and financial distress risk.\textsuperscript{17,18} Furthermore, dominant customers in the “buyer’s market” would force the enterprise to decrease the price, extend the collection time, provide more commercial credit, etc., and the customer change may compel enterprise to give up more right of using capital, meet customers’ self-interest demand, and reduce the working capital of the enterprise. What is more serious is that the customer change would overstock the inventories, deteriorate the sales rapidly. It is costly and difficult to find alternative new customers in the short term. Therefore, the customer change increases the business risk and inevitably affects the operation and long-term stable development of enterprises. This paper discusses the impact of the customer change on the enterprise, which has important practical significance.

This paper aims to address the research questions as follow: first, will enterprises increase the cash holding level when they encounter the customer change? Second, if yes, what are the possible mechanisms and what are the economic consequences? Third, considering government subsidies and tax preference could directly or indirectly affect enterprises’ cash holdings, will the strong government support for manufacturing change the relationship between the customer change and cash holdings? Fourth, are there differences between different support channels? This paper tries to answer these questions by investigating the influence of the customer change on the cash holding level of enterprises.

In particular, this paper analyzes the impact of customer change on cash holdings and its internal mechanism. To achieve this aim, this paper sources data form China’s listed manufacturing enterprises. The sample focuses on the operation of these enterprises during 2012–2017. In the empirical analysis, the paper first analyzes the impact of customer change on cash holds. Then, the paper analyzes the customer change and the value of cash holdings. Finally, this paper discusses the interaction role of government support between customer change and cash holdings.

This paper makes important contributions to corporate finance in several ways. First, the research fills a gap in the existing research on customer change. Additionally, this paper helps enterprises make customer management decisions, providing valuable references for improving supply chain management. It is conducive to guiding enterprises to establish efficient and high-quality partnerships with customers and improve the overall performance of the supply chain. Finally, this paper helps enterprises pay attention to the effective use of funds, strengthen management, reduce corporate financial risks, and ensure the long-term stability of corporate funds.

**Empirical hypotheses**

Customers are not only of economic and strategic importance but also can provide enterprises with competitive advantage resources. The stable relationship between enterprises and major customers is conducive to promoting the integration of supply chain, improving the operation of enterprises, reducing enterprise risks, and motivating long-term performance.\textsuperscript{19} Patatoukas\textsuperscript{20} pointed out that enterprises can obtain valuable information from major customers to promote joint investment; reduce administrative expenses, sales expenses, and advertising expenses; improve the efficiency of inventory management and the recovery rate of accounts receivable; and increase enterprise performance. Customer relationship, the intangible asset of “organizational capital,” is recognized by the capital market and got a higher price.\textsuperscript{11}

With the previous intensive study on the supply chain relationship, many achievements have been made on the impact of customers on enterprises, such as the impact of customer concentration on corporate performance, operational activities, cost structure, and profitability\textsuperscript{20,21}; customer centralization and inventory management\textsuperscript{12}; earnings management\textsuperscript{22}; IPO underpricing\textsuperscript{19}; capital structure\textsuperscript{14}; accounting conservatism\textsuperscript{23}; and so on.
Cash, which is regarded as the “blood” of an enterprise, has a significant strategic influence on the normal operation and sustainable development. At the same time, since cash is a scarce resource and freely used by agents, cash holding and cash management have been an important issue of academic in recent years. As an important resource of an enterprise, the change of customer may strike the operation of enterprises, affect the cash flow, and change the cash holding level. The relationship between customers and corporate cash holdings has gradually become a hot topic among scholars.

Customer change and the level of cash holdings

With the widespread application of the supply chain management model, the role of supply chain relations in corporate financial decision-making is becoming increasingly important. Scholars think that enterprises need to integrate supply chain relationship to better balance the relationship between enterprises and customers. Itzkowitz proposed that specific assets make upstream enterprises significantly affected by the bankruptcy filings of their downstream counterparts, and vice versa. To hedge the risk in the supply chain relations, the enterprise will hold additional current assets. Current research on customer concentration and cash holdings considers mainly the risk of customer concentration: (1) The financial distress and bankruptcy of major customers will have a negative impact on enterprises’ stock price, which makes enterprises face the risk of losing a large number of future sales. (2) Enterprises will provide more business credit to their main customers, but when customers file for bankruptcy, enterprises will not be able to recover their accounts receivable and will therefore face the risk of losing their expected cash flow, leading to negative fluctuations in stock returns. Therefore, from a preventive motivation, enterprises with higher customer concentration rely more heavily on key customers and hold more cash.

Similarly, enterprises with customer changes face higher risks. If an enterprise has major changes in customers, it may experience a devaluation of relationship-specific investment. As the degree of specificity increases, the cost and the value loss increase when the enterprise redirects the usage of the asset. This phenomenon will bring high conversion costs to the enterprise, resulting in cash flow risk and financial distress risk. In addition, in a “buyer’s market,” strong customers will force enterprises to lower sales prices, delay the collection of accounts receivable, and provide more commercial credit. Enterprises that have customer changes may have to grant the remaining customers more privileges to use credit in order to cater to customers’ self-interest, reducing enterprises’ valuable liquidity. An even more serious consequence is that if changes occur among one or more major customer(s), the enterprises’ inventory management and sales performance will deteriorate rapidly. To find new and suitable customers in a short time, enterprises will need to incur higher costs and face greater difficulties, increasing business risks. Therefore, to prevent these possible risks, enterprises with customer change tend to be more financially conservative and hold large amounts of cash.

In summary, customer change increases enterprise risk. Thus, this paper proposes hypotheses H1 and H2:

H1: Compared with enterprises that do not change customers, enterprises that change customers have higher levels of cash holdings.
H2: The higher the concentration of changing customers, the higher enterprise’s cash holding levels.

Value of cash holdings

Assuming that the market is efficient, the value of cash holdings is a measure of the potential efficiency of a company’s cash holdings from the perspective of the market’s valuation of cash. The market value of a firm’s cash holdings can vary significantly depending on the level of corporate governance, the degree of financial discipline, etc. Companies generally hold more cash for precautionary or agency motivations. However, these two motivations do not act in the same direction on firm value in terms of investor pricing results. Therefore, holding higher cash does not necessarily mean having a higher cash holding value, and it is particularly important to consider the cash holding value.

The preventive motivation of cash holdings notes that cash holdings can ease the financing constraints and improve the liquidity of corporate assets, thus increasing the market value of cash holdings. From the perspective of financing constraints, this paper argues that customer change will affect the cash holding value in the following respects.

Commercial credit. Businesses may be forced by strong buyers to provide commercial credit, and customers with greater negotiating power usually enjoy commercial credit. To cater to customers and defeat competitors, enterprises facing changing customers will provide even more commercial credit and use it as a means of competition. This action reduces the cash flow of enterprises and increases the potential for enterprises fall into financial difficulty.

Financing costs. The trust between customers and enterprises is an important form of social capital for enterprises that has a significant impact on bank loan acquisition. Customer change destroys this “trust” relationship, increases the risk of default, forces creditors to reduce the scale of lending to enterprises, and requires higher financing costs.

Bargaining power. Customer bargaining power forces enterprises to make concessions in the course of trading, affecting the profits and performance of enterprises.
the concentration of changing customers increases, the impact on the internal sources of funds increases; moreover, major customers (reflected by a high concentration) with stronger bargaining power will increase enterprises’ demand for financing.

Customer-specific investment. The greater the degree of customer concentration is, the greater the degree of the enterprise’s customer-specific investment. Customer change breaks down the relations between the enterprise and the customer, so the customer-specific assets may no longer be fully utilized or even suffer from huge losses because of this lock-up. Therefore, operating performance will be negatively affected, leading to cash flow problems.40

In summary, from the perspective of financing constraints, customer change will increase enterprises’ financial risk, reduce cash flow, and increase financing demand and financing costs, the higher the customer concentration is, the greater the risk faced by enterprises. To ease financing constraints, enterprises may be more rational when making decisions related to corporate cash holdings based on a preventive motivation, thus creating higher value. Based on the above analysis, this paper proposes hypothesis H3:

H3: Compared with enterprises that do not change customers, those that change customers hold a higher value of cash.

Government support, customer change, and cash holdings

Government supports the innovation of enterprises via government subsidies and tax preferences. The mechanisms of the two types of support are different. When the relations between enterprises and customers change, the two different types of government support may have varied effects on enterprises’ cash holding levels.

Government subsidy refers to the free acquisition of monetary or non-monetary assets from the government for enterprise innovation activities, and high-tech firms are more likely to receive public grants.41 Czarnitzki and Hussinger42 proposed that direct government subsidies can reduce innovation cost and risk. Customers are the main source of enterprise income, and internal capital has a significant role in promoting enterprise innovation investment.43 Itzkowitz27 believed that enterprises with a higher customer concentration will maintain higher cash holdings. If the customer changes, the cash flow of the enterprise will be directly affected, but government subsidies, as a zero-cost external financing for the enterprise, can make up for the capital flow problem caused by customer changes.

Unlike government subsidies, tax preferences are a special provision for the government to reduce or exempt enterprises from the tax burden, to motivate the investment in innovation.44,45 Government subsidies are directly used for innovation activities, which occur in the early stage of investment, while tax preference occurs after innovation activities, which occur in the late stage of investment. The fluctuation of cash flow caused by customer change may affect the funding for innovation activities. At this time, enterprises need direct financial support rather than indirect tax relief.

In summary, from the perspective of financial support for innovative activities, government subsidies have a more direct impact on corporate cash flow volatility than tax preferences. Based on the above analysis, we propose hypothesis H4:

H4: The impact of customer change on cash holdings will decrease with the increase of financial subsidies, but the impact of tax preferences is not significant.

Research design

Sample selection and data sources

This paper chooses the listed manufacturing enterprises in China from 2012 to 2017 as the research sample. To review the annual reports of listed enterprises of China’s manufacturing industry from 2011 to 2017 by manual query, and reorganized the statistics of related data from corporate customers information, which included concentration ration and customer names of top five customers, and the customer information data have been matched annually as well. In addition, the sample enterprises were screened by using the following steps: (1) we eliminated enterprises under special treatment (ST and ST*); (2) we eliminated listed enterprises that lack relevant financial data; (3) we eliminated listed enterprises that were missing information regarding the customer concentration or customers’ names. Voluntary disclosure system makes customer information inconsistent each year. We manually matched the collected customer information data, screened them according to the above steps, and finally got 2615 sample enterprises between 2012 and 2017.

The financial data and corporate governance data used in this paper were obtained from the China stock market and accounting research database (CSMAR). To eliminate the influence of extreme values, all continuous variables were winsorized at the 1% level, simultaneously.

Regression models and variable definition

Opler46 found that variables, such as investment opportunities, firm size, financial leverage, dividend payout dummy, cash flow, cash flow riskiness, financial distress costs, management-shareholder incentive alignment,
availability of cash substitutes, derivatives usage, etc., significantly impact on corporate cash holdings. We follow the classic research method of Opler to test hypothesis H1, take the factors found by Opler that have significant influence on cash holding as the control variable, and use OLS model for empirical test. Opler pioneered the study of cash holding behavior, and many scholars cited his methods and conclusions in the subsequent studies. (What determines cash holdings at privately held and publicly traded firms? Evidence from 20 emerging markets; State ownership, soft-budget constraints, and cash holdings; Evidence from China’s privatized firms.) However, Opler did not involve the risk management of an enterprise, and did not consider the role of cooperative relationship in reducing the operation risk. The following econometric models are constructed to examine the impact of customer change on corporate cash holdings

\[
Cash_{it} = a_0 + a_1 CV_{it} + a_2 Control_{it} + e_{it}
\]

where the level of cash holdings (Cash) is the dependent variable, which is calculated as the year-end balance of cash and cash equivalents. The explanatory variables are customer change (CV1) and the degree of customer change (CV2); CV1 is a dummy variable, CV1 = 1 if customer changes occur to one or more of the top five customers, CV1 = 0 if otherwise; CV2 is proportion of the sum of sales to the changing customers in total annual sales to all customers. In accordance with previous literature, the following control variables are added to the model: the scale of the enterprise (Size, natural log of total assets), operating cash flow (Cash-Flow, net operating cash flow/year-begin total assets), cash dividend (Divi, a dummy variable, Divi = 1 if a cash dividend is paid, otherwise, Divi = 0), solvency (Lev, year-end total liabilities/year-end total asset), profitability (RoA, year-end net profit/year-end total asset), and the nature of ownership (Ownership, a dummy variable that equals 1 if state-owned and 0 otherwise); we also control for the annual time trend (Year). Based on the hypothesis H1 proposed above, we expect that \(a_1\) is positive.

With reference to Pinkowitz et al., Frévard and Salva, and Drobetz et al., we use the revised Fama-French classical value regression model to test hypothesis H2

\[
MV_{it} = \beta_0 + \beta_1 CV_{it} + \beta_2 CV_{it} \times Cash_{it} + \beta_3 Cash_{it} + \beta_4 Oi_{it} + \beta_5 Cap_{it} + \beta_6 Fin_{it} + \beta_7 Div_{it} + \beta_8 DX_{it} + \beta_9 DX_{it-1} + e_{it}
\]

where the dependent variables in the model are the market value of the enterprise (MV), and the independent variables are the enterprise’s operating profit (Oi), capital expenditure (Cap), financial expense rate (Fin), cash dividend (Div), and non-cash assets (Nca). In the model, all variables are standardized by total assets. \(DX_{it}\) represents the change of x in period t, \(DX_{it-1}\) including \(Doi_{it-1}, DDiv_{it-1}, Dnca_{it-1}\) and \(DX_{it-1}\) represents the change in x in period \(t-1\), \(DX_{it-1}\) including \(Dmov_{i,t-1}, Doi_{i,t-1}, Dcap_{i,t-1}, Dfin_{i,t-1}, Div_{i,t-1}\) and \(Dnca_{i,t-1}\). The coefficient of Cash (\(\beta_3\)) represents the marginal pricing of an enterprise for every ¥1 increase in cash holdings. To test hypothesis H2, we introduce an interaction term between CV1 and Cash. Based on H2, we expect the coefficient (\(\beta_3\)) of the interaction term to be significantly positive.

To test hypothesis H3, this paper constructs the following models to test whether government subsidies and tax preferences affect the relationship between customer change and corporate cash holdings

\[
Cash_{it} = \sigma_0 + \sigma_1 CV_{it} + \sigma_2 CV_{it} \times Subsidy_{it} + \sigma_3 Subsidy_{it} + \sigma_4 Control_{it} + e_{it}
\]

where government support (\(Subsidy_{it}\)) includes government subsidy (\(Subsidy\)) and tax preferences (\(Treat\), \(Subsidy = \) government subsidy/year-end total assets; \(Treat = \) income tax/EBIT. According to hypothesis H3, we expect the coefficient (\(\sigma_2\)) of the interaction between government subsidies and customer changes to be negative, but the coefficient of the interaction between tax preferences and customer changes to be statistically insignificant.

Key variable definitions are shown in Table 1.

### Empirical analysis

#### Descriptive statistics

Table 2 reports the descriptive statistical results for the key variables. The minimum cash holding level (Cash) is 0.007 and the maximum value is 1.173, indicating that there are great differences in the cash holding status of listed manufacturing enterprises in China. Therefore, it is of practical significance to pay attention to the mechanism through which corporate cash holdings are affected and relevant economic consequences. The mean of CV1 is 0.366. The proportion of listed enterprises with changing customers is less than that of listed enterprises without changing customers. Moreover, the mean of CV2 is only 0.147, indicating that the changing customers account for only a small portion of the overall customer concentration of listed enterprises.

### Empirical results

#### Customer changes and the level of cash holdings

Evidence indicates that customer change and cash holdings have a positive relationship. Table 3(1) (2) shows the test results for hypothesis 1 and hypothesis 2. The regression coefficients of variables CV1 and CV2 are 0.024 and 0.099, respectively, and are significantly positive at the 1% level. That is, the cash holding level of the enterprises with customer
changes is higher than that of the enterprises without customer changes. And the higher the concentration of the changed customers is, the higher the cash holding level. These findings validate our hypotheses H1 and H2.

**Customer changes and the value of cash holdings.** To test hypothesis H3, we present the regression results of customer changes and the level of cash holdings in Table 3(3). The regression coefficient of Cash is 2.665, which is significant at the level of 1%, indicating that the market value of each Yuan held in cash by listed enterprises in the sample is 2.665 Yuan. Furthermore, the coefficient term of the interaction between CV1 and Cash is 1.228, which is significant at the 10% level. This finding shows that the cash holding value of

| Variable name | Meaning | Computation |
|---------------|---------|-------------|
| Cash          | Cash holding level | Year-end balance of cash and cash equivalents/(year-end total assets–year-end cash and cash equivalents) |
| MV            | Market value | (Price of tradable share + price of non-tradable share + book value of corporate debt)/year-end total assets |
| CV1           | Customer change | 1 if changes occur to top 5 customers, otherwise 0 |
| CV2           | Customer change degree | $\sum_{j}^{n} \%Sales_{ij}$ |
| Subsidy       | Government grants | Total government/year-end total assets |
| Treat         | Tax preferences | Income tax/EBIT |

| Variables | Mean | SD | Min | p25 | Median | p75 | Max  | n |
|-----------|------|----|-----|-----|--------|-----|------|---|
| Cash      | 0.169| 0.174| 0.007| 0.060| 0.116 | 0.205 | 1.173| 2615|
| MV        | 2.871| 3.501| 0.865| 1.322| 1.782 | 2.865 | 25.949| 2184|
| CV1       | 0.366| 0.482| 0.000| 0.000| 0.000 | 1.000 | 0.100| 2615|
| CV2       | 0.147| 0.164| 0.003| 0.046| 0.084 | 0.182 | 0.995| 956 |
| Subsidy   | 0.006| 0.008| 0.000| 0.001| 0.003 | 0.006 | 0.051| 2259|
| Treat     | 0.169| 0.208| -0.758| 0.093| 0.159 | 0.247 | 0.911| 2508|

| Variables | H1   | H2   | H3   |
|-----------|------|------|------|
| CV1       | 0.024*** (3.565) | -0.306* (-1.757) | 0.020** (2.432) |
| CV2       | 0.099*** (2.700) | 1.228* (1.717) |
| CV1*Cash  | 2.665*** (6.027) | -0.863* (-1.801) |
| Subsidy   | 0.878*** (3.546) | -0.040 (-1.087) |
| Treat     | 0.009 (0.426) | 0.093 (0.426) |

Note: ***, **, and * indicate significance at the levels of 1%, 5%, and 10%, respectively; t statistics in parentheses, similarly henceforth.
the enterprises with customer change is significantly higher than that of the enterprises without customer change. Specifically, the average cash holding value of an enterprise with customer change is 3.893 Yuan (= 2.665 + 1.228). This finding means that investors expect more uncertainty in the future operation of enterprises with customer changes. To prevent the risk of bankruptcy, investors attach a significantly higher pricing level to enterprises with customer change. Hypothesis H3 in this paper is verified.

**Government support, customer change, and cash holding levels.** Table 3(4) (5) shows the test results for hypothesis H4. The coefficient of the interaction term between \( CV1 \) and \( Subsidy \) is \(-0.863\), which is significant at the 10% level. This finding shows that government subsidies can reduce the positive correlation between customer change and cash holdings. The coefficient of interaction between \( CV1 \) and \( Treat \) is \(-0.040\), which is negative but not significant, indicating that tax preferences do not significantly change the relationship between customer change and cash holdings. It can be seen that the ex ante government subsidy has a greater impact on corporate cash holdings than the ex post tax preferences. Hypothesis 4 is validated.

**Further testing based on government support**

“Made-in-China 2025” is the first ten-year strategic action plan for China to transform itself into a world manufacturing power. The plan strives to achieve the innovation-driven transformation and upgrading of the manufacturing industry and enhance the overall competitiveness of the industry. It offers both opportunities and challenges to manufacturing enterprises. Innovation investment requires long-term and stable financial support. The previous results confirm that government subsidies can weaken the impact of customer change on corporate cash holdings, while no significant impact is brought about by tax preferences. Customer change increases business risks, strengthening the preventive incentives for cash holding. The benefits of government subsidies are intuitively more obvious than those of tax preferences. In addition, the action plan clearly stipulated that China should not only increase its financial support for the manufacturing industry but also reduce the tax burden of manufacturing enterprises. To this end, we need to further verify the relationship between customer change, cash holdings, and innovation investment, as well as the differences between the two forms of government support.

We group the sample enterprises according to changes in cash holdings \( \Delta CH \). \( \Delta CH \) is calculated as \((\text{Year-end cash and cash equivalents} - \text{year-begin total assets}) / \text{year-begin total assets} \). The two groups are enterprises with \( \Delta CH \geq 0 \) and enterprises with \( \Delta CH < 0 \). We use the following regression models and perform the regression separately for the two groups:

\[
\text{Inno}_{ij} = \theta_0 + \theta_1 CV1_{ij} + \theta_2 \text{Control}_{ij} + \epsilon_{ij}
\]

\[
\text{Inno}_{ij} = \mu_0 + \mu_1 CV1_{ij} + \pi_2 CV1_{ij} \times \text{Subsidy}_{ij} + \pi_3 \text{Subsidy}_{ij} + \pi_4 \text{Control}_{ij} + \epsilon_{ij}
\]

where the explained variable \( \text{Inno} \) is the corporate innovation investment, which is equal to R&D investment/year-begin total assets.

**Table 4. Results of the further testing.**

| Variable          | \( \Delta CH \geq 0 \)         | \( \Delta CH < 0 \)         |
|-------------------|---------------------------------|---------------------------------|
|                   | (1)                             | (2)                              | (3)                             | (4)                             | (5)                             | (6)                             |
| CV1               | \(-0.003** (-1.701)\)           | \(-0.005** (-2.303)\)           | \(-0.002 (-0.839)\)            | \(-0.003** (-1.802)\)           | \(-0.001 (-0.334)\)            | \(0.001 (0.620)\)               |
| CV1*Subsidy       | 0.507 (1.586)                   |                                 |                                 |                                 |                                 |                                 |
| Subsidy           | 0.132 (0.766)                   |                                 |                                 |                                 |                                 |                                 |
| CV1*Treat         |                                 | \(-0.005 (-0.437)\)            |                                 | \(-0.018** (-1.896)\)           |                                 |                                 |
| Treat             |                                 | 0.004 (1.004)                   |                                 | 0.020** (3.716)                  |                                 |                                 |
| Control           | Controlled                      | Controlled                      | Controlled                      | Controlled                      | Controlled                      | Controlled                      |
| Constant          | 0.013 (0.730)                   | 0.011 (0.638)                   | 0.013 (0.744)                   | 0.036** (2.316)                 | 0.039** (2.480)                 | 0.013 (0.799)                   |
| F                 | 3.84                            | 3.60                            | 3.00                            | 2.51                            | 3.09                            | 3.22                            |
| Adj R²            | 0.038                           | 0.047                           | 0.040                           | 0.036                           | 0.058                           | 0.056                           |
significant. They are indicating that the impact of government subsidies or tax preferences on customer change and innovation input is not significant when enterprises increase cash holdings. (5) and (6) of Table 4, the regression coefficients of CV1*Subsidy and CV1*Treat are 0.655 and −0.018, respectively, and both are significant at the 10% level, indicating that if the cash holding level of enterprises decreases. This shows government subsidies or tax preferences can weaken the negative impact of customer changes on enterprise innovation investment. Also, the impact of government subsidies is greater than that of tax preferences.

It can be seen that when the level of cash holdings decreases, government support can have a positive effect on enterprises, regardless of the type of government support. However, when the level of cash holdings of enterprises is sufficient, the role of government support is not obvious—government support is similar to charcoal in the snow.

**Robustness test**

To test the robustness of the impact of customer change on cash holdings and enhance the credibility of this study, the following robustness tests are carried out.

(1) We use the year-begin value of customer change to control for the possible problem of endogeneity. As shown in Table 5, the conclusions remain unchanged.

(2) To avoid bias caused by sub-industrial characteristics, the sample enterprises are divided into technology-intensive (TI) and non-technology-intensive (NTI) sub-groups based on factor intensity. Among them, the technology-intensive sub-group includes the following sub-industries: C27 pharmaceutical manufacturing; C34 general equipment manufacturing; C35 special equipment manufacturing; C36 automobile manufacturing; C37 ship, aerospace, and other transportation equipment; C38 electrical machinery and equipment system manufacturing; C39 computer, communication, and other electronic equipment manufacturing; C40 instrument manufacturing; and C41 other manufacturing industries. Another sub-industry falls under the non-technology-intensive group. The regression results are given in Table 6 and do not change the previous conclusions. Moreover, we find that customer changes have a greater impact on the cash holdings of the non-technology-intensive manufacturing industry.

**Discussion**

We use a sample of listed manufacturing enterprises in China from 2012 to 2017 and examine the impact of customer change and government support on corporate cash holdings. We also studied the relationship between customer change, government support, and innovation investment under different conditions of changes in cash holdings. The empirical results show as following: (1) compared with enterprises that do not change customers, the enterprises with customer change have higher cash holding levels, and the concentration of change has a significant positive correlation with cash holdings. (2) The market value of the enterprises’ cash holdings with customer change is higher, that is, the investors believe that the enterprises with customer change have a significant higher pricing. (3) Government subsidies can significantly reduce the impact of customer change on cash holdings, while the effect of tax preferences is insignificant. (4) Whether cash holdings are increasing or decreasing, customer change and innovation investment are significantly and negatively correlated; however, when the level of cash holdings decreases, government subsidies and tax preferences can reduce this negative impact.
When key customers of corporation fall into financial distress or declare bankruptcy,\textsuperscript{40} corporation will face the risk of losing expected cash flow. In particular, the higher degree that corporate relies on key customers, the higher level of cash will be held.\textsuperscript{49} Second, based on the buyer market, aggressive customers force corporations to provide more business credit, lower selling price, extend collection, etc., change of corporate customer will transfer more capital-use-rights to meet customer needs, which leads to loss in value and increase risk in cash flow.\textsuperscript{29} In the meanwhile, customer acts as a downstream component of the supply chain, stable relationship of customer will help corporate lower the selling price, increase marketing efficiency, and guarantee corporate a continuous profit, etc\textsuperscript{19}, therefore, when customer change happens to the corporate, corporate performance and cash flow will be affected, which will higher the business operation and financial risk. It has been proved by scholars that if a corporate does not own enough cash reserves, insufficient cash flow will force the corporate to abandon beneficial investment — insufficient case reflow causes undercapitalize etc\textsuperscript{50,51} Therefore, on the basis of preventive motivation, corporate holding more cash will prevent investment failure caused by shortage of cash flow, or make corporate fall into financial distress and cause greater crisis. To support growth of corporate, high volume of cash held by corporate will not worsen the corporate performance,\textsuperscript{52} it also has an impact on the value of corporate cash holdings,\textsuperscript{53} as can be seen, the more cash holdings a corporate owns for rainy day in the future when customer change, the higher value of cash holdings will be.

This study also shows that government subsidies can significantly improve the impact of customer change on enterprises, alleviate the important role of preventive motivation in traditional cash holdings theory, and when the level of cash holdings decreases, both forms of government support can play a positive role. It can be seen that government support, especially government subsidies, is like charcoal in the snow for enterprises. Under the background of “Made-in-China 2025,” Chinese manufacturing enterprises are facing new opportunities. Program of action proposed innovative development should be focused on explicitly improving quality and efficiency, to enhance the international comparative of China’s manufacturing industry comprehensively. Innovation investment is different from ordinary investment; innovation investment is affected by factors such as technology and market, which involves higher risk and uncertainty, it requires large fund demand, a longer period, and higher requirement of continuity\textsuperscript{54}, therefore, to avoid the devastating blow brought by capital rupture, they generally choose to maintain a relatively high level of cash reserves. In the meanwhile, “Made in China 2015” proposed the series of financial supportive policy, broadened the manufacturing industry, reduced financing cost, improved capacity of government support and tax reduction and exemption, etc., which provide powerful guarantee for Chinese manufacturing corporations. Therefore, to avoid risks, Chinese manufacturing corporations should also strengthen the management of cash holding, rational use of funds, enhance innovation input, make use of opportunities, and strengthen their competitiveness constantly.

\textbf{Limitations and further research}

There are limitations in this study. The model that constructed in this study demonstrated the problem of customer change and cash holding, only integrates the variables such as size, operating cash flow, cash dividend, solvency, profitability, and the nature of ownership into the model as a whole, and financing constraints were not considered; and this study has considered the cash flow of customer and corporate only, which has not involved entire situation of supply chain and capital chain.

In the future research, financing constraints and fund demand can be considered on existing research foundation, to complete influence study on customer relationship and corporate cash holding. Also, supply chain and capital chain works from downstream customers to upstream suppliers, except the cash flows of corporate and customer that were considered in the study, the analysis of impact on cash flow from suppliers can be also added in the future research, to complete the research on relationship between entire cash flow of supply chain and business capital. Furthermore, future research should also continue exploring the measurement of customer change, such as the difference of weight influenced by numbers of customer change, major or minor customers change, to discuss the impact of customer change on corporate more thoroughly and in detail, to complete customer relationship research system.

\textbf{Conclusions}

This paper reveals that customer change has a governance, direct, and indirect effect on cash holdings. This paper verified that customer change has obvious significance on cash holding, also, customer change corporate owns higher value in cash holding. What I learnt from this research is incomplete to measure the relationship between corporate and customer by customer concentrate only, the influence of customer change on enterprises cannot be ignored. Strengthening the management of customer relations and catering to customers’ needs can help ensure the sustainable and healthy development of enterprises and enhance their comprehensive competitiveness.

Furthermore, this paper also discusses about the influences of government support on customer change and cash
holding, which found that government subsidy has obvious significance on these two, but impact on tax revenue subsidy is not significant. Therefore, program of action “Made in China 2025” provides financial supportive policy to Chinese manufacturing corporations, which brings new opportunities for China’s manufacturing industry. Manufacturing enterprises should seize the opportunity created by the “Made-in-China 2025” action plan, improve cash management efficiency, and truly regard government support as the driver of enterprise value creation.

This paper completes the research on customer relationship, which is helpful for decisions making on corporate system and customer management, and provides valuable reference on improving supply chain management. The conclusion of this study will also be helpful for corporate to emphasis on the use of business funds, strengthen management, and lower financial risks. The paper is of great significance to strengthen investor protection and improve the construction of the market system.

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