Chih-Young Hung & Li-Han Kao

Management Style of Accounts Receivable and Performance of the Firms: Evidence from Taiwan Electronics Industry

(Received Nov 19, 2008; First Revision May 19, 2009; Second Revision Oct 1, 2009; Third Revision Jan 6, 2010; Accepted Jan 28, 2010)

Introduction

Accounts receivable (hereafter AR) is a monetary claim of firms for goods and services received by customers, and is not only the major account of total assets, but also the source of operating value in accounting transactions. Previous studies of AR fall under two categories: one considers AR policies and seeks for the optimized model of AR amounts to achieve profit maximization (Schiff and Lieber 1974; Lieber and Orgler 1975; Kim and Atkins 1978; Stanford 1989; Liu, Zhou, and Shi 2007). The other analyzes the auditing risks of manipulations and recognizes accrued items (Healy 1985; DeAngelo 1986; Rayburn 1986; Bowen, Burgstahler, and Daley 1987). Unfortunately, even for large-sized firms showing less risk, they may arbitrarily adjust the credit policy to fulfill short-term benefits and disobey the optimal model. Thus, solely depending on general audit procedures cannot easily detect a fraudulent firm, especially when firms operate with malicious intent. Some studies have noticed the phenomenon and discussed the relationship between managerial behaviors and future performance (Ramage, Krieger, and Spero 1979; Johnson, Leitch, and Neter 1981; O’glove 1987; Dechow 1994), but neglect the effects on AR management changes and fail to conduct empirical research.

As mentioned above, AR reveals the marketing and financial capabilities of a firm and plays an important role in the business asset structure. Therefore, this study first establishes AR related indices to classify firms from distinct management behaviors and proceeds with regression models of different dependent variables. By analyzing the estimated results, this pilot study clarifies the relationship among different AR management styles, performance, and market valuation of different categorized firms.

Literature Review

Strategic Types of Accounts Receivable policy

Financial management scholars typically adopt the three major strategic types of AR including relaxed, moderate, and restricted (Brigham and Gapenski 1997). Studies have often utilized financial ratios to identify the characteristics of each strategic type and compare them to other similar firms in practice, such as the AR over total assets ratio (AR/TA) or the turnover rate of AR (Sales/AR). Some studies adopt a single ratio as the proxy variable of AR strategic type. For example, Hutchinson, Meric, and Meric (1988), and Luo and Chen (1997) utilized the credit sales ratio as an individual proxy variable of a firm’s financial attribute; Berger and Udell (1995) adopted AR turnover days as the proxy of credit policy; Stone (1976) and Sachdeva and Gitman (1981) proposed basing AR management classification on the average days outstanding. Though these studies provide various viewpoints to identify AR policy, there is no certainty that a higher (or lower) ratio represents better performance.

Managerial Behavior of Accounts Receivable Policy

Among the discussions of relationship between AR and performance, management policy and credit terms are two key determinants that obviously affect performance. However, differences of managerial
behavior still exist, that a traditional single factor cannot observe. Sachdeva and Gitman (1981) first separated AR policies into two groups to measure if performance shows a difference between the two groups. Hopper and Lewis (1992) applied profit-based and risk-based concepts to form a two-dimension structure and arranged the managerial behaviors with three brackets. They stressed that the decision maker should adjust strategies with the environmental changes to fulfill and achieve goals. Mian and Smith Jr. (1992) further indicated basing AR policy on the management decision, determined by the following factors of incentives to extend trade credit, sales structure, and agency problems.

Based on the results of previous research, most studies agree that credit terms affect performance. Few studies acknowledge the connections between managerial behaviors and performance, and examine the data with only a single proxy variable, or neglect the differences from distinct management styles. Therefore, this research extends the scope to measure the strategic effectiveness and controlling capability of AR simultaneously.

### Research Design and Methodology

To distinguish from previous studies, the current study proposes two-dimension indices to identify AR management styles. According to the results of Hopper and Lewis (1992), and Mian and Smith Jr. (1992), firms’ management behavior of AR reacts to the following situation: changing sales and market demands, and the effectiveness of controlling AR capability. By adopting the partial adjustment model, this study derives AR management style indices.

**Derivation of management style of accounts receivable**

Suppose that the expected average AR \( Y^*_t \) and the sales \( X_t \) at time \( t \) present a linear function form as Equation (1):

\[
Y^*_t = \alpha + \beta X_t
\]

where \( \alpha \) (\( \alpha \geq 0 \)) represents the initial value (or prior period balance amount) of AR.

A previous study mentions that the changes of prior period sales affect current AR amount (Stober 1993), for ceteris paribus, therefore, this study supposes that a partial adjustment could explain the average amount of AR as in Equation (2):

\[
\Delta Y_t = \lambda \Delta Y^*_t + \mu_t
\]

\[
Y_t - Y_{t-1} = \lambda (Y^*_t - Y^*_{t-1}) + \mu_t
\]

where \( \mu_t \) represents the random shock.

With replacing \( Y^*_t \) by Equation (1), we can obtain Equation (3):

\[
\begin{align*}
Y_t &= \alpha \lambda + (1 - \lambda) Y_{t-1} + \beta \lambda X_t + \mu_t \\
&= \theta_0 + \theta_1 Y_{t-1} + \theta_2 X_t + \mu_t
\end{align*}
\]

Let \( \theta_0 = \alpha \lambda \), \( \theta_1 = (1 - \lambda) \) and \( \theta_2 = \beta \lambda \), then we can further show the Equation (4):

\[
Y_t = \theta_0 + \theta_1 Y_{t-1} + \theta_2 X_t + \mu_t
\]

The parameters (\( \theta_0 \), \( \theta_1 \), \( \theta_2 \)) can be estimated with the panel data collected from the Taiwan electronics industry from 1997 to 2006. After obtaining the estimated results we can further compute the estimations (\( \hat{\alpha} \), \( \hat{\beta} \), \( \hat{\lambda} \)) of each firm with \( \hat{\lambda} = 1 - \hat{\theta}_1 / \hat{\theta}_2 \), and \( \hat{\alpha} = \hat{\theta}_0 / \hat{\lambda} \).

Theoretically, changes of \( \lambda \) should be \( |\hat{\lambda}| \leq 1 \), explained as the adjustment speed. If \( \lambda \) becomes larger, the difference between expected and real adjustments should be smaller. The management implication explains \( \lambda \) as the controlling capability of the real AR amount.

### Table 1 Definitions of Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent variables</strong></td>
<td></td>
</tr>
<tr>
<td>( ROA )</td>
<td>Return on total assets.</td>
</tr>
<tr>
<td>( Q )</td>
<td>Tobin’s Q ratio.</td>
</tr>
<tr>
<td><strong>Independent variables</strong></td>
<td></td>
</tr>
<tr>
<td>( STRG )</td>
<td>The sensitivity of the changes of AR policy. It is also the estimates of ( \hat{\beta} ) in Eq. (4).</td>
</tr>
<tr>
<td>( CON )</td>
<td>The controlling capability of the AR amount. It is also the estimates of ( \hat{\lambda} ) in Equation (5).</td>
</tr>
<tr>
<td>( TOR )</td>
<td>Turnover rate of accounts receivable.</td>
</tr>
<tr>
<td><strong>Control variables</strong></td>
<td></td>
</tr>
<tr>
<td>( DTA )</td>
<td>Debit ratio = Total liabilities / Total assets.</td>
</tr>
<tr>
<td>( GO )</td>
<td>Growth opportunity of a firm. The sales growth rate is adopted as the proxy.</td>
</tr>
<tr>
<td>( SIZE )</td>
<td>We compute the firm size with the natural logarithm of total assets.</td>
</tr>
<tr>
<td>( RD )</td>
<td>The rate of R&amp;D expenses over net sales.</td>
</tr>
<tr>
<td>( IND )</td>
<td>We follow the electronics sub-industry classifications of Taiwan Stock Exchange (TSE) and setup the dummies as follows:</td>
</tr>
<tr>
<td>( IND_1 = 1 )</td>
<td>represents the semi-conductor and opto-electronic, 0 for otherwise;</td>
</tr>
<tr>
<td>( IND_2 = 1 )</td>
<td>represents the communication, network and information suppliers, 0 for otherwise;</td>
</tr>
<tr>
<td>( IND_3 = 1 )</td>
<td>represents the e-channel and other distributors, 0 for otherwise.</td>
</tr>
<tr>
<td>Reminders that do not belong to any of above three groups are computer peripherals and components firms.</td>
<td></td>
</tr>
<tr>
<td>( PERF )</td>
<td>( PERF = 1 ) represents the sales growth rate of a firm is greater than zero, 0 for otherwise.</td>
</tr>
</tbody>
</table>
Furthermore, we perform the total differential on Equation (1) as follows:

\[
dY_{it} = \beta \cdot dX_{it} \quad (5)
\]

\[
\beta = \frac{dY_{it}}{dX_{it}} \quad (5.1)
\]

The Equation (5.1) shows that \( \beta \) can be explained as the sensitivity on the changes of sales to the expected average amount of AR, or the sensitivity of AR policy changes.

**Empirical models and data source**

To examine the effects of AR management styles on performance, we establish two empirical models with different dependent variables, which are returns on total assets (ROA) and the Tobin’s Q Ratio. The two dependent variables represent the profitability and future growth of a firm (Titman and Wessels 1988; Fama and French 2000; Wolfe and Sauaia 2003). This study further adds control variables suggested by Short and Keasey (1999) and imports sub-industry dummies, and the interactions of management styles and a performance dummy. This work also adopts White’s correction (White 1980) in OLS model to reduce heteroskedasticity and runs the regression model with only the pooled data of the last year to avoid hindsight bias.

**Model 1:**

\[
ROA_i = \gamma_0 + \gamma_1 STRG_i + \gamma_2 CON_i + \gamma_3 TOR_i + \gamma_4 DTA_i + \gamma_5 GO_i + \gamma_6 SIZE_i + \gamma_7 RD_i + \gamma_8 PERF \times STRG_i \quad (6)
\]

\[
+ \alpha_j \sum_{j=1}^{3} IND_j + \alpha_k PERF \times CON_i + \nu_i
\]

**Model 2:**

\[
Q_i = \delta_0 + \delta_1 STRG_i + \delta_2 CON_i + \delta_3 TOR_i + \delta_4 DTA_i + \delta_5 GO_i + \delta_6 SIZE_i + \delta_7 RD_i + \delta_8 PERF \times STRG_i \quad (7)
\]

\[
+ \beta_j \sum_{j=1}^{3} IND_j + \beta_k PERF \times CON_i + \eta_i
\]

Collected samples are only listed companies of the electronics industry in Taiwan without missing data in the database of the Taiwan Economic Journal (TEJ) from 1997 to 2006.

**Propositions**

According to the discussion of prior research, this study argues that AR management styles influence profitability and market valuation. Therefore, the following four propositions:

**Proposition 1:** A significant relationship exists between profitability and the controlling capabilities of AR

**Proposition 2:** A significant relationship exists between market valuation and the controlling capabilities of AR

**Proposition 3:** A significant relationship exists between profitability and the sensitivity of AR policy

**Proposition 4:** A significant relationship exists between market valuation and the sensitivity of AR policy

**Empirical Results and Analysis**

Table 2 presents the estimated results of each empirical model, which form the basis of our analysis of the effects of management style on performance and market valuation.

**Analysis of the effects on ROA**

The estimates of Model 1 in Table 2 report that the sensitivity of AR policy \((STRG)\) has a significant negative effect on the \(ROA\). The fact that bad debt and operating risk may raise as firms relax their AR policy indicates that firms with a more conservative AR policy would have higher profit. However, the controlling capability of AR \((CON)\) reveals a significant positive effect on the \(ROA\). A firm that can adjust more quickly to the expected target will have better performance than other firms will. In the summary of the above analysis, the results provide significant evidence to support proposition 1 and 3.

In the representation of control variables, most coefficients are consistent with our expectation, but \(RD\) has a significant negative effect on \(ROA\), perhaps caused by lagged effects.

Finally, the dummies show that only the sub-industry of communication, network, and information suppliers has significant positive effect on \(ROA\), but the interactions show only slight significance on \(PERF \times STRG\). This represents that firms encountering sales decline would possibly reduce the amount of AR.

**Analysis of the effects on Tobin’s Q**

To analyze further the estimated results of Model 2 in Table 2, we find that only the controlling capability of AR \((CON)\) has a positive effect on Tobin’s Q. The result reveals that market investors are more concerned about financial adjusting capability than the sensitivity of firm strategy and they would give higher valuation to those in moderate operation. The sensitivity of AR policy \((STRG)\) still has a negative effect on Tobin’s Q, but it is a statistically insignificant variable and cannot support proposition 2. Therefore, only the effect of \(CON\) on Tobin’s Q can provide significant evidence to support proposition 4.

Other variables and dummies are mostly insignificant to the Tobin’s Q. Perhaps other factors do not influence investors when they make investment decisions and they believe that firms in the electronics industry are indifferent on performance.
### Table 2  Estimated Results of Regression Models

<table>
<thead>
<tr>
<th>Variables</th>
<th>Expected sign</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Sensitive analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(I) ROA</td>
<td>(II) ROE</td>
<td>(III) Tobin’s Q</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Coefficient</td>
<td>t-statistics</td>
<td>Coefficient</td>
</tr>
<tr>
<td>Intercept</td>
<td></td>
<td>-0.455</td>
<td>-0.056</td>
<td>-17.862</td>
</tr>
<tr>
<td>STRG (±)</td>
<td></td>
<td>-7.151***</td>
<td>-3.210</td>
<td>-16.867*</td>
</tr>
<tr>
<td>CON (±)</td>
<td></td>
<td>5.188**</td>
<td>2.157</td>
<td>9.166</td>
</tr>
<tr>
<td>TOR (+)</td>
<td></td>
<td>-0.004</td>
<td>-0.113</td>
<td>0.027</td>
</tr>
<tr>
<td>GO (+)</td>
<td></td>
<td>0.087**</td>
<td>2.224</td>
<td>0.176*</td>
</tr>
<tr>
<td>DTA (−)</td>
<td></td>
<td>-0.413***</td>
<td>-7.102</td>
<td>-1.150***</td>
</tr>
<tr>
<td>ln(SIZE) (+)</td>
<td></td>
<td>1.347***</td>
<td>2.607</td>
<td>4.521***</td>
</tr>
<tr>
<td>RD (+)</td>
<td></td>
<td>-0.308*</td>
<td>-1.843</td>
<td>-1.247</td>
</tr>
<tr>
<td>IND₁ (±)</td>
<td></td>
<td>0.691</td>
<td>0.399</td>
<td>-0.341</td>
</tr>
<tr>
<td>IND₂ (±)</td>
<td></td>
<td>2.362*</td>
<td>1.687</td>
<td>1.047</td>
</tr>
<tr>
<td>IND₃ (±)</td>
<td></td>
<td>2.770</td>
<td>1.316</td>
<td>5.999</td>
</tr>
<tr>
<td>PERF*STRG (±)</td>
<td></td>
<td>5.494*</td>
<td>1.889</td>
<td>14.205*</td>
</tr>
<tr>
<td>PERF*CON (±)</td>
<td></td>
<td>-2.849</td>
<td>-1.011</td>
<td>-8.996</td>
</tr>
</tbody>
</table>

R² | Adjusted R² | F-statistics | Prob. (F-statistics) |
---|-------------|--------------|----------------------|
0.448 | 0.413 | 12.736 | 0.000 |
0.509 | 0.478 | 16.252 | 0.000 |
0.202 | 0.151 | 3.960 | 0.000 |
0.448 | 0.416 | 13.967 | 0.000 |
0.509 | 0.481 | 17.818 | 0.000 |
0.201 | 0.154 | 4.316 | 0.000 |

Note 1: Model 1 shows the alternative model which adopts ROE as the dependent variable. The results can be an interpretation for robust comparison.

Note 2: *** denotes 1% significant level, ** denotes 5% significant level, and * denotes 10% significant level, respectively.
**Robustness and sensitive analysis**

The regression of ROE in Model 1 and the estimated coefficient of turnover rate of AR (TOR) are robust and sensitive to the analysis in this study. The results indicate that the regression models possess robustness and the turnover rate of AR can be excluded from our models.

**Conclusions**

This study first provides two-dimension indices to measure the effects of AR management styles on the performance and market valuation of firms. The empirical evidence indicates significant relationships among management styles, performance, and market valuation. Results of the model measuring the effect on ROA show that the sensitivity of AR policy has significant negative effect and the controlling capability of AR has positive effect. However, in the model measuring the Tobin’s Q, only the controlling capability of AR has significant positive effect on market value.

Classification methodology may be rough and ignore some qualitative factors; however, this pilot study extends the scope of analyzing the field of AR.

**REFERENCES**


