Managerial Diversion, Product Market Competition, and Firm Performance

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Observation

The separation of ownership and management creates rooms for managerial opportunism, allowing managers to divert value from shareholders, including self-dealing, insider trading, embezzlement, perquisites, etc. (Shleifer and Vishny, 2012)

Literature

- Managerial diversion is a rent seeking behavior and should be disapproved and regulated: Jensen and Meckling (1976), Grossman and Hart (1980), Jensen (1986), Bebehuk and Jolls (1999), Meulbroek (1992), Shleifer and Wolfenzon (2002)

- Other common forms of compensation can better align managers' incentives with shareholders' interests as compared with managerial diversion (Bebchuk and Jolls, 1999)

Literature (Cont.)

- Emphasizing the potential role of diversion as a form of compensation, a part of the optimal employment contract, and arguing that restrictions on managerial diversion are unnecessary (Easterbrook and Fischel, 1991; Fama,1980; He, 2006)

Literature (Cont.)

- ☐ While we cannot rule out the occasional aberration, and while we have little to say on the overall level of perks, our findings suggest that treating perks purely as managerial excess is incorrect (Rajan and Wulf, 2006).

- ☐ When personal aircraft use by CEOs is first disclosed to shareholders, company stock prices drop by about 1.1%. Firms permitting CEO aircraft use underperform market benchmarks by about 400 basis points per year, a severe shortfall that cannot be explained simply by the costs of the resources consumed (Yermack, 2006).

Focus of our paper

- This paper focuses on the interaction between managerial value diversion and product market competition.

- The implication of the model for the relationship between managerial value diversion and firm performance.

Main Theoretical Results

- Under *Cournot* competition, managerial diversion is more likely to occur when (i) the incentive mechanisms are weak; (ii) corporate governance is weak and, therefore, the probability of detection is low; (iii) ex post punishment is not severe enough to prevent managerial diversion ex ante.

- Managerial diversion creates strong incentives for managers to increase output and boosts product market performance.

Main Theoretical Results (Cont.)

- ☐ The relation between managerial diversion and the firm's profits is inverse-U shaped.(Intuition: output enhancement effect versus value transfer effect)

Dataset Used In this Paper

- Annual Surveys of Industrial Production conducted by the Chinese National Bureau of Statistics.

- Advantages of using this dataset: allow us to construct the precise measures of product market performance than CSMAR; reports information on the administrative expenses so that the degree of managerial diversion can be gauged; allow us to contrast SOEs with private firms regarding managerial incentives and corporate governance so that our hypotheses can be tested.

Main Empirical Results

- There exists a positive relation between current managerial diversion and future product market expansion for SOEs, and the relation tends to be negative for private firms

- The relation between managerial diversion and profitability is inverse U-shaped for SOEs, but is negative for private firms.

The Model

Consider two firms competing in the same market, firm 1 and firm 2. Both firms produce a homogenous good at the same marginal costs, with quantity outputs being q_1 and q_2, respectively. For simplicity, we normalize both firms' marginal costs to be

zero. The market's inverse demand curve is given by $p = 1 - q_1 - q_2$.

The Model (Cont.)

The utility function for the manager of firm 1 who takes into account the income

diversion is specified as follows:

$$S_1 = (1-\alpha)[\lambda(p-\gamma)q_1 + \gamma q_1 + f] + \alpha[\lambda(p-\gamma)q_1 + \gamma q_1 + f - \rho\gamma q_1], \qquad (1)$$

which can be simplified to

$$S_1 = \lambda(p-\gamma)q_1 + \gamma q_1 - \alpha\rho\gamma q_1 + f = \lambda p q_1 + (1 - \alpha\rho - \lambda)\gamma q_1 + f. \quad (2)$$

The Model (Cont.)

In firm 2, its manager simply maximizes the firm's profits,

$$S_2 = \pi_2(q_1, q_2) = (1 - q_1 - q_2)q_2. \tag{3}$$

Thus, when manager 1 is a profit maximizer, our model is reduced to a standard textbook *Cournot* competition model.

The Model (Cont.)

In what follows, we consider a simple two-stage game:

- *First Stage.* The manager of firm 1 chooses whether to divert γq_1 or zero.

- *Second Stage.* Firms 1 and 2 compete, *à la Cournot.*

The Model (Cont.)

The condition under which managerial diversion will occur is

$$\lambda < 1 - \alpha\rho$$

λ: the reward rate
α: the probability of dis(
ρ: the penalty for divers

The Model: the impact of diversion on product market behavior

- □ Firm 1's output in the presence of diversion is always greater than that in the case of no diversion

- □ firm 1's market share is larger in the presence of diversion and, more generally, increases with γ.

The Model: the impact of diversion on profits

The relation between the profits of firm 1 and γ is inverse U-shaped, i.e., at moderate levels, managerial diversion has a favorable effect on firm 1's profits, but excessive managerial diversion reduces profits.

Hypotheses from the Model

- ☐ Hypothesis 1: The managerial diversion is more likely to occur for SOEs compared to other types of firms.

- ☐ Hypothesis 2: Product market performance is better for SOEs with managerial diversion , but not for private firms.

Hypotheses from the Model (Cont.)

- ☐ Hypothesis 3: Product market performance improves with managerial diversion for SOEs, but not for private firms.

- ☐ Hypothesis 4: The relation between managerial diversion and firm profits is inverse U-shaped for SOEs, but not for private firms.

Data and Variables

- Our data are obtained from the Annual Surveys of Industrial Production conducted by the Chinese National Bureau of Statistics from 1998 through 2006.

Data and Variables (Cont.)

- The dataset covers all SOEs, plus other manufacturing firms with more than 5 million Yuan (approximately 600,000 US dollars) in annual sales. The dataset covers all mining firms, manufacturing firms, and firms involved in production and supply of electricity, water, and heat. To be consistent with the existing literature (Fresard, 2010; Campello, 2006), we include only manufacturing firms in our analysis.

Data and Variables (Cont.)

- We drop firms with missing or negative values of total assets, employees, total wages, total liabilities, or sales. Firms with the number of employees less than 10 are also excluded in our analysis. The firm-year observations with a business status of "not in operation" are excluded. To minimize the influence of outliers and misreported data in our analysis, observations with extremely high values (above the ninety-ninth percentile) or extremely low values (below the first percentile) of the variables are trimmed away.

Data and Variables (Cont.)

- We use a 50% cutoff point to identify different types of firms. Specifically, SOEs are identified as firms with the share of state ownership greater than 50%; firms with the share of individual investor ownership greater than 50% are identified as *private* firms; firms with the share of corporate investor ownership greater than 50% are identified as *Corporate* firms; firms with the share of foreign investor ownership greater than 50% are identified as *Foreign* firms; firms not included in any of the above categories are identified as *Other* firms.

Measuring managerial diversion

- We construct a proxy for managerial diversion based on the abnormal administrative expenses, i.e., regressing the administrative expenses on several firm characteristics within each type of firms in each year and using the residuals as the measures of abnormal administrative expenses:

$$AExp_{it} = \beta_0 + \beta_1 Size_{it} + \beta_2 \ln(Employees)_{it} + \beta_3 Leverage_{it} + \beta_4 Profit_{it}$$

$$+\beta_5 Investment_{it} + \beta_6 SalesG_{it} + \beta_7 Exports_{it} + \beta_8 Inventory_{it} + \beta_9 FxdS_{it}$$

$$+\beta_{10} LaborCosts_{it} + \sum \alpha_j Province_j + \sum \gamma_k Industry_k + \varepsilon_{it}.$$

Table 1

	SOEs	Foreign	Private	Corporate	Collective and Others
AExpenxe / Sales	0.143	0.075**	0.053**	0.068**	0.069**
Total Assets (million Yuan)	242.922	113.117**	36.453**	102.712**	69.078**
Lev	0.627	0.478**	0.594**	0.563**	0.585**
Inventory / Sales	0.410	0.226**	0.167**	0.214**	0.229**
PPE / Sales	0.932	0.402**	0.287**	0.386**	0.371**
Profitability	0.008	0.058**	0.074**	0.066**	0.067**
Investment	0.027	0.047**	0.055**	0.049**	0.036**
Pay/Sales	0.155	0.104**	0.082**	0.089**	0.091**
Employee	733	369**	190**	309**	282**
SalesGrowth	0.099	0.203**	0.225**	0.210**	0.131**
MPK	4.510	9.978**	11.561**	10.659**	10.252**
Export/Sales	0.055	0.460**	0.135**	0.131**	0.101**
obs	71,912	126,659	315,721	172,163	117,123

Empirical Analysis

Hypothesis 1: The managerial diversion is more likely to occur for SOEs compared to other types of firms.

we augment the previous model with four firm type indicators (*Private*, *Foreign*, *Corporate*, and *Other*) and estimate the model on the full sample.

$$AExp_{it} = \beta_0 + \beta_1 Size_{it} + \beta_2 \ln(Employees)_{it} + \beta_3 Leverage_{it} + \beta_4 Profit_{it}$$

$$+\beta_5 Investment_{it} + \beta_6 SalesG_{it} + \beta_7 Exports_{it} + \beta_8 Inventory_{it} + \beta_9 FxdS_{it}$$

$$+\beta_{10} LaborCosts_{it} + \sum \alpha_j Province_j + \sum \gamma_k Industry_k + \varepsilon_{it}.$$

Empirical Analysis

- Table 2 reports the OLS estimation results. We find that the administrative expenses of SOEs are about 3% higher relative to other types of firms.

- To address the possibility that the differences in the residual administrative expenses across different types of firms are driven by unobservable time-invariant firm characteristics, we drop the province and industry indicators and re-estimate regression (8) with firm fixed effects. The results are similar.

Table 2

	Full Sample	SOEs	Private Firms
Size	0.005**	0.005**	0.005**
	(37.91)	(6.75)	(24.87)
Lev	-0.004**	-0.013**	0.002**
	(-9.21)	(-5.74)	(3.68)
Profitability	-0.025**	-0.184**	-0.009**
	(-29.60)	(-24.41)	(-9.00)
Investment	-0.019**	-0.032**	-0.014**
	(-35.59)	(-10.14)	(-20.85)
$\ln(Employee)$	-0.008**	-0.004**	-0.004**
	(-43.15)	(-4.51)	(-20.54)
SalesGrowth	-0.003**	-0.005**	-0.005**
	(-20.82)	(-5.53)	(-25.48)
Export/Sales	-0.009**	-0.023**	-0.006**
	(-30.20)	(-9.06)	(-16.12)
Inventory / Sales	0.020**	0.007**	0.026**
	(32.64)	(4.44)	(28.28)
PPE / Sales	0.018**	0.019**	0.013**
	(44.01)	(23.13)	(18.30)
Pay/Sales	0.091**	0.089**	0.116**
	(23.72)	(11.50)	(14.50)
Dummy _ Foreign	-0.026**		
	(-42.12)		
Dummy _ Individual	-0.032**		
	(-56.40)		
Dummy _ Corporate	-0.027**		
	(-48.08)		
Dummy _ Collective	-0.027**		
	(-46.27)		
Constant	0.042**	0.051**	0.008
	(12.16)	(3.71)	(1.68)
Observations	803,578	71,912	315,721
R-squared	0.466	0.491	0.348

Empirical Analysis: Event Study Results

- To address the differences in the administrative expenses between SOEs and private firms are driven by other unobserved differences between SOEs and private firms, we examine how management costs change when there is a transition from SOEs to private firms using a sample of firms that are privatized during our sample period.

Empirical Analysis: Event Study Results (Cont.)

- Table 3 reports the time-series of individual and state ownership levels as well as the administrative expenses of privatized firms from two years before to two years after the privatization. Overall, the administrative expenses decline by about 20% following the privatization.

Table 3

	-2	-1	0	1	2
Individual ownership	0.0578	0.0652	0.9334	0.9345	0.9422
State ownership	0.9053	0.9020	0.0383	0.0346	0.0271
$AExpense / Sales$	0.1306	0.1319	0.1155	0.1046	0.1007
Observations	635	635	635	635	635

Empirical Analysis: Managerial diversion and product market performance

- Following Campello (2003, 2006), we examine whether firms with managerial diversion expand their market shares more than their peer industry rivals using the following regression model:

$$SalesG_{it} = \beta_0 + \beta_1 Size_{it} + \sum_{k=1}^{2} \beta_{2k} SalesG_{it-k} + \sum_{k=1}^{2} \beta_{3k} Investment_{it-k}$$

$$+ \sum_{k=1}^{2} \beta_{4k} Profitability_{it-k} + \sum_{k=1}^{2} \beta_{5k} Leverage_{it-k}$$

$$+ \beta_6 DumDiversion_{it-2} + \sum \alpha_j Province_j + \sum \gamma_t Year_t + \varepsilon_{it}.$$

Empirical Analysis: Managerial diversion and product market performance

- The key variable for testing Hypothesis 2 is the indicator variable for firms associated with managerial diversion, *DumDiversion*
- Table 4 reports the estimation results for regression equation (9). The results are consistent with Hypothesis 2. The SOEs with managerial diversion show 1.1% higher industry-adjusted sales growth rate than their peer rivals. As predicted, the relation does not exist for private firms.
- The private firms with extremely high residual administrative expenses are associated with 1% lower industry-adjusted sales growth rate than their rivals.

Table 4

	SOEs	Private Firms
$DumDiversion_{t-2}$	0.011**	-0.011**
	(2.76)	(-4.31)
$Sales\ Growth_{t-1}$	-0.012	0.023**
	(-1.62)	(5.83)
$Sales\ Growth_{t-2}$	0.004	0.021**
	(0.64)	(6.22)
$Size_t$	0.013**	0.027**
	(10.46)	(23.96)
$Profitability_{t-1}$	0.154**	0.021
	(3.30)	(1.04)
$Profitability_{t-2}$	-0.074	-0.075**
	(-1.62)	(-3.67)
$Investment_{t-1}$	0.099**	0.187**
	(4.90)	(14.83)
$Investment_{t-2}$	0.068**	0.091**
	(3.50)	(8.49)
$Leverage_{t-1}$	0.059**	0.028**
	(2.96)	(2.78)
$Leverage_{t-2}$	-0.054**	-0.076**
	(-2.69)	(-7.70)
Constant	-0.175**	0.019
	(-3.24)	(0.50)
Observations	31,140	97,016
R^2	0.027	0.027

Empirical Analysis: Managerial diversion and product market performance

- To test the hypothesis that product market shares should increase with the extent of managerial diversion for SOEs, but not for private firms, we replace the diversion indicator, *DumDiversion* in equation (9), with the censored version, *Diversion*, with continuous values of the positive abnormal administrative expenses and re-estimate the model.

- The estimation results are presented in Table 5. The results show that SOEs gain higher industry-adjusted sales growth rate as managerial diversion increase. For *Private firms*, the regressions generate a negative relation between managerial diversion and product market performance.

Table 5

	SOEs	Private Firms
$Diversion_{t-2}$	0.018**	-0.010**
	(4.92)	(-5.98)
$Sales\ Growth_{t-1}$	-0.014	0.023**
	(-1.80)	(5.86)
$Sales\ Growth_{t-2}$	0.005	0.021**
	(0.72)	(5.98)
$Size_{t}$	0.014**	0.027**
	(10.78)	(24.00)
$Profitability_{t-1}$	0.155**	0.021
	(3.32)	(1.04)
$Profitability_{t-2}$	-0.069	-0.077**
	(-1.50)	(-3.78)
$Investment_{t-1}$	0.100**	0.186**
	(4.93)	(14.75)
$Investment_{t-2}$	0.069**	0.090**
	(3.54)	(8.40)
$Leverage_{t-1}$	0.059**	0.027**
	(2.97)	(2.75)
$Leverage_{t-2}$	-0.053**	-0.076**
	(-2.64)	(-7.71)
Constant	-0.178**	0.018
	(-3.29)	(0.47)

Empirical Analysis: Managerial diversion and product market performance

- To address the concern that firms with better growth opportunities incur higher management costs and expand market share faster, we add industry adjusted MPK in Table 4 and Table 5. We still find the similar results.

Empirical Analysis: Managerial diversion and product market performance

- To address the concern that the relation between management costs and sales growth is linear for all values of administrative expenses, implying that it is driven by something other than excessive administrative expenses, we follow Campello (2006) and estimate the following continuous spline regression:

$$SalesG_{it} = \beta_0 + \beta_1 Size_{it} + \sum_{k=1}^{2} \beta_{2k} \, SalesG_{it-k} + \sum_{k=1}^{2} \beta_{3k} \, Investment_{it-k}$$

$$+ \sum_{k=1}^{2} \beta_{4k} \, Profitability_{it-k} + \sum_{k=1}^{2} \beta_{5k} \, Leverage_{it-k}$$

$$+ \beta_6 zresid_{it-2} + \beta_7 Dum_{knot} * (zresid_{it} - knot)$$

$$+ \sum \alpha_j Province_j + \sum \gamma_t Year_t + \varepsilon_{it}.$$

Empirical Analysis: Managerial diversion and product market performance

- Table 6 reports that only at positive and higher levels, the effect of excess administrative expenses on product market performance is significantly positive ($a_2 > 0$). At negative and lower levels, the effect of excess management costs on product market performance (a_1) is negative.

Table 6

	SOEs		
	$Knot = 0$	$Knot = zresid^{75th}$	$Knot = zresid^{90th}$
$zresid$	-0.026**	-0.015**	-0.006*
	(-5.15)	(-3.62)	(-2.02)
$Dum\_knot * (zresid - knot)$	0.052**	0.044**	0.048**
	(6.90)	(5.86)	(5.02)
Sales Growth$_{t-1}$	-0.016*	-0.015*	-0.014
	(-2.09)	(-1.99)	(-1.88)
Sales Growth$_{t-2}$	0.006	0.006	0.005
	(0.94)	(0.84)	(0.75)
Size$_t$	0.014**	0.014**	0.014**
	(11.22)	(10.99)	(10.77)
Profitability$_{t-1}$	0.163**	0.162**	0.159**
	(3.48)	(3.45)	(3.41)
Profitability$_{t-2}$	-0.054	-0.053	-0.056
	(-1.18)	(-1.16)	(-1.21)
Investment$_{t-1}$	0.104**	0.103**	0.102**
	(5.11)	(5.07)	(5.03)
Investment$_{t-2}$	0.070**	0.070**	0.069**
	(3.60)	(3.60)	(3.54)
Leverage$_{t-1}$	0.060**	0.060**	0.060**
	(3.02)	(3.01)	(2.99)
Leverage$_{t-2}$	-0.052**	-0.053**	-0.053**
	(-2.59)	(-2.63)	(-2.66)
Constant	-0.190**	-0.181**	-0.173**
	(-3.45)	(-3.30)	(-3.17)
F-stat(null of linearity)	40.65**	28.49**	21.32**
Observations	31,140	31,140	31,140
R^2	0.03	0.03	0.03

Empirical Analysis: Managerial diversion and firm profits

- To test the inverse-U shape relation between managerial diversion and profits for firms with weak incentive plans and corporate governance, we run the following regression:

$$Profitability_{it+1} = \beta_0 + \beta_1 Size_{it} + \beta_2 MPK_{it} + \beta_3 Leverage_{it} + \beta_4 Tangibility_{it}$$

$$+ \beta_5 Inv_{it} + \beta_6 Diversion_{it} + \beta_7 Diversion_{it}^2$$

$$+ \sum \alpha_j Province_j + \sum \gamma_t Year_t + \sum \delta_k Industry_k + \varepsilon_{it}.$$

Empirical Analysis: Managerial diversion and firm profits

- For SOEs, the estimate of a_1 is positive and the estimate of a_2 is negative at one percent significance level in Table 7; for *private* firms, we only find negative effect of diversion on firm value in Table 7.

- Table 8 summarizes the firm characteristics for three subsamples of SOEs sorted by the standardized residual administrative expenses. It implies that for SOEs, managerial diversion increase product market performance.

Table 7

	SOEs	Private Firms
$Diversion_t$	0.006**	-0.003**
	(4.74)	(-4.60)
$Diversion_t^2$	-0.002**	0.000
	(-6.05)	(0.30)
$Size_t$	0.002**	-0.010**
	(6.54)	(-34.81)
MPK_t	0.001**	0.001**
	(11.70)	(36.12)
Lev_t	-0.051**	-0.110**
	(-23.41)	(-77.21)
$PPE/Total\_assets_t$	-0.027**	0.040**
	(-10.67)	(21.78)
$Investment_t$	0.043**	0.020**
	(13.19)	(9.59)
$Constant$	0.038*	0.152**
	(2.30)	(21.58)
Observations	46,705	180,860
R^2	0.105	0.162

Table 8

	$zresid > 2.56$	$zresid \in (0, 2.56)$	$zresid \leq 0$
$AExpenxe / Sales_t$	0.510	0.185	0.090
$Sales_t$	22.683	140.992	186.026
$AExpenxe_t$	7,741	14,478	11,076
$Profitability_t$	-0.008	0.023	0.012
$Total\ Assets_t$ (million Yuan)	66.297	223.699	292.419
$R\&D_t$ (million Yuan)	0.247	2.046	2.354
$R\&D / AExpenxe_t$	0.020	0.032	0.064
$SalesGrowth_{t+2}$	-0.010	-0.067	-0.078

Robustness

- Replacing sales growth with output growth and repeat the analysis from Table 4-6 get similar results.

- Repeat our analysis for firms with more than 5 million in annual sales and our main findings still hold.

- Check the impact of managerial diversion on product market competition in industries where *SOE*s dominate and industries where private firms dominate.

- Check whether our findings are robust to different degree of industry concentration.

Conclusions

- This paper analyzes the effect of managerial diversion on product market performance in a *Cournot* model, which predicts that modest levels of managerial diversion have favorable effect on firm performance, whereas excessive managerial diversion harms firm performance.

- Empirical analysis shows that for SOEs, managerial diversion has a positive effect on market share expansion and that the relation between diversion and profits is inverse U-shaped. The effects of diversion on product market performance and profits are mainly negative for individual-controlled firms.

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Conclusions

- Our study echoes one view in law and economics literature that managerial diversion may not necessarily be harmful for shareholder value, and the effect of diversion varies across firms with different incentive mechanisms, corporate governance, and the extent of diversion.

Thanks!