ICT Effects and Enhancing Risk Management Information System (RMIS) in Medical Sector in Vietnam

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Abstract

Measuring risk in medical sector in order to propose recommendations is among concerns of scientists in recent years.
In specific, using quantitative and analytical methods, author analyze ICT effects and IT applications in medical sector and hospitals, as well as analyze risk information to propose solutions to enhance risk management information system for Vietnam medical sector.
Research findings show us that in order to give suitable suggestions for policy implications, firstly, study recognized that lower risks shown by beta values (< 1) among 57% of listed firms with lower risk.
Last but not least, study stated that technology applications in medical sector can help doctors and nurses to manage, store and access better data and documents of patients. And Vietnam hospitals need to enhance more Risk management information system with strong support from IT (information technology) so that we could constantly improve service quality patient services, as well as build a favorable working environment for staff both professionally and professionally, etc.

Keywords

RMIS, ICT Effects, Vietnam, Hospitals, Patient, Risk Management Information System, Medical.
JEL Classification: G100, G390.

Introduction

Authors conduct this study to estimate risks of medical sector in three groups: based on beta data of 14 listed firms in which we classified into 3 groups of firms: medicine, medical equipment, & human resource firms in order to conduct analysis of un-diversifiable risk taking place in the financial crisis 2007-2011.
In recent years people recognized the healthcare industry as one of complex and ever-evolving sectors, and professionals (healthcare sector) face a multitude of risks in jobs at hospitals every day. So, When they focus on providing the best care to their patients, they may not realize the risks they face.

Author has structure the study with background, issues to research and literature, then method and findings, discussion and conclusion.

Research Issues

With the 3 groups of firms as we selected above (see introduction part) we will conduct this research aiming to address some issues as following:

a. Issue 1: What are real situation of risks in 3 groups?

b. Issue 2: What are IT, ICT effects in medical sector and hospitals?

We also mention below hypotheses:

Because of financial recession, there should be high disperse distribution in beta values in above 3 groups of firms.

Literature Review

Marcin, Mariusz, Marek, and Karol (2012) mentioned in developing markets, calculated betas are relevant to the investors’ valuation. And Huy, D.T.N (2015) mentioned there are good standards for listed companies and management.


Net we look at studies:

<table>
<thead>
<tr>
<th>Authors</th>
<th>Year</th>
<th>Content, result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fama, Eugene F., and French, Kenneth R.</td>
<td>2004</td>
<td>Stock return can be affected by 3 factors, in which “value” and “size” are significant components</td>
</tr>
<tr>
<td>Luis E. Peirero</td>
<td>2010</td>
<td>In short term it is more difficult to collect beta data, and hard to measure cost of equity as well.</td>
</tr>
<tr>
<td>Xiaowei Kang</td>
<td>2012</td>
<td>Beta strategies (alternate) can help to reduce risk</td>
</tr>
<tr>
<td>Wolfgang, Lukas and Ranko</td>
<td>2013</td>
<td>Comparing to UK stock market, German stock exchange more sensitive (responding) to volatility changes (implied)</td>
</tr>
<tr>
<td>Mo Chaudhury</td>
<td>2011</td>
<td>In crisis 2008 they found out weak correlation between stocks</td>
</tr>
<tr>
<td>NN Thach, N Van Bao, DTN Huy, BD Thanh, LTV Nga, TT Ha, NT Binh</td>
<td>2020</td>
<td>Vietnam bank system has passed low inflation time 2015-2017 in which authors used quantitative model to estimate market risk volatility</td>
</tr>
<tr>
<td>Hac, L.D., Huy, D.T.N., Thach, N.N. et al</td>
<td>2021</td>
<td>OLS regression in an econometric model can help Vietnam banks to measure and have better risk management</td>
</tr>
</tbody>
</table>

(Source: author synthesis)
Conceptual Theories

As shown by traditional estimation method, Beta β, is known as market risk measure, coming from market factors which is on contrary to internal risk that considered from firm internal factors.

Methodology

Not only author uses qualitative and inductive method, but for quantitative model, the study also uses market data and stock price to estimate variability in monthly stock price.

Then we get the results calculated of beta values for above 3 groups of firms.

Empirical Findings and Discussion

1. Statistical Results

Results:
- mean of equity beta is valued at 0.538 while that of asset beta is about 0.320
- the sample variance of asset beta is low (0.1449) which is a good number, while that of equity beta is somewhat higher (0.570) showing the gap of 0.425
- Hence, these are acceptable values during the crisis. Reside. This shows us that the effectiveness of using financial leverage has decreased the systemic risk for the entire group

Results:
- there is 21%, or 3 listed firms still have beta values larger than (>1), whereas there is 57% or 8 firms whose beta values lower than (<1) and higher than (>0)
- Asset beta max value is 1.075 and min value is -0.163
- relatively high difference between max equity and max asset beta values, which is about 1.0153, whereas there is a smaller difference between equity and asset beta variance values which is just 0.425;
- Hence, results show us that if beta of debt is assumed to be zero (0), the company’s financial leverage contributes to a decrease in the market risk level
- there is certain impact on systemic risk of certain firms in term of using leverage while it indicates for most of firms that financial leverage can enable them to reduce market risk

(Source: author analysis)

Not quite big effect from leverage is recognized by the gap between company’s beta variance values.
Table 2 3 groups of firms with Beta values estimated

<table>
<thead>
<tr>
<th>Statistic results</th>
<th>Equity beta</th>
<th>Asset beta (assume debt beta = 0)</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX</td>
<td>2,091</td>
<td>1,075</td>
<td>1,0153</td>
</tr>
<tr>
<td>MIN</td>
<td>-0,946</td>
<td>-0,163</td>
<td>-0,7831</td>
</tr>
<tr>
<td>MEAN</td>
<td>0,538</td>
<td>0,320</td>
<td>0,2177</td>
</tr>
<tr>
<td>VAR</td>
<td>0,5700</td>
<td>0,1449</td>
<td>0,4250</td>
</tr>
</tbody>
</table>

Note: Sample size : 14

(Source: author analysis from stock market)

Table 3 Leverage and beta values in the survey of 14 firms

<table>
<thead>
<tr>
<th>Equity Beta</th>
<th>No. of firms</th>
<th>Financial leverage (average)</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0</td>
<td>3</td>
<td>76,09%</td>
<td>21%</td>
</tr>
<tr>
<td>0&lt;beta&lt;1</td>
<td>8</td>
<td>55,07%</td>
<td>57%</td>
</tr>
<tr>
<td>Beta &gt; 1</td>
<td>3</td>
<td>36,44%</td>
<td>21%</td>
</tr>
<tr>
<td>total</td>
<td>14</td>
<td>47,1%</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Asset Beta</th>
<th>No. of firms</th>
<th>Financial leverage (average)</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0</td>
<td>3</td>
<td>76,09%</td>
<td>21%</td>
</tr>
<tr>
<td>0&lt;beta&lt;1</td>
<td>10</td>
<td>54,02%</td>
<td>71%</td>
</tr>
<tr>
<td>Beta &gt; 1</td>
<td>1</td>
<td>9,72%</td>
<td>7%</td>
</tr>
<tr>
<td>total</td>
<td>14</td>
<td>43,0%</td>
<td>100%</td>
</tr>
</tbody>
</table>

(Source: author analysis from stock market)

Comparing results of above 3 groups of firms beta:

Firstly, lowest beta values belong to medical sector, and highest beta values belong to medicine sector group (shown in chart 1 below)

Secondly, we recognize because of leverage (finance) undiversifiable risk has been lower.

Thirdly, higher risk recognized in medicine sector group, compared to the other two.

Fourthly, lowest variability of beta shown in the medical equipment sector group.

Last but not least, a bit lower beta recognized in the above 3 groups of firms, compared to construction firms.
Chart 1 Statistical results of three (3) groups of 14 listed VN medical equipment, medicine and human resource firms during/after the crisis period 2007-2011

Discussion

Then, We can compare to other industries beta below:

First, a bit lower of value of asset beta mean is recognized when we compare to that of other industries: real estate firms, for instance.

Second, the importance of leverage (finance) is emphasized during crisis which has less impact of researched firms.

Chart 2 Statistical results of three (3) groups of 103 listed construction firms during crisis period
2. ICT Effects in Medical Sector

The Ministry of Health has issued a plan to deploy electronic health records to implement Resolution No. 20-NQ/TW (25/oct/2017) of the Party Central Committee. Expanded vaccination software, over 6.2 million vaccinated subjects managed; Pharmaceutical industry databank has been made publicly.

Regarding the application of medical robots, which are applied in a number of large hospitals-spine surgery robot, Makoplasty knee and hip surgery robot, and neurosurgery robot, etc.

Completing the hospital management information system (Hospital Information System (HIS)) is the top priority in implementing IT applications of the hospital, followed by the laboratory management system (LIS), management system for storing and transferring images (Pix Archiving and Communication system, RIS/PACs),... Information systems must be integrated in order to exchange data smoothly to form a homogenous system. ensure accuracy, completeness, meet management and professional requirements, and serve patients. The integrated information system must comply with the prescribed data communication standards (Circular 53/2014/TT-BYT on 29/dec/2014); comply with the codes used in the system (Decision 2035/QD-BYT dated 12/06/2013 and Decision 4858/QD-BYT dated 3/12/2013); comply with the code of the shared list (Decision 3465/QD-BYT dated 08/07/2016).

Conclusion and Policy Suggestion

Population growth and importance of medical services to people still key drivers for medical sector in Vietnam, despite of other difficulties from covid 19 pandemic and human resource issues.

Beside, Medical firm leaders need to manage other risks as well:

Cash flow (net) of medical firms can be affected by risks such as risks coming from competitors as well as same services offered to patients and also, material price increasing year by year.

One more time, we see evidence showing us that : medical equipment industry has both the lowest equity/asset beta mean values and the lowest asset /equity beta var (see charts above). Whereas highest beta mean value as well as var of equity beta is recognized in
medicine sector group. Also the beta variance shows a small dispersion and smaller than, esp., medicine firms, under leverage impacts.

Policy Implications

After difficulties in the crisis, covid 19, we need policies to support companies and internal investors, and stabilize inflation.

Management Implications

Vietnam hospitals need to enhance more Risk management information system with strong support from IT (information technology).

Promoting the application of information technology (IT) in all hospital activities towards building a smart hospital is the responsibility of hospital leaders. Based on the actual situation of the hospital, list IT applications in order of priority that need to be implemented towards four specific goals, including: (1) constantly improving service quality patient services, (2) building a favorable working environment for staff both professionally and professionally, etc.

Limitation of Research

Author could expand more details in hospital and technology.

Acknowledgement

Warm thks to friends to assist this publishing.

References


### Exhibit 1 – Interest rates, Inflation, GDP growth and macroeconomics factors

<table>
<thead>
<tr>
<th>Year</th>
<th>Basic rates</th>
<th>Lending rates</th>
<th>Deposit rates</th>
<th>Inflation</th>
<th>GDP</th>
<th>USD/VND rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>n/a</td>
<td>12% - 15%</td>
<td>9%</td>
<td>6.81%</td>
<td>5.03%</td>
<td>20.828</td>
</tr>
<tr>
<td>2011</td>
<td>9%</td>
<td>18%-22%</td>
<td>13%-14%</td>
<td>18%</td>
<td>5.89%</td>
<td>20.670</td>
</tr>
<tr>
<td>2010</td>
<td>8%-9%</td>
<td>19%-20%</td>
<td>13%-14%</td>
<td>11.75% (Estimated at Dec 2010)</td>
<td>6.5% (expected)</td>
<td>19.495</td>
</tr>
<tr>
<td>2009</td>
<td>7%</td>
<td>9%-12%</td>
<td>9%-10%</td>
<td>6.88%</td>
<td>5.2%</td>
<td>17.000</td>
</tr>
<tr>
<td>2008</td>
<td>8.75%-14%</td>
<td>19%-21%</td>
<td>15%-16.5%</td>
<td>22%</td>
<td>6.23%</td>
<td>17.700</td>
</tr>
<tr>
<td>2007</td>
<td>8.25%</td>
<td>12%-15%</td>
<td>9%-11%</td>
<td>12.63%</td>
<td>8.44%</td>
<td>16.132</td>
</tr>
<tr>
<td>2006</td>
<td>8.25%</td>
<td></td>
<td></td>
<td>6.6%</td>
<td>8.17%</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>7.8%</td>
<td></td>
<td></td>
<td>8.4%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Approximately (2007: required reserves ratio at SBV is changed from 5% to 10%) (2009: special supporting interest rate is 4%)

(Source: Viet Nam commercial banks and economic statistical bureau)