



Equity Pledge of Controlling Shareholders, Internal Control and Earnings Management

Yanping Liu^{1(✉)}, Zhiyi Huang², and Rong Wang¹

¹ School of Economics and Management, Dalian University of Technology, Dalian 116000, China

sylyp008@dlut.edu.cn

² School of Accounting, Shanghai University of Finance and Economics, Shanghai 200433, China

Abstract. From 2012 to 2017, a-share listed companies with stock pledge behaviors of controlling shareholders in Shanghai and Shenzhen stock exchanges were selected as the research object to study the influence of stock pledge behaviors of controlling shareholders of listed companies on internal control and earnings management. The research shows that with the increase of the equity pledge ratio of the controlling shareholder, the quality of internal control of the enterprise will decrease, and the accrual earnings management and real earnings management will increase. Further study found that after the controlling shareholder's equity pledge relatively less costly true earnings management is likely to be carried out by reducing the quality of the company's internal controls.

Keywords: Equity pledge · Internal control · Earnings management

1 Introduction

Since July 2013, listed companies have been able to raise capital by way of equity pledges. This financing method has grown rapidly due to the ability of equity pledges to retain control of shareholders. However, when the share price of the pledging company falls below the warning line, the pledgee will require the pledger to deposit more pledge margin or increase the number of pledged shares, and when the share price falls below the closing line and the financier fails to provide additional security, it is likely to face the risk of forced liquidation and consequent transfer of control. In addition, the share price directly determines the loan amount to a certain extent, while the discount rate of equity pledges is generally around 30%-50%, which is also affected by the share price of the pledging company. Therefore, surplus management becomes an option for controlling shareholders to stabilize the company's share price in order to avoid the risk of transfer of control due to forced liquidation and to increase the equity pledge rate and thus the pledged loan amount.

In fact, due to the existence of the principal-agent mechanism, the controlling shareholder is actually not directly involved in the daily management of the listed company. Therefore, controlling shareholders need to use some indirect means in order to achieve

their surplus management purposes. According to Fang Hongxing and Jin Yuna (2011), internal control has a certain inhibiting effect on the surplus management behavior of listed companies [1]. Does the controlling shareholder's behavior of equity pledging occur by reducing the quality of corporate internal control in order to achieve the purpose of surplus management? This paper explores the relationship between controlling shareholders' equity pledges, internal control and surplus management in a sample of A-share listed companies with controlling shareholders' equity pledges in Shanghai and Shenzhen from 2012 to 2017.

2 Theoretical Analysis and Research Hypothesis

2.1 Equity Pledge and Earnings Management of Controlling Shareholders

Listed companies and their management have different motives to promote their earnings management activities. David et al. believe that enterprises conduct earnings management to avoid income decline [2]. Patel et al. believe that the earnings management motivations of the management mainly include reporting positive profits, maintaining recent performance and meeting analyst expectations [3]. Daniel et al. found that enterprises with higher potential total compensation of CEO have more obvious accrued earnings management behaviors [4]. Fu Yuyuan et al. found that the pledge of major shareholders' equity will reduce the quality of internal control of enterprises, and the degree of influence will increase with the increase of pledge proportion and pledge frequency [5].

On the one hand, the main risk of controlling shareholders' equity pledge lies in the transfer of control rights caused by forced liquidation. Wang Xiongyuan et al. believe that the right of control can obtain huge private benefits for the controlling shareholder, while the transfer of the right of control means the disappearance of PBC, and relatively speaking, its loss is far greater than the convenience brought by equity pledge financing [6]. Therefore, controlling shareholders are more inclined to stabilize stock prices and reduce the risk of stock price collapse through earnings management and other information disclosure manipulation [7].

On the other hand, for the pledged shareholders, the stock price directly determines the loan amount to some extent. At the same time, the stock price is also an important influencing factor for the pledge party to evaluate the quality of the equity and give the discount rate of the equity pledge. Therefore, in order to increase the equity pledge rate and obtain more loan amount, the controlling shareholder has strong motivation to implement earnings management when the equity pledge has not yet happened but will happen soon, so as to raise the corporate profit level and then the stock price through earnings manipulation [8]. Accordingly, hypothesis 1 is proposed.

H1: Earnings management degree of listed companies is positively correlated with the proportion of equity pledge of controlling shareholders.

2.2 Controlling Shareholder Equity Pledge, Internal Control and Earnings Management

Cheng Xiaoke, Zheng Lidong and Yao Lijie found that enterprises with higher internal control quality also have lower earnings management degree [9]. Ye Jianfang et al.

found that enterprises with defects in internal control have a high degree of earnings management, and the degree of earnings management will gradually decrease with the correction of defects [10]. Accordingly, hypothesis 2 is proposed.

H2: The quality of internal control of listed companies is negatively correlated with the proportion of equity pledge of controlling shareholders.

According to the principal-agent theory, shareholders actually only retain the ownership but not the management right of the enterprise, so they cannot directly participate in the daily operation and management activities of the listed company, so they need to achieve the goal of earnings management through indirect means. Wang Bin and Song Chunxia found that equity pledge would weaken the management and supervision role of enterprise internal control and create a suitable environment for real earnings management [8]. Li Changqing and Xing Wei found that under the background of equity pledge of controlling shareholders, executive compensation of listed companies increases more and earnings management degree is higher [11]. In the context of equity pledge, to achieve the goal of earnings management, reducing the quality of internal control may become a choice for controlling shareholders.

In terms of the choice of earnings management methods, existing studies generally believe that the cost of real earnings management is lower, and enterprises are more inclined to real earnings management. However, under the background of dual supervision of equity pledge and internal control, the cost required by real earnings management increases more significantly. When the cost of real earnings management exceeds that of real earnings management, enterprises are more inclined to implement accrued earnings management. Accordingly, hypothesis 3 is proposed.

H3: The influence of equity pledge of controlling shareholders on earnings management of listed companies is related to the quality of internal control. Under the background of equity pledge, enterprises with higher internal control quality will choose more ways of accrual earnings management, while enterprises with lower internal control quality will choose more ways of real earnings management.

3 Study Design and Data Description

3.1 Data Source

In this paper, A-share listed companies with equity pledge behavior of controlling shareholders in Shanghai and Shenzhen stock markets from 2012 to 2017 are selected as research samples, and the data are screened, and the following samples are excluded: financial samples, ST and *ST samples, samples with missing or difficult to obtain data; Dubo internal control index is 0 extreme samples, finally get effective samples 6175. In this paper, the internal control index data are from the DIB internal control and risk management database, and the rest data are from CSMAR and RESSET database.

3.2 Variable Measurement

Based on the study of Dechow, this paper calculates the accrued earnings management level of listed companies with the modified Jones model [12]. In addition, using

Table 1. Variable Definition and Measurement

| | Variable name | Variable specification |
|----------------------|-------------------|---|
| Explained variable | <i>IDA</i> | Accrued earnings management based on the modified Jones model [12] |
| | <i>RM</i> | Using Roychowdhury's model [13] to calculate real earnings management |
| | <i>Dib</i> | The natural logarithm of Dubeau's internal control index |
| Explanatory variable | <i>PR</i> | Shareholding pledge ratio of controlling shareholders, number of shares pledged by controlling shareholders/number of shares held by controlling shareholders |
| Control variable | <i>Size</i> | The size of the company's assets, the natural log of its total assets at the end of the period |
| | <i>ROA</i> | Return on total assets, net profit/total assets |
| | <i>Lev</i> | Asset-liability ratio, ending total liabilities/ending total assets |
| | <i>Growth</i> | Revenue growth rate |
| | <i>Indep</i> | Proportion of independent directors, number of independent directors/total number of directors |
| | <i>Big4</i> | If the auditor is a big Four, it is 1, otherwise it is 0 |
| | <i>VDib</i> | Dubo internal control index greater than the middle digit to take 1, otherwise take 0 |
| | <i>Ind · Year</i> | Are respectively industry and year dummy variables |

Roychowdhury's model for reference, this paper measures the degree of real earnings management with three data: abnormal product cost (*APROD*), abnormal operating cash flow (*ACFO*) and abnormal discretionary expense (*ADISEXP*) [13].

The quality of internal control of enterprises is improving with the continuous improvement of the system. Fang Hongxing and Jin Yuna believe that with the emergence of mandatory internal information disclosure requirements, it has gradually lost its significance to continue to use the disclosure of internal control certification report as a standard to measure the level of enterprise internal control [14]. Therefore, this paper selects the Dibo internal control index and takes its natural logarithm as explanatory variable to measure the internal control quality of listed companies. All variables involved in the research and their definitions are shown in Table 1.

3.3 Model Design

In order to test hypothesis 1, model (1) was established; in order to test hypothesis 2, model (2) was established. By referring to the methods of Li Changqing et al., *VDib* was substituted into model (1) as a dummy variable for regression testing hypothesis 3 [11].

Table 2. Descriptive Statistical Results for Major Variables

| | Full sample | | VDib = 1 | | VDib = 0 | | Test |
|-------------|-------------|--------|----------|--------|----------|--------|-------------------------|
| | Average | Median | Average | Median | Average | Median | |
| <i>PR</i> | 0.603 | 0.603 | 0.575 | 0.552 | 0.631 | 0.652 | 7.309 ^{****} |
| <i> DAI</i> | 0.001 | -0.004 | 0.011 | 0.002 | -0.010 | -0.010 | -7.132 ^{****} |
| <i>RM</i> | -0.003 | 0.009 | -0.016 | -0.001 | 0.011 | 0.018 | 3.236 ^{****} |
| <i>Dib</i> | 6.471 | 6.496 | 6.554 | 6.547 | 6.387 | 6.427 | -57.070 ^{****} |

Note: *, **, *** and **** are significant under the level of 10%, 5%, 1% and 0.1% respectively

EM represents the degree of earnings management, *Dib* represents the natural logarithm of Dibo’s internal control index, and *PR* represents the proportion of equity pledged by controlling shareholders.

$$EM = \alpha_0 + \alpha_1 PR + \alpha_2 Size + \alpha_3 ROA + \alpha_4 Lev + \alpha_5 Growth + \alpha_6 Indep + \alpha_7 Big4 + \alpha_8 Ind + \alpha_9 Year + \varepsilon \tag{1}$$

$$Dib = \beta_0 + \beta_1 PR + \beta_2 Size + \beta_3 ROA + \beta_4 Lev + \beta_5 Growth + \beta_6 Indep + \beta_7 Big4 + \beta_8 Ind + \beta_9 Year + \varepsilon \tag{2}$$

4 Empirical Test and Result Analysis

4.1 Descriptive Statistics and Difference Testing

Table 2 shows the descriptive statistical results of the main variables in Model (1) and Model (2). In this paper, descriptive statistics were conducted three times with the whole sample, VDib = 1 and VDib = 0 as the classification.

In terms of equity pledge ratio (*PR*), its mean value is 60.3% and median value is 60.3% under the full sample condition, indicating that the degree of equity pledge of controlling shareholders of listed companies in China has reached a certain level. The mean and median values in the *VDib* = 0 group are higher than those in the *VDib* = 1 group, and the difference test is significant at the 0.1% level, which tentatively proves that hypothesis 2 is correct.

4.2 Correlation Analysis

Table 3 shows the results of correlation analysis of main variables. There is a significant positive correlation between real earnings management and the shareholding pledge ratio of controlling shareholders, which preliminarily proves that hypothesis 1 is correct. The internal control index of Dubo is significantly negatively correlated with the shareholding pledge ratio of controlling shareholders, which preliminarily proves that hypothesis 2 is correct.

Table 3. Correlation Analysis

| | <i>IDA</i> | <i>RM</i> | <i>Dib</i> | <i>PR</i> |
|------------|------------|-----------|------------|------------|
| <i>IDA</i> | 1 | 0.303**** | 0.087**** | -0.009 |
| <i>RM</i> | - | 1 | -0.050**** | 0.093**** |
| <i>Dib</i> | - | - | 1 | -0.103**** |
| <i>PR</i> | - | - | - | 1 |

Note: *, **, *** and **** are significant under the level of 10%, 5%, 1% and 0.1% respectively

4.3 Multiple Regression Analysis

Table 4 shows the regression results of shareholding pledge ratio, internal control quality and earnings management of controlling shareholders. Among them, Column (1) is used to test the relationship between the quality of internal control of listed companies and the proportion of equity pledge. The results show that the regression coefficient of *PR* is -0.025 , and it is significant at the level of 0.1%. Hypothesis 2 is confirmed.

Column (2) and columns (5) is under the condition of all samples, with accrued earnings management (*IDA*) and real earnings management (*RM*) to be explained variable regression results. The results show that accrued earnings management is positively correlated with the proportion of pledged equity at 1%, while real earnings management is positively correlated with the proportion of pledged equity at 0.1%. Hypothesis 1 is confirmed.

Column (3), (4) and (6), (7), with $VDib = 1$ and $VDib = 0$ for classification basis, corresponding to earnings management (*IDA*), real earnings management (*RM*) to return. The results in column (3) and (4) show that the degree of accrual earnings management is significantly positively correlated with the proportion of equity pledge for enterprises with higher internal control level. The results in column (6) and (7) show that the significance of listed companies with higher internal control quality is lower than that of listed companies with lower internal control quality. In summary, in the context of equity pledges, firms with higher levels of internal control will choose more accrual-based surplus management and firms with lower levels of internal control will choose more true surplus management. Hypothesis 3 is tested.

4.4 Robustness Test

In order to make the above research more robust, the following robustness tests are carried out: (1) The measurement method of explanatory variables is changed, and the ratio *PR_2* of the controlling shareholder's equity pledge to the total number of shares of the company is used for regression; (2) In terms of real earnings management, a new measure index *RM_1*(*APROD-ACFO*) of real earnings management is constructed for regression analysis. The regression results are shown in Table 5.

Column (1) in Table 5 is the regression result after replacing explanatory variable *PR* with *PR_2*. The results show that the regression coefficient of *PR_2* is -0.041 , which is significant at 1% level, which is consistent with the results above. Columns

Table 4. Equity Pledge, Internal Control and Earnings Management

| | <i>Dib</i> | IDA1 | | RM | | | | |
|-------------------------|------------------------|------------------------|-----------------------|------------------------|-------------------------|-------------------------|------------------------|-----------------|
| | | Full sample | (2) | <i>VDib = 1</i> | <i>VDib = 0</i> | Full sample | <i>VDib = 1</i> | <i>VDib = 0</i> |
| | (1) | | | (3) | (4) | (5) | (6) | (7) |
| <i>PR</i> | -0.025**** (-4.437) | 0.011*** (2.231) | 0.017** (2.045) | 0.005 (1.045) | 0.074**** (5.263) | 0.057*** (2.760) | 0.088**** (4.722) | |
| <i>Size</i> | 0.019**** (9.306) | 0.008**** (4.552) | 0.006** (2.122) | 0.008**** (4.808) | 0.018**** (3.746) | 0.007 (0.944) | 0.030**** (4.642) | |
| <i>ROA</i> | 0.780**** (22.369) | 0.569**** (19.318) | 0.646**** (10.488) | 0.509**** (18.222) | -1.051**** (-12.407) | -1.918**** (-12.558) | -0.592**** (-5.714) | |
| <i>Lev</i> | -0.025** (-2.281) | 0.011 (1.146) | 0.026 (1.521) | -0.001 (-0.104) | -0.017 (-0.630) | -0.030 (-0.708) | -0.026 (-0.772) | |
| <i>Indep</i> | 0.033* (1.844) | -0.009 (-0.603) | -0.011 (-0.413) | -0.007 (-0.456) | -0.019 (-0.444) | 0.051 (-0.792) | -0.007 (-0.122) | |
| <i>Growth</i> | 0.000 (0.473) | 0.001 (1.424) | 0.004**** (3.272) | 0.000 (-0.738) | 0.016**** (13.286) | 0.029**** (10.506) | 0.012**** (9.483) | |
| <i>Big4</i> | -0.004 (-0.296) | -0.041**** (-3.568) | -0.038** (-2.183) | -0.044**** (-3.173) | -0.092**** (-2.805) | -0.049 (-1.131) | -0.142**** (-2.729) | |
| <i>R2_{adj}</i> | 0.126 | 0.066 | 0.037 | 0.117 | 0.060 | 0.090 | 0.052 | |
| <i>N</i> | 6175 | 6175 | 3088 | 3087 | 6175 | 3088 | 3087 | |

Note: *, **, ***, **** are significant under the level of 10%, 5%, 1% and 0.1% respectively

Table 5. Robustness Test

| | <i>Dib</i> | <i>DAI</i> | | <i>RM_I</i> | | | <i>VDib = 0</i> |
|-------------------------|-----------------------------------|------------------------------------|-----------------------------------|------------------------------------|-------------------------------------|------------------------------------|------------------------------------|
| | | Full sample | <i>VDib = I</i> | <i>VDib = I</i> | Full sample | <i>VDib = I</i> | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| <i>PR</i> | - | - | - | - | 0.063 ^{****} (4.680) | 0.052 ^{***} (2.611) | 0.073 ^{****} (4.066) |
| <i>PR_2</i> | -0.041 ^{***} (-2.852) | 0.026 ^{**} (2.111) | 0.043 ^{**} (2.043) | 0.011 (0.849) | - | - | - |
| <i>Size</i> | 0.019 ^{****} (9.635) | 0.007 ^{****} (4.418) | 0.006 ^{**} (2.022) | 0.008 ^{****} (4.745) | 0.018 ^{****} (3.782) | 0.005 (0.747) | 0.030 ^{****} (4.921) |
| <i>ROA</i> | 0.795 ^{****} (22.920) | 0.563 ^{****} (19.221) | 0.636 ^{****} (10.370) | 0.507 ^{****} (18.195) | -0.830 ^{****} (-10.161) | -1.444 ^{****} (-9.799) | -0.508 ^{****} (-5.087) |
| <i>Lev</i> | -0.027 ^{**} (-2.433) | 0.011 (1.156) | 0.026 (1.484) | -0.001 (-0.072) | -0.045 [*] (-1.742) | -0.044 (-1.074) | -0.060 [*] (-1.832) |
| <i>Indep</i> | 0.036 ^{**} (2.027) | -0.010 (-0.685) | -0.012 (-0.446) | -0.008 (-0.515) | 0.006 (0.142) | -0.012 (-0.200) | 0.009 (0.165) |
| <i>Growth</i> | 0.000 (0.354) | 0.001 (1.483) | 0.004 ^{****} (3.339) | 0.000 (-0.712) | 0.017 ^{****} (14.009) | 0.031 ^{****} (11.732) | 0.012 ^{****} (9.643) |
| <i>Big4</i> | -0.003 (-0.202) | -0.042 ^{****} (-3.628) | -0.039 ^{**} (-2.249) | -0.045 ^{****} (-3.187) | -0.066 ^{**} (-2.073) | -0.028 (-0.681) | -0.104 ^{**} (-2.074) |
| <i>R₂adj</i> | 0.124 | 0.065 | 0.037 | 0.117 | 0.051 | 0.076 | 0.047 |
| <i>N</i> | 6175 | 6175 | 3088 | 3087 | 6175 | 3088 | 3087 |

Note: *, **, ***, **** are significant under the level of 10%, 5%, 1% and 0.1% respectively

(2)–(4) took the accrual earnings management as the explained variable and replaced the explanatory variable *PR* with *PR_2* to get the regression result; columns (5)–(7) took *RM_1* to replace the explained variable *RM* to get the regression result. The empirical test results are consistent with the above, and the research results of this paper are robust.

5 Conclusion and Suggestion

In this paper, it is found that the controlling shareholder has strong earnings management motivation to avoid the risk of control transfer and increase the financing amount after equity pledge. The empirical results show that:

First, the earnings management degree of listed companies will be enhanced with the increase of the shareholding pledge ratio of controlling shareholders.

Secondly, the quality of internal control of listed companies is significantly negatively correlated with the proportion of equity pledge of controlling shareholders.

Third, under the background of equity pledge, enterprises with higher internal control quality tend to implement accrued earnings management, while enterprises with lower internal control quality tend to implement real earnings management.

Based on the above conclusions, in order to regulate the behavior of listed companies, restrain the earnings management degree of listed companies, and improve the authenticity of the statements of listed companies, this paper puts forward the following suggestions:

First, since the controlling shareholder has stronger motivation of earnings management after the pledge of equity, the enterprise should supervise the pledge of equity of its own shareholders, timely disclose relevant information, and improve the corporate governance structure and other regulatory mechanisms;

Second, after the occurrence of equity pledge by the controlling shareholder, it is highly possible to improve the level of real earnings management by reducing the quality of internal control. Listed companies should improve the internal control mechanism, and solve the behavior of the controlling shareholder that damages the company's internal control mechanism for earnings management through other regulatory measures.

Third, the state continues to deepen the development of the internal control mechanism of listed companies, promulgation of relevant laws and regulations, further promote the development of internal control norms and mechanisms, and effectively supervise the internal behavior of listed companies.

Acknowledgements. I am very grateful to The National Social Science Fund of China for supporting this article. The project name is Modern financial supervision from the perspective of institutional investors and earnings management. (Project Number: 18BJY230)

References

1. Fang Hongxing, & Jin Yuna. (2011). Can high quality internal control inhibit surplus management? --An empirical study based on voluntary internal control attestation reports. *Accounting and Control Review* (01):57–73. DOI:<https://doi.org/10.3969/j.issn.1003-2886.2011.08.008>

2. David, Burgstahler, and, Ilia, & Dichev. (1997). Earnings management to avoid earnings decreases and losses. *Journal of Accounting & Economics* (24):99–126. DOI: [https://doi.org/10.1016/S0165-4101\(97\)00017-7](https://doi.org/10.1016/S0165-4101(97)00017-7)
3. Patel, J., Degeorge, F., & Zeckhauser, R. (1999). Earnings management to exceed thresholds. *Journal of Business* 72(1):1–33. DOI: <https://doi.org/10.1086/209601>
4. Daniel, Bergstresser, and, Thomas, & Philippon. (2006). Ceo incentives and earnings management. *Journal of Financial Economics*. DOI: <https://doi.org/10.1016/j.jfineco.2004.10.011>
5. Fu, Yuyuan, Yuan, Zeming, & Li, Tian. (2019). Major shareholder equity pledges and corporate internal control. *Finance and Economics Series* (1):71–80. DOI: <https://doi.org/10.13762/j.cnki.cjlc.2019.01.007>
6. Wang Xiongyuan, Ouyang Caiyue, & Shi Zhenyang. (2018). Equity pledge, control transfer risk and tax avoidance. *Economic Research* 53(1):138–152. DOI: CNKI:SUN:JJYJ.0.2018-01-011
7. Xie, D.R., Zheng, D.J., & Cui, Chen-Yu. (2016). Are controlling shareholders' equity pledges potential "landmines"? --A study based on the perspective of stock price collapse risk. *Management World* (5):128–140+188. DOI: <https://doi.org/10.19744/j.cnki.11-1235/f.2016.05.011>
8. Wang B, & Song CH. (2015). Major shareholders' equity pledge, equity nature and surplus management approach. *East China Economic Management*, 29(8):118–128. DOI: CNKI:SUN:HDJJ.0.2015-08-018
9. Cheng S. K., Zheng L. D., & Yao L. J. (2013). Can internal control inhibit real activity surplus management? --A comparison with accrual surplus management. *China Soft Science* (3):120–131. DOI: <https://doi.org/10.3969/j.issn.1002-9753.2013.03.012>
10. Ye Jian-Fang, Li Dan-Meng, & Zhang Bin-Ying. (2012). The impact of internal control deficiencies and their corrections on surplus management. *Audit Research* (6):50–59+70. DOI: CNKI:SUN:SJYZ.0.2012-06-009
11. Li, Changqing, & Xingwei. (2018). Controlling shareholders' equity pledges affect executive compensation - Is it performance sensitive? *Economic Management* 40(5):157–174. DOI: <https://doi.org/10.19616/j.cnki.bmj.2018.05.010>
12. Dechow, P. M., Sloan, R. G., & Hutton, A. P. (1995). Detecting earnings management. *Accounting Review* 70(2):193–225. DOI: <https://doi.org/10.2307/258852>
13. Roychowdhury, S. (2006). Earnings management through real activities manipulation. *Journal of Accounting & Economics* 42(3):335–370. DOI: <https://doi.org/10.2139/ssrn.477941>
14. Fang Hongxing, & Jin Yuna. (2013). Perceived internal control quality: metrics and preliminary tests. *Research on Finance and Economics* (10):18–25. DOI: <https://doi.org/10.3969/j.issn.1000-176X.2013.10.003>

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

