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INVESTMENT BEHAVIORS AND FINANCIAL AUTONOMY: A FIRM LIFECYCLE APPROACH

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Abstract. *This study examines how investment behaviours relate to financial autonomy across firm's lifecycle. Our empirical evidence shows that high (low) financially autonomous firms are more likely to over- (under-) invest. It suggests that managers of highly financial independent firms from their shareholders usually overinvest to pursue their private benefits. On the other hand, due to difficulty of funding in capital market, firms with low level of financial autonomy may choose to forgo some investment opportunities. In addition, we find that high financially autonomous firms usually have lower valuation. Regarding corporate governance, while it mitigates both over- and under-investment over time, such an effect becomes insignificant when we consider different levels of financial autonomy. Our study has practical implications to both investors and policy makers. For investors, they need to consider firms' investment behaviors coupled with their financial autonomy before making any decision. Policy makers should consider designing more solid corporate governance policy to control the opportunism of managers who are more independent from their shareholders.*
Keywords: Over- and under-investment, Financial autonomy, Transaction cost, Firm's lifecycle, Corporate governance, USA market

1. **Introduction.** A significant body of prior literature studies the characteristics of firm's investment behaviors from the perspective of relationship between firms' sensitivity of investment to cash and features of being financially constrained (Abel and Eberly [1]), the correlation between over-invest and free cash flow (Richardson [2]), the effect of financial reporting quality on constraining investment inefficiency (Balakrishnan et al. [3]). In line with agency theory, firms with positive free cash flow are more likely to over-invest. Management has the potential to squander free cash flow only when free cash flow is positive. At the other end of the spectrum, firms with negative free cash flow can only squander cash if they are able to raise "cheap" capital (Robinson and Sensoy [4]).

Our study mainly differs from the prior literature in the following. At first, we apply the concept of bilateral dependence stemmed from transaction cost economics to defining financial autonomy, and build up the theoretical model by incorporating managerial opportunism across firm's lifecycle. Secondly, and most importantly, incorporating with the intuition of firm's lifecycle theory, we build up a theoretical model by classifying and analyzing firm's lifecycle into five different STATEs through two dimensions in terms of financial autonomy and managerial opportunism.

Our study contributes to a growing body of literature that studies firm's investment behaviors (Ramalingegowda et al. [5]) from the perspective of financial autonomy in

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different STATEs of firm's lifecycle. Our results extend and generalize the prior results by considering multiple measures of investment (and sub-components), by using different proxies for financial autonomy, and by specifically documenting an association between financial autonomy and over- (under-) investment. Such a highly explanatory power of financial autonomy on firm's investment behaviors has been largely unaddressed by the prior research. Our results not only have macro-economic implications due to the importance of investment as a determinant of growth, but firm-level implications given that investment is an influential component of the return on capital that can be obtained by investors.

The remainder of the paper proceeds as follows. Section 2 develops the theoretical framework of the study. Sections 3 and 4 develop the testable hypotheses and describe the research design respectively. Section 5 presents the main results. Section 6 is the conclusion.

2. **The Theoretical Framework.** The theoretical model of firms' unique characteristics at different STATEs across firm's lifecycle is illustrated in Figure 1. We apply firm's financial autonomy dimension based on the level of bilateral dependence coupled with managerial opportunism dimension mainly reflecting the issue of moral hazard as the cornerstone to present different STATEs across firm's lifecycle.

We adopt the concept of bilateral dependency as the main element in our theoretical model to construct the notion of being financially autonomous. Both managers and

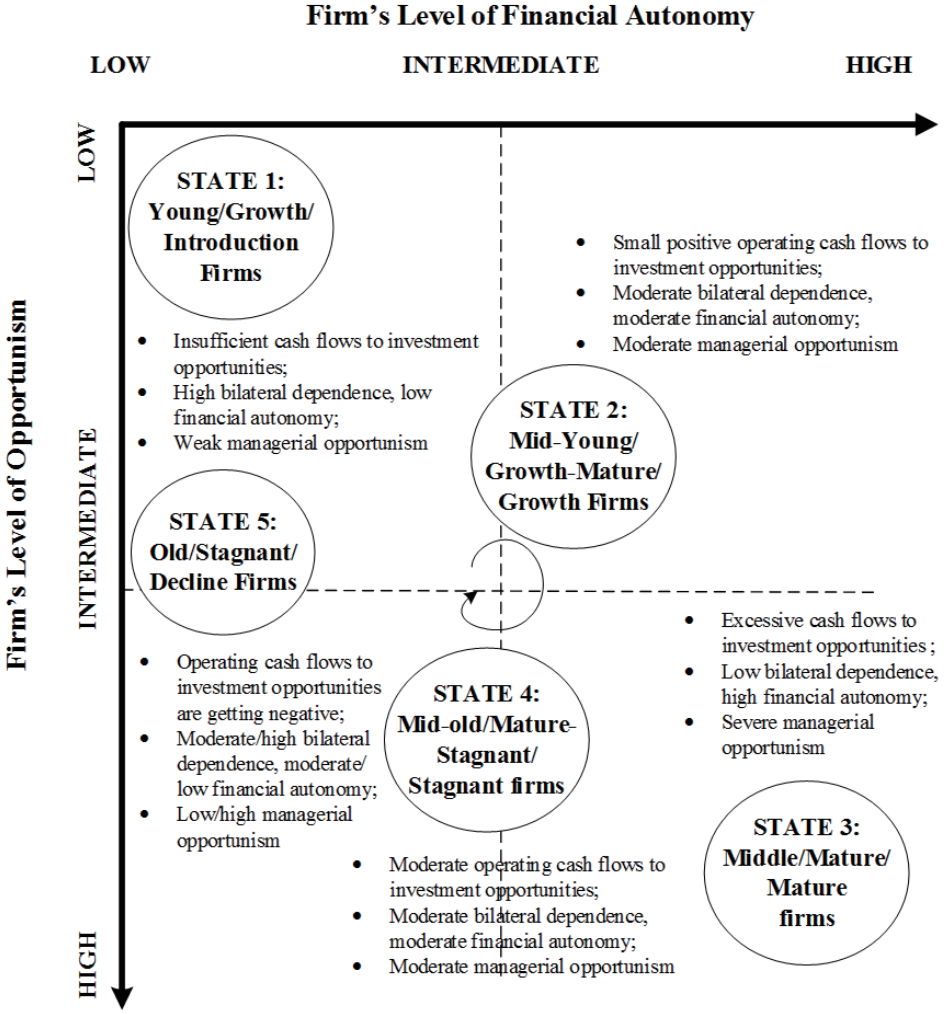

FIGURE 1. Firm's system STATEs over lifecycle

shareholders are bilaterally dependent due to their specific assets involved in transactions. Given the level of managers' human specific asset constant, the degree of such a bilateral dependence attributes to managers' needs of monetary specific asset contributed by shareholders. In specific, high to median level of bilateral dependence with the characteristics of insufficient free cash flows to investment opportunities and needs to rely on external financial market for funds indicating low to median level of firm's financial autonomy, and if firms' internally generated cash flows are consistently larger than the quantities required financing investment opportunities, they will have weak relationship of bilateral dependence but high level of financial autonomy with outside shareholders.

Managerial opportunism, whether in the form of expropriation of investors (Li et al. [6]) or of misallocation of company funds (Klapper et al. [7]), reduces the amount of resources that investors are willing to put up ex ante to finance the firm. While our study fully applies these intuitions of managerial opportunism, it is also argued that the degree of managerial opportunism may be different across firm's lifecycle. For instance, firms that are highly financial autonomous are more likely to suffer the problem that managements expropriate shareholders' welfare by refusal to pay firms' free cash flows and use the funds to invest in more projects to maintain the growth and size of firms (Adams and Jiang [8]).

3. **Hypothesis Development.** Compared with firms with high financial autonomy, for the low financial autonomy firms which are more dependent on shareholders' monetary specific assets, the expected drop in share prices prior to the announcement of offerings represent a material economic impact on their cost of capital. In the similar vein, the great degree of uncertainty surrounding the early years of firms' life makes it difficult to raise outside capital, and the firms can be viewed as facing a very steeply rising cost of capital schedule. Thus, the cost of new equity could be so high that managers of firms that have low degree of financial autonomy might rationally forgo both capital and the investment opportunities.

As demonstrated in the theoretical model, managers of financially autonomous firms tend to engage in self-serving activities to realize their private benefits. We thus expect in firms which have high level of financial autonomy the opportunistic management to undertake more investments even on negative net present value projects. Kieschnick and Moussawi [9] state that corporations may have dominant insiders with nontrivial cash flow rights and larger private benefits in the firms that they control. Their high exposure may lead them to engage in over-investment behaviors. Therefore, we formulate first hypothesis as follows.

Hypothesis 1a. *The firms with low level of financial autonomy tend to under-invest.*

Hypothesis 1b. *The firms with high level of financial autonomy tend to over-invest.*

Although firms with low financial autonomy may face substantial hurdles in raising capital from external sources, these entrepreneurial companies normally grow rapidly and eventually will be recognized by the market. On the other hand, if the management of a sluggish financially autonomous firm is substantially over-investing, the firm would have a lower market value. Gao et al. [10] find evidence consistent with "cash rich" firms (measured using balance sheet cash information) which engage in more poorly performing investments and decline the firms value. Therefore, we formulate second hypothesis as follows.

Hypothesis 2. *Firms with high level of financial autonomy tend to have low value.*

Corporate governance is generally recognized as a monitoring system with the objective of protecting shareholders' rights through mitigating opportunistic activities. The results of Lockhart and Unlu [11] indicate that effective corporate governance leads to more informative stock prices by encouraging collection of and trading on private information. Consistent with an information-flow interpretation, better governance is associated with

the efficiency of corporate investment. An effective corporate governance system not only reduces low financial autonomous firms' cost of capital by making them more credible to the shareholders, but mitigates the managerial opportunism of the firms with high level of financial autonomy as well. Accordingly, it is to test whether high (low) financially autonomous firms engage in less over- (under-) investment activities when corporate governance system is effective. In addition, if corporate governance can increase investment efficiency, we shall see higher valuation for both high and low financially autonomous firms. Therefore, we formulate the third hypothesis as follows.

Hypothesis 3a. *High (low) financially autonomous firms with better corporate governance are less likely to over- (under-) invest.*

Hypothesis 3b. *High (low) financially autonomous firms with better corporate governance have higher valuation.*

4. Methodology.

4.1. Sample and data.

Our sample consists of 38,274 firm-year observations from 2008-2018 in the U.S. market. We collect financial reporting data from Compustata, price and return data from CRSP, and governance data from Li and Zaiats [12]. Given that some of the companies changed names and ticker symbols, we match the information in the two years using 8 digit CUSIPs provided in Bebchuk et al.'s database in order to make sure that the data refer to the same company. Consistent with the previous practice in the literature, banks, financial companies and some service industries (i.e., SIC codes in the 6000 to 6999 and above 8100) are excluded because of the different nature of capital and investment of these firms. In order to mitigate the influence of outliers, we winsorize all continuous variables at the 1 percent and 99 percent level.

4.2. Variable design and measurement.

4.2.1. *Measurements of dependent variables.* We establish two measurements that have been used in the prior literature to capture the practices of over- and under-investment behaviors. The first method adopts the model developed by Richardson [2]. It is argued that such a model allows us to capture the opportunistic behaviors when firms refuse to pay out the free cash flow to shareholders, but selfishly invests in negative net present value projects instead. In order to capture the effect of growth opportunities on investment decisions, we include the book-to-market of equity to measure the growth opportunities. Moreover, we also use the change stock returns as an additional variable to capture growth opportunities which are not reflected in B/M ratio.

The next step is to decompose investment behaviors into expected investment expenditure in new positive NPV projects, and abnormal (or unexpected) investment. Specifically, it is measured as the unexplained portion (or residual) of the following regression model which regresses firm's specific characteristics against the total investment on new projects. While the negative values of the residual correspond to underinvestment behaviors, the positive reflect the magnitude of overinvestment practices.

$$\begin{aligned} I_{NEW,i,t} = \alpha &+ \beta_1 B/M_{i,t-1} + \beta_2 LEVERAGE_{i,t-1} + \beta_3 CASHLEVEL_{i,t-1} \\ &+ \beta_4 AGE_{i,t-1} + \beta_5 SIZE_{i,t-1} + \beta_6 STOCKRETURNS_{i,t-1} + \beta_7 I_{NEW,i,t-1} \end{aligned} \tag{1}$$

where $I_{NEW,i,t}$ = the difference between total investment expenditure and required investment expenditure to maintain assets in place of firm i in year t; $B/M_{i,t-1}$ = ratio of book value to market value of equity of firm i in year $t-1$; $LEVERAGE_{i,t-1}$ = the sum of the book value of short term and long term debt deflated by the sum of the book value of total debt and the book value of equity of firm i in year $t-1$; $CASHLEVEL_{i,t-1}$ = the sum of cash and short term investment deflated by the book value of total assets of firm i in year $t-1$; $AGE_{i,t-1}$ = the natural logarithm of the number of years since firm i was originally formed in year $t-1$; $SIZE_{i,t-1}$ = the natural logarithm of the book value

of total assets of firm i at the end of year $t-1$; $STOCKRETURNS_{i,t-1}$ = the change in market value of firm i over that prior year.

To calculate the second proxy, we follow the model of Chen et al. [13]. The model is a parsimonious model for expected investment as a function of review growth, while also allows for differential predictability for revenue increases and revenue decreases by employing the following regression:

$$\begin{aligned} &Invest_{i,t} \\ &= \beta_0 + \beta_1 NEG_{i,t-1} + \beta_2 \%\text{RevGrowth}_{i,t-1} + \beta_3 NEG_{i,t-1} * \%\text{RevGrowth}_{i,t-1} + \varepsilon_{i,t} \end{aligned} \tag{2}$$

where $Invest_{i,t}$ = sum of research and development expenditure, capital expenditure, and acquisition expenditure less cash receipts from sale of property, plant, and equipment multiplied by 100 and scaled by lagged total assets; $\%\text{RevGrowth}_{i,t-1}$ = the annual revenue growth rate for firm i in year $t-1$; $NEG_{i,t-1} = 1$ for negative revenue growth, and 0 otherwise.

With regard to the performance measurement, Lang and Maffett [14] provide evidence suggesting that the existence of abundant free cash flows which is expected to continue for an extended period of time is the primary cause of a declining *Tobin*'s Q of the firm, since managements increasingly use the free cash flows to invest in negative net present value projects. According to Ghouma et al. [15], Q is equal to the market value of firm's assets divided by its book value of assets in year t, where the market value of assets is computed as the book value of assets plus the market value of common stock less the sum of book value of common stock and balance sheet deferred taxes.

4.2.2. *Measurements of independent variables.* We measure the level of financial autonomy by different life-cycle stages. There is no universally accepted measure of life-cycle stages. We employ three different measures that have been used in prior research for the following reasons. (See Figure 2) Firstly, we use firm age to measure lifecycle. We calculate the natural logarithm of the number of years since the firm was originally formed, and we arrange all firm observations into five different groups. Then, we use a standardized ranking system via $(\text{Rank}-1)/(\text{GroupSize}-1)$ for each firm-year observation [16]. Secondly, based on three descriptors of dividend payout, sales growth, and firm age, we follow

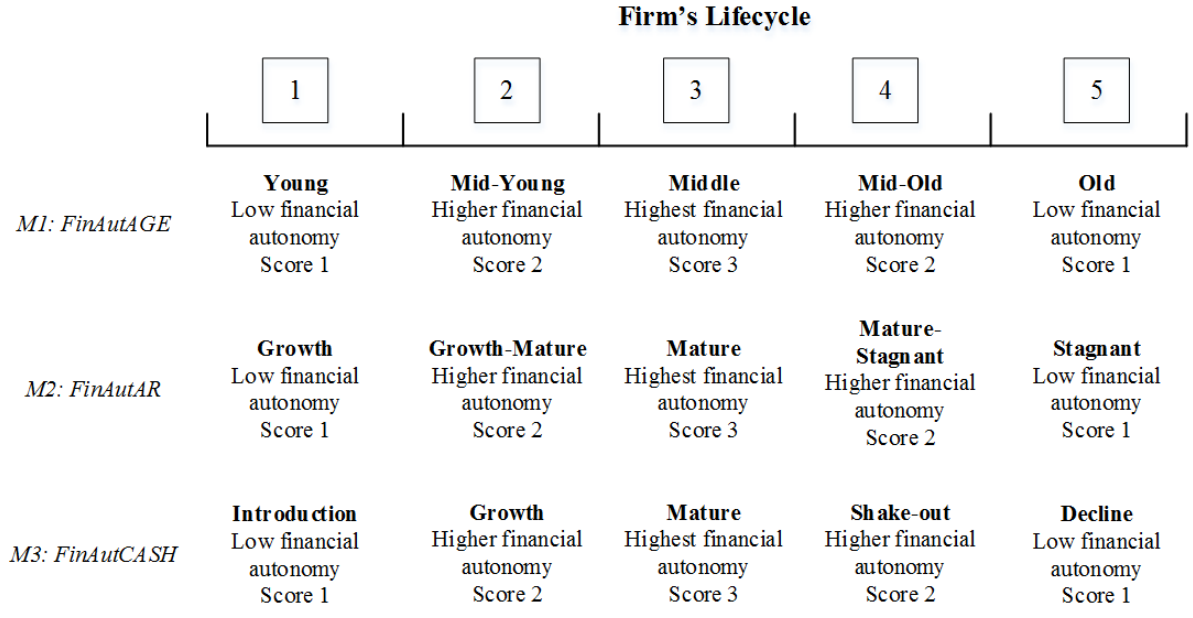

FIGURE 2. Summary of the measurements of financial autonomy

AR model to classify firm's lifecycle from the perspective of firm's operating characteristics ($\text{FinAutAR}_{i,t}$) [17]. Based on the composite score obtained by summing these three individual variable scores (the composite scores range from 3 to 9), we rank firm-years to five cycle groups. Thirdly, the measure is the combination of a firm's net operating, investing, and financing cash flows by following the work of Dickinson [18]. We collapse firm-years observations into five theoretical lifecycle stages based on the characteristics of their cash flows.

We use the level of managerial entrenchment as a measure for the effectiveness of institutional corporate governance in constraining opportunism. The E-index, management entrenchment index is introduced and used by Bebchuk, Cohen and Ferrell [19] (hereafter BCF), as a proxy for the influence of market for corporate control. The BCF's E-index is composed of six key governance provision including staggered boards, limits to amend by-laws, poison pills, golden parachutes, supermajority requirements for mergers, and supermajority requirements for charter amendments. Firms with large E-scores have more entrenchment provisions that reduce the ability of market for corporate control to act as a monitoring device for managers. For consistency with our other measures, we multiply the score by minus one so that the measure is increasing in corporate governance. In our regression analysis, $InvE\text{-}index_{i,t}$ is the invert value of BCF's *E-index*, and it is increasing in the likelihood of good corporate governance. We include an indicator variable *E-index* $Dummy_{i,t}$ that takes the value of one if the data is missing and zero otherwise.

5. **Main Empirical Results.** Panels A and B of Table 1 report the regression results for the test of H1a and H1b using two investment proxies. The results of Panel A provide

Table 1. OLS regression results of investment behaviors

Panel A: The Relation Between Investment Behaviors (Richardson, 2006 model) and Firms Financial Autonomy

$$InvestR_{i,t} = \alpha + \beta_1 FinAut_{i,t} + \sum \gamma_j Control\_Variables_{j,i,t} + \varepsilon_{i,t}$$

Variables	Dependent Variable *Invest-R*			Dependent Variable *Over-Invest*			Dependent Variable *Under-Invest*		
FinAutAGE	**0.010** (2.002)**			**0.014*** (3.053)**			**0.013** (2.114)**		
FinAutAR		**0.016*** (3.613)**			**0.007* (1.454)**			**0.007 (0.952)**	
FinAutCASH			**0.049*** (11.332)**			**0.001 (0.084)**			**0.009* (1.572)**
Intercept	−0.034*** (−6.116)	−0.050*** (−7.081)	−0.068*** (−9.886)	−0.007 (−1.196)	−0.005 (−0.718)	−0.031*** (−4.218)	−0.024 (−1.244)	−0.083*** (−2.944)	−0.070*** (−2.793)
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm/Year Cluster	YES	YES	YES	YES	YES	YES	YES	YES	YES
OBS	38,274	38,274	38,274	30,619	30,619	30,619	7,655	7,655	7,655
Adjusted R^2	0.242	0.257	0.324	0.293	0.293	0.454	0.372	0.335	0.376

Panel B: The Relation Between Investment Behaviors (Chen et al., 2011 model) and Firms Financial Autonomy

$$InvestC_{i,t} = \alpha + \beta_1 FinAut_{i,t} + \sum \gamma_j Control\_Variables_{j,i,t} + \varepsilon_{i,t}$$

Variables	Dependent Variable *Invest-C*			Dependent Variable *Over-Invest*			Dependent Variable *Under-Invest*		
FinAutAGE	**0.008* (1.741)**			**0.005 (1.173)**			**0.031* (1.505)**		
FinAutAR		**0.007* (1.828)**			**0.000 (0.019)**			**0.011 (0.834)**	
FinAutCASH			**0.009* (1.788)**			**0.015*** (4.539)**			**0.040*** (2.778)**
Intercept	0.107*** (7.744)	0.131*** (7.112)	1.605*** (10.741)	0.132*** (8.581)	0.124*** (9.048)	0.086*** (6.174)	−0.014 (−0.720)	0.005 (0.052)	1.298*** (11.788)
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm/Year Cluster	YES	YES	YES	YES	YES	YES	YES	YES	YES
OBS	38,274	38,274	38,274	28,714	28,714	28,714	9,560	9,560	9,560
Adjusted R^2	0.298	0.406	0.350	0.316	0.151	0.653	0.124	0.083	0.207

*, **, *** denote significance at the 10 percent, 5 percent, and 1 percent levels, respectively.

evidence that the firms with low level of financial autonomy attend to engage more under-investment activities, and high financial autonomous firms are more likely to overinvest. In Panel B, the estimated coefficients on financial autonomy are positively correlated with investment measurements ranging from 0.000 to 0.40, and some coefficients are statistically significant at 1 per cent and 10 per cent respectively. Basically, the results reported in Panel A (Richardson [2]) and Panel B (Chen et al. [13]) are consistent.

Furthermore, across all three test model specifications arranged by different financial autonomy proxies, as we expected, the conclusion is the same: firm valuation decreases with the level of firm's financial autonomy. Specifically, all three estimated financial autonomy coefficients are negative and significant at the level of 1 per cent to 5 per cent. In sum, the results provide consistent evidence supporting our H2 that since firms are more likely to overinvest when they become financial autonomous, their valuation is largely jeopardized (untabulated here).

The relation between behaviors, firms valuation and corporate governance is reported in Table 2. The results show that our investment proxies are positively correlated with most of financial autonomy measurements. Regarding corporate governance index, we find that the investment proxies are negatively correlated with *InvE-index*, but positively related with *Tobin's Q*. In terms of the interaction between the corporate governance proxy and financial autonomy, the estimated coefficients are generally insignificant suggesting that the relations between investment behaviors, firm valuation and corporate governance are independent of the level of financial autonomy. By further partitioning our variable of invest into over- and under-investment, we obtain qualitatively the same results. In sum, the findings suggest that the effectiveness of the market for corporate control decrease (increase) investment inefficiency (firm valuation) regardless firm's degree of financial autonomy.

Table 2. OLS regression results of corporate governance

The Relation Between Investment Behaviors, Forms Valuation and Corporate Governance

$$Invest_{i,t} = \alpha + \beta_1 FinAut_{i,t} + \beta_2 InvE\text{-}index_{i,t} + \beta_3 InvE\text{-}index\ Dummy_{i,t} + \beta_4 FinAut_{i,t} * InvE\text{-}index_{i,t} + \sum \gamma_j Control\_Variables_{j,i,t} + \varepsilon_{i,t}$$

$$TobinQ_{i,t} = \alpha + \beta_1 FinAut_{i,t} + \beta_2 InvE\text{-}index_{i,t} + \beta_3 InvE\text{-}index\ Dummy_{i,t} + \beta_4 FinAut_{i,t} * InvE\text{-}index_{i,t} + \sum \gamma_j Control\_Variables_{j,i,t} + \varepsilon_{i,t}$$

Variables	**Dependent Variable** ***ABS (Invest-R)***			**Dependent Variable** ***ABS (Invest-C)***			**Dependent Variable** ***Tobin's Q***		
FinAutAGE	0.014*** (5.121)			0.005* (1.846)			−0.010* (−1.493)		
FinAutAR		0.001 (0.134)			0.004 (0.849)			−0.23*** (−3.774)	
FinAutCASH			0.047*** (9.552)			−0.008 (−1.391)			−0.020*** (−3.442)
InvE-index	−0.038*** (−2.491)	−0.009 (−0.732)	−0.020* (−1.850)	−0.019 (−1.466)	−0.012 (−1.119)	0.005 (0.333)	0.041*** (2.739)	0.064*** (4.430)	0.027* (1.677)
*InvE-index * FinAutAGE*	0.010 (0.699)			−0.009 (−0.731)			0.007 (0.514)		
*InvE-index * FinAutAR*		−0.016* (−1.381)			−0.004 (−0.392)			0.003 (0.428)	
*InvE-index * FinAutCASH*			−0.049*** (−3.975)			−0.011 (−0.735)			0.006 (0.401)
InvE-index Dummy	0.004 (0.487)	−0.028*** (−3.553)	−0.022** (2.804)	−0.025*** (−3.253)	−0.016** (−2.320)	0.002 (0.259)	−0.064*** (−7.085)	−0.063*** (−7.027)	−0.074*** (−8.013)
Intercept	0.250*** (24.328)	−0.028*** (−3.017)	−0.058*** (−6.497)	0.162*** (7.664)	0.145*** (5.933)	−1.410*** (−6.861)	3.029*** (17.138)	3.281*** (17.844)	2.571*** (17.098)
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm/Year Cluster	YES	YES	YES	YES	YES	YES	YES	YES	YES
OBS	38,274	38,274	38,274	38,274	38,274	38,274	38,274	38,274	38,274
Adjusted R^2	0.044	0.289	0.331	0.138	0.084	0.039	0.073	0.074	0.056

*, **, *** denote significance at the 10 percent, 5 percent, and 1 percent levels, respectively.

As robustness checks, we conduct several additional sets of tests. First, we model the association between financial autonomy and the likelihood of over- or under-investing. As an additional test, we directly regress financial autonomy proxies against the likelihood of over- or under-investing behaviors by performing multinomial logit regressions. Consistent with our prior results, the coefficients on financial autonomy are positive and statistically significant. Second, considering the corresponding performance effect due to overinvestment, we introduce an over-investment adjusted performance measurement (which is the ROA scaled over-investment ratio) to estimate firms' corresponding performance following over-investment. The results show significant negative correlations with all three financial autonomy proxies respectively. We also use the ROE scaled over-investment ratio as a substitute, the results are also consistent with the notion that financially autonomous firms tend to over-invest and such an activity hampers their value. At last, in order to control the potential problem of endogeneity, we perform two-stage least squares regression test (or 2SLS). In the first stage, we use the lagged value of financial autonomy as the instrument variable. The lagged value is significantly correlated with our proxies of financial autonomy. In the second stage, we include the predicted value of financial autonomy and residuals from the first stage in our main regressions. The results show insignificant results indicating that no inferences are affected after controlling for potential endogeneity of financial autonomy via this two-stage estimation.

6. **Conclusions.** Our results are mainly consistent with the hypotheses when tested in several ways. The results provide consistent evidence that while large and lavish firms who are financially independent from their shareholders are more likely to over-invest, firms with low level of financial autonomy tend to forgo investment opportunities due to high cost of capital and uncertainty. The values of over-investing firms are usually jeopardized. In addition, although we find that market for corporate control is effective on mitigating investment inefficiency and increasing firm valuation over time, such effects are independent from firm's level of financial autonomy. These insights have a number of important practical implications, particularly for investors and policymakers.

For the future research, we have three recommendations. First, we could establish more appropriate theoretical method to estimate the lifecyle which plays a core role in analyzing the investment behaviors. Second, we could find the more appropriate proxy to identify the financial autonomy and corporate governance. A lot of studies use internal control system quality, governance performance and so on to describe the level of corporate governance. Also, how to identify the under or over investment is hard in different industries and time horizon. Since our research is based on data from U.S. market, we would like to see more accurate study in various industry of new emerging countries.

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