10384

2009170020

厦门大学

模糊经济中的决策理论与市场实证分析

Analysis of decision-making in ambiguous economic and market evidences

蒋致远

指导教师：张顺明

专业名称：金融工程

答辩日期：2012年4月

厦门大学学位论文原创性声明

　　本人呈交的学位论文是本人在导师指导下，独立完成的研究成果。本人在论文写作中参考其他个人或集体已经发表的研究成果，均在文中以适当方式明确标明，并符合法律规范和《厦门大学研究生学术活动规范（试行）》。

　　另外，该学位论文为（　　　　　　　　　　　　　　）课题（组）的研究成果，获得（　　　　　　　　　　　　　）课题（组）经费或实验室的资助，在（　　　　　　）实验室完成。（请在以上括号内填写课题或课题组负责人或实验室名称，未有此项声明内容的，可以不作特别声明。）

　　声明人（签名）：

　　　　年　　月　　日

厦门大学学位论文著作权使用声明

本人同意厦门大学根据《中华人民共和国学位条例暂行实施办法》等规定保留和使用此学位论文，并向主管部门或其指定机构送交学位论文（包括纸质版和电子版），允许学位论文进入厦门大学图书馆及其数据库被查阅、借阅。本人同意厦门大学将学位论文加入全国博士、硕士学位论文共建单位数据库进行检索，将学位论文的标题和摘要汇编出版，采用影印、缩印或者其它方式合理复制学位论文。

本学位论文属于：

（　　　）1. 经厦门大学保密委员会审查核定的保密学位论文，于　年　月　日解密，解密后适用上述授权。

（　　　）2. 不保密，适用上述授权。

（请在以上相应括号内打"√"或填上相应内容。保密学位论文应是已经厦门大学保密委员会审定过的学位论文，未经厦门大学保密委员会审定的学位论文均为公开学位论文。此声明栏不填写的，默认为公开学位论文，均适用上述授权。）

声明人（签名）：

　　年　　月　　日

摘　要

至今，人们已普遍意识到Knight不确定性的概念比风险更加贴近现实，并且与风险情形下决策行为有很大的不同，当前该领域的大部分研究都集中在奈特不确定情形下决策理论及其应用，本文的目的在于梳理已有的有关模糊(Ambigulity)经济的决策理论模型的同时，完善模糊经济中的决策理论的公理化体系，刻画模糊厌恶、不确定性厌恶、模糊溢价、不确定性溢价，以及定价模型和风险管理模型等问题。在模糊经济框架下，基于KMM模型，给出双期望效用的表示形式，并建立了比较模糊厌恶的框架，给出了模糊态度和模糊信念的刻画，在此基础之上，导出了模糊经济框架下的不确定性溢价由纯风险溢价和模糊溢价构成，推导出了不确定性溢价、模糊溢价和纯风险溢价的表达式。针对常数模糊绝对厌恶和常数模糊相对厌恶的情形，探讨了相应的弹性分析，通过模糊溢价有效的加强了对"股权溢价之谜"解释力。从二维的角度（风险厌恶，模糊厌恶）实现了对投资的分类，并给出了在此意义下的广义随机占优理论，尝试构造了双期望效用下的高阶期望损失风险测度。为了寻求与前景理论的结合点，通过实验数据分析，把累积前景理论的价值函数修改为弓形价值函数，构造中给出了三拐点的价值函数。第二部分主要实证研究了在模糊经济情形下，中国证券市场的情绪因素、危机预报和整点效应，运用动态因子模型（DFM）从五个情绪代理变量中提取情绪因子，得到与宏观经济正交的纯的情绪测度，实证分析发现，情绪越高未来市场收益越小，未来市场收益为负的概率也越大，且情绪对未来市场收益大小及方向的影响随着持有期的增长而增强，另外，过度高涨的市场情绪均会增加危机及临界点发生的风险，也发现了在临界点之前情绪演化的一些模式。随后分别运用AR－GARCH模型和GARCH模型对沪、深证指数进行时间效应实证分析，发现都有周内效应，即周一和周四有正的效应，而周二有负的效应；夜间休市的信息累积导致有第二天开盘十点有明显的正的效应，十一点有明显的负效应；并且股指期货推出有一定的平滑作用。

模糊经济；模糊溢价；模糊决策理论；情绪预报；整点效应

Abstract

So far, it has been generally kown tnat the Knight uncertainty is closer to reality than the risk, and decision-making behavior and risk situations are very different between them. Most of the studies in this field are concentrated in the Knight uncertain circumstances, decision theory and its application. The purpose of this paper is to comb the already Ambiguity theoretical models of economic decision-making, and improving the theory of axiomatic system of Ambiguous economic decision-making, depicts Ambiguity aversion, uncertainty aversion, Ambiguous premium, not uncertainty premium, as well as pricing models and risk management model. Ambiguous economic framework, based on the KMM model, is given by the dual expected utility representation. And the establishment of a framework of relatively Ambiguity aversion implies the ambiguities and the characterizations of Ambiguous belief. On this basis, export ambiguous economic framework under, the expression of uncertainty premium, pure risk premium and Ambiguous premium is derived. For constant Ambiguous case, absolute aversion and constant Ambiguity relative aversion to explore the elastic analysis have been given. And effectively enhance the explanatory power of the "equity premium puzzle" by the Ambiguous premium. From the angle of the two-dimensional (risk aversion, Ambiguity aversion) on the classification of investments, we give the generalized stochastic dominance theory in this sense, we attempt to construct a high-order expected loss under the dual expected utility risk measure. In order to seek the point of integration with the prospect theory, through experimental data analysis cumulative prospect theory value function to modify the bow-shaped value function, with three inflection point in the constructed value function. The second part of the empirical study , the emotional factors of the Ambiguous economic situation, China's securities market, the forecast of crisis and the whole point of the effects have been researched. By using the dynamic factor model

(DFM) to extract the emotional factor from the five mood proxy variables and macro economy, the cross of pure emotion measure, the empirical analysis found that the emotions the higher the income the smaller the market, the greater the probability of future market returns is negative, and the impact of emotion on the size and direction of future market gains holding period of growth and enhanced. In addition, the excessive rising market sentiment will increase the risk of crisis and the critical point, also found that the emotional evolution of the mode before the critical point. Subsequent by using the AR-GARCH model and GARCH model, we find that the Shanghai and Shenzhen index has a week effect, ie, Monday and Thursday, have the positive effect, on Tuesday have the negative effect; the information accumulated lead significantly positive effect at 10 oclock in the next opening day, at eleven have significant negative effects; and stock index futures have a smoothing effect on it.

参考资料

[1]　　　　　,　　.　　　　　　[M].　　　　　　　　　　,2009.

[2]　　　,　　.　　　　　　　　"　　　　"　　　　　　[J,　　　　　　,　　　,

[3]　　　.　　　　　　　　　　　[J,　　　　　　　,2003(3):29　32.

[4]　　　,　　.　　　　　　　　　　　[J.　　　　,1999(4):45　49

[5]　　.　300　　　　　　　　　　　　　　　　　　[J.　　　　　,2011　(2):66　67

[6]　　,　　.　　　　　　　　　　　[J.　　　　　　,2002　2

[7]　　.　　　　　　　"　　　　　"[J.　　　　　,2000　11　-2002(12):8　12

[8]　　,　　.Knight　　　　　　　　　　　　　　　　[J.　　　　　　　　　,2007(27)

[9]　　　　.　　　　　　——　　　　　　　4　　[M].　　　　　　　　　,2007.

[10]　　　,　　.　　　　　　　　　　　　　[J,　　　　,2007(8):57--59.

[11]　　.　　　　　　　　　[J.　　　　　.2003(12)

[12]　　,　　.Knight　　　　　　　　　　　[J.　　　,2010(10)

[13]　　,　　,　　.Knight　　　　　　　　　[J.
,2008(11)

[14]　　,　　,　　.　　　　　　:　　　　　　　　　　　　[J.
,2004(1)

[15]　　,　　　　　　　　　　.　　,2004　12

[16]　　.　　　　　　　　　　[J.　　　　　　,2003(6):28　57

[17]　　,　　.　　　　　　　.　　　　　,2001,47(11)　21-27.

[18]　　,　　.　　　　　　　　　　,2003,6　1　　68-74

[19]　　,　　.　　　　GARCH　　　　　[J,
,2003(7):75　79.

[20]　　　,　　,　　.　　　　　　　[J,　　　　,2006(2):54　70.

[21]　　,　　.　　　　　　:　　　　　[J.　　　,2007(7):74-77

[21]　　.　　　　　　　　　　　IJ,　　　,1995(6):74　78

[22]　　.　　　　　　　　　　　　　　[J.
,1994(9):43　49

[23]　　　.　　　　　　　　　　　[J.　　　　　,2004(11)

[24]　　,　.Knight　　　　　　　　　　[J.　　　　,2007(4)

[25]　　,　　,　　.　　　　　　　　[J.　　　　　,2008(16)

[26]　.Knight　　　　　　　　　[J.　　　　,2010(6)

[27]　.　　　　　　　　　　J.　　　　2004 (7):25　31

[28]　.　　　　　　[J.　　　,2009(11):51—53

[29]　　,　　,　　,　.　　　　　[M].　　　　　　　,2000

[30] Ahn, D., Choi, S., Gale, D. and Kariv, S. Estimating ambiguity aversion in a portfolio choice experiment. Working Paper. (2009)

[31] Al Najjar, N. and Weinstein, J The ambiguity aversion literature: a critical assessment. Economics and Philosophy[J] .2009(25): 249- 284.

[32] Amarante, M. Foundations of neo-Bayesian statistics[J]. Journal of Economic Theory 2009　144 : 2146- 2173.

[33] Amarante, M. and Filiz, E. Ambiguous events and maxmin expected utility[J]. Journal of Economic Theory. 2007(134): 1– 33.

[34] Anscombe, F. and Aumann, R. A definition of subjective probability[J]. Annals of Mathematical Statistics. 1963(34): 199- 205.

[35] Asano, T. Portfolio inertia under ambiguity[J]. Mathematical Social Sciences. 2006(52):223- 232.

[37] Banz, Rolf W., " The Relationship between Return and Market Value of Common Stock" , Journal of Financial Eeconomics, 1981, 9, 3-18

[38] Bewley, T. (1986) Knightian decision theory: Part I. Discussion Paper 807, Cowles Foundation.

[39] Binswanger M. Stock markets, speculative bubbles and economic growth: new dimensions in the co-evolution of real and financial market. Edward Elgar Publishing Limited, 1999.

[40] Bossaerts, P., Ghirardato, P., Guarnaschelli, S. and Zame, W. Ambiguity in asset markets: theory and experiment[J]. Review of Financial Studies. 2010(23): 1325– 1359.

[41] Bussiere M, Fratzscher M. Towards a new early warning system of financial crises. Journal of International Money and Finance, 2006, 25(6): 953-973.

[42] Baker M, Wurgler J. Investor sentiment and the cross-section of stock returns. Journal of Finance, 2006, 61(4): 1645-1680.

[43] Brown G W, Cliff M T. Investor sentiment and the near-term stock market. Journal of Empirical Finance, 2004, 11(1): 1-27.

[44] Camerer, C. and Weber, M. Recent developments in modeling preferences: uncertainty and ambiguity[J]. Journal of Risk and Uncertainty. 1992(5): 325– 370.

[45] Cao, H., Wang, T. and Zhang, H. Model uncertainty, limited market participation, and asset prices[J]. Review of Financial Studies. 2005(18): 1219– 1251.

[46] Chateauneuf, A. Modeling attitudes towards uncertainty and risk through the use of Choquet integral[J]. Annals of Operations Research. 1994(52): 3– 20.

[47] Chateauneuf, A. and Faro, J. Ambiguity through confidence functions[J]. Journal of Mathematical Economics, 2009(45)(9– 10): 535– 558

[48] Chateauneuf, A. and Tallon, J-M. Diversification, convex preferences and non-empty core in the Choquet expected utility model[J]. Economic Theory . (2002)(19),3 509– 523

[50] Chateauneuf, A., Cohen, M. and Meilijson, I. Four notions of mean-preserving increase in risk, risk attitudes and applications to the Rank-dependent expected utility model[J]. Journal of Mathematical Economics. 2004(40): 547– 571.

[51] Chateauneuf, A., Eichberger, J and Grant, S. Choice under uncertainty with the best and worst in mind: neo-additive capacities[J]. Journal of Economic Theory. 2007(137):538– 567.

[52] Chen, Z. and Epstein, L. Ambiguity, risk, and asset returns in continuous time[J]. Econometrica. 2002(70): 1403– 1443.

[53] Chew, S. and Sagi, J. Small worlds: modeling attitudes toward sources of uncertainty[J]. Journal of Economic Theory . 2008(139): 1– 24.

[54] Cohen, M. Risk-aversion concepts in expected- and non-expected-utility models[J]. The Geneva Papers on Risk and Insurance Theory. 1995(20): 73– 91.

[55] Cross, F. The behavior of stock Prices on Fridays and Mondays[J],Financial Analysis Journal,1973,11:67--69

[56] Dana, R. Ambiguity, uncertainty aversion and equilibrium welfare[J]. Economic Theory. 2004(23): 569– 587.

[57] Daniel K, Hirshleifer D, Subrahmanyam A. Investor psychology and investor security market under- and overreactions. Journal of Finance, 1998, 53(6): 1839-1886.

[58] De Long J B, Shleifer A, Summers L H, Waldmann R J. Noise trader risk in financial markets [J].The Journal of Political Economy, 1990a, 98(4): 703-738.

[59] De Bondt W F M, Thaler R H. Dose the stock market overreact? Journal of Finance, 1985, 40(3): 793-805.

[60] De Long J B, Shleifer A, Summers L H, Waldmann R J. Positive feedback investment strategies and destabilizing rational speculation[J]. Journal of Finance, 1990b, 45(2): 375-395.

[61] Dekel, E., Lipman, B. and Rustichini, A. Representing preferences with a unique subjective state space[J]. Econometrica. 2001(69): 891– 934.

[62] Dow, J and Werlang, S. Uncertainty aversion, risk aversion, and the optimal choice of portfolio[J]. Econometrica. 1992(60) 1: 197– 204.

[63] Ellsberg, D. Risk, ambiguity, and the Savage axioms[J]. Quarterly Journal of Economics. 1961(75): 643- 669.

[64] Epstein, L. A definition of uncertainty aversion[J]. Review of Economic Studies. 1999(66): 579- 608.

[65] Epstein, L. Three paradoxes for the smooth ambiguity model of preference. Mimeo, Boston University. 2009.

[66] Epstein, L. and Miao, J. A two-person dynamic equilibrium under ambiguity[J]. Journal of Economic Dynamics and Control. 2003(27): 1253- 1288.

[67] Epstein, L. and Schneider, M. Recursive multiple prior[J]. Journal of Economic Theory. 2003b(113): 1– 31.

[68] Epstein, L. and Schneider, M. Ambiguity, information quality and asset pricing[J]. Journal of Finance. 2008(63): 197– 228.

[69] Epstein, L. and Wang, T. Intertemporal asset pricing under Knightian uncertainty[J]. Econometrica. 1994(62):3. 283- 322.

[70] Epstein, L. and Zhang, J. Subjective probabilities on subjectively unambiguous events[J]. Econometrica. 2001(69): 265- 306.

[71] Ergin, A. and Gul, F. A theory of subjective compound lotteries[J]. Journal of Economic Theory. 2009(144):3. 899- 929.

[72] Fisher K L, Statman M. Investor sentiment and stock returns. Financial Analysts Journal, 2000, 56(2): 16-23

[73] French,M.&P. Stock returns and the weekend effect[J],Journal of Financial Economics,1980,8.55 - 69

[74] Gajdos, T., Hayashi, T., Tallon, J-M. and Vergnaud, J-C. Attitude toward imprecise information[J]. Journal of Economic Theory. 2008(140): 23- 56.

[75] Gervais S, Odean T. Learning to be overconfident [J]. The Review of Financial Studies, 2001, 14 (1):1-27.

[76] Geweke.J The dynamic factor analysis of economic time series models. In Latent Variables in Socioeconomic Models, ed. Aigner D J and Goldberger A S, 365-383 Amsterdam: North-Holland, 1977.

[77] Ghirardato, P. and Marinacci, M. Risk, ambiguity, and the separation of utility and beliefs[J]. Mathematics of Operations Research. 2001(26): 864- 890.

[78] Ghirardato, P. and Marinacci, M. Ambiguity aversion made precise: a comparative foundation and some implications[J]. Journal of Economic Theory. 2002(102): 251– 282.

[79] Ghirardato, P., Maccheroni, F. and Marinacci, M. Differentiating ambiguity and ambiguity attitude[J]. Journal of Economic Theory. 2004(118): 133- 173.

[80] Gilboa, I. Theory of Decision under Uncertainty, Econometric Society Monographs edn. Cambridge: Cambridge University Press. 2009

[81] Gilboa, I. and Schmeidler, D. Maxmin expected utility with a non-unique prior[J]. Journal of Mathematical Economics. 1989(18): 141– 153.

[82] Grant, S. and Quiggin, J. Increasing uncertainty: a definition[J]. Mathematical Social Sciences. 2005(49): 117– 141.

[83] Grinblatt M, Titman S, Wermers R. Momentum investment strategies, portfolio performance, and herding: a study of mutual fund behavior. The American Economic Review, 1995, 85(5): 1088-1105.

[84] Gultekin,Mustafa N.,and N.Bulent Gultekin," Stock Market Seasonality:International Evidence, Journal of Financial Economics,Vol.12,1983 pp.469-481

[85] Hansen, L. and Sargent, T. Robust control and model uncertainty[J]. American Economic Review. 2001(91): 60- 66.

[86] Halevy, Y. Ellsberg revisited: an experimental study[J]. Econometrica.2007(75): 503- 536.

[87] Hayashi, T. Intertemporal substitution, risk aversion and ambiguity aversion[J]. Economic Theory. 2005(25)-4 933- 956.

[88] Jaffray, J-Y. and Philippe, F. On the existence of subjective upper and lower probabilities[J]. Mathematics of Operations Research. 1997(22): 165- 185.

[89] Jaffe,J &R.Westerfield,The weekend effect in common stock return: Th einternational evidence[J],The

Journal of Finance 1985, 2: 433-454.

[90] Kahneman, D. and Tversky, A. Prospect theory: an analysis of decision under risk[J]. Econometrica. 1979(47): 263–291.

[91] Kahneman, D. and Tversky, A. Advances in prospect theory: cumulative representation of uncertainty[J]. Journal of Risk and Uncertainty. 1992(5): 297–323.

[92] Keim, D. & R.Stambaugh, The impact of firm size difference on the day-of-the-week effect[J], The Journal of Finance, 1984, 3: 819-840.

[93] Keim, Donald B.," Dividend Yield and The Journal of Portfolio Management, Winter 1986a, 54-60.

[94] Keim, Donald B.," The CAPM and Equity Return Regulations", Financial Analysis Journal, May-June 1986b 19-34.

[95] Kirman A. Ants, rationality and recruitment [J]. The Quarterly Journal of Economics, 1993, 108(1): 137-156.

[96] Kirman A, Teyssiere G. Testing for bubbles and change-points [J]. Journal of Economic Dynamics and Control, 2005, 29(4): 765-799.

[97] Klibanoff, P., Marinacci, M. and Mukerji, S. A smooth model of decision making under uncertainy[J]. Econometrica. (2005) 6: 1849–1892.

[98] Klibanoff, P., Marinacci, M. and Mukerji, S. On the smooth ambiguity model: a reply[J]. Mimeo, Northwestern University. 2009a

[99] Klibanoff, P., Marinacci, M. and Mukerji, S. Recursive smooth ambiguity preferences[J]. Journal of Economic Theory. 2009b(3): 930–976.

[100] Kreps, D. (1979) A representation theorem for preference for flexibility[J]. Econometrica 47: 565–576.

[101] Lakonishok J, Shleifer A, Vishny R. Impact of institutional investors on stock prices. Journal of Financial Economics, 1992, 32(1): 23-44.

[102] Lakonishok, Josef and Seymour Smidt," Are Seasonal Anomalies Real? A 90-Year Perspective,", Cornell University Johnson Graduate Schlool of Managemet UnPublished Manuscript, 1986.

[103] Lee C M C, Shleifer A, Thaler R H. Investor sentiment and the closed-end fund puzzle. Journal of Finance, 1991, 46(1): 75-109.

[104] Lux T. Herd behavior, bubbles and crashes [J]. The Economic Journal, 1995, 105(431): 881-896.

[105] Machina, M. and Schmeidler, D. A more robust definition of subjective probability[J]. Econometrica. 1992(60): 745–780.

[106] Mehdian, S. and Perry, M.J, The Recersal of the Monday effect : New Evidence from the US Equity Markets[J],Journal of Business,Finance & Accounting 2001, 7: 125-132.

[107] Mukerji, S. and Tallon, J-M. Ambiguity aversion and incompleteness of financial markets[J]. Review of Economic Studies. 2001(68): 883–904.

[108] Nau, B. Uncertainty aversion with second-order utilities and probabilities[J].Management Science. 2006(52): 136–145.

[109] Nehring, K. Ambiguity in the context of probabilistic beliefs. Working Paper. 2001.

[110] Patel S A, Sarkar A. Crisis in developed and emerging stock markets. Financial Analysts Journal, 1998, 54(6): 50-61.

[111] Quiggin, J A theory of anticipated utility[J]. Journal of Economic Behavior and Organization. 1982(3): 323–343.

[112] Rinaldi, F. (2009) Endogenous incompleteness of financial markets: the role of ambiguity and ambiguity aversion[J]. Journal of Mathematical Economics 45: 872–893.

[113] Rothschild, M. and Stiglitz, J Increasing risk I: a definition[J]. Journal of Economic Theory. 1970(2): 225–243.

[114] Rozeff. Michael S.and william R. Kinney ,.Jr." CaPital Market Seasonality :The Case of Stock Returns,Journal of Financial Economics, 1976, 3, 379-402.

[115] Sargent T J, Sims C A. Business cycle modeling without pretending to have too much a priori economic

theory. In New Methods in Business Cycle Research: Proceedings from a Conference, ed. Sims C A, 45-109. Minneapolis: Federal Reserve Bank of Minneapolis, 1977.

[116] Savage, L. The Foundations of Statistics[M]. New-York: John Wiley. 195.

[117] Schmeidler, D. Subjective probability and expected utility without additivity[J]. Econometrica. 1989(57).3: 571– 587.

[118] Segal, U. The Ellsberg paradox and risk aversion: an anticipated utility approach[J]. International Economic Review. 1987(28): 175– 202.

[119] Segal, U. Two-stage lotteries without the reduction axiom[J]. Econometrica. 1990(58):349– 377.

[120] Seo, K. Ambiguity and second-order belief[J]. Econometrica. 2009(77).5: 1575– 1605.

[121] Steeley,J,A,note,on,information,seasonality,and,the,disappearance of the weekend effect in the UK stock market[J],Journal of Banking & Finance,2001,25:1941--1956

[123] Stock JH, Watson M W. New indexes of coincident and leading economic indicators. In NBER Macroeconomics Annual 1989, ed. Blanchard O J and Fischer S, vol. 4, 351-394. Cambridge, MA: MIT Press, 1989.

[124] Stock JH, Watson M W. A probability model of the coincident economic indicators. In Leading Economic Indicators: New Approaches and Forecasting Records, ed. Lahiri K and Moore G. H, 63-89. Cambridge: Cambridge University Press, 1991.

[125] Tinic,Seha M.and Richard R.West," Risk and Return: January and Rest of the year", Journal of Financial Economics,1984,13,561-574.

[126] Vandewalle N, Ausloos M, Boveroux P, Minguet A. Visualizing the log-periodic pattern before crashes. The European Physical Journal B, 1999, 9: 355-359.

[127] Wakker, P. and Tversky, A. An axiomatization of cumulative prospect theory[J]. Journal of Risk and Uncertainty. 1993(7): 147– 176

[128] Wang, T. A class of multi-prior preferences. Discussion Paper, University British Columbia. 2003

[129] Watson M W, Engle R F. Alternative algorithms for the estimation of dynamic factor, MIMIC and varying coefficient regression models. Journal of Econometrics, 1983, 23(3): 385-400.

[130] Westerhoff F H. Greed, fear and stock market dynamics. Physica A, 2004, 343: 635-642.

[131] Wermers R. Mutual fund herding and impact on stock prices. Journal of Finance, 1999, 54(2): 518-622.

[132] Yaari, M. Some remarks on measures of risk aversion and on their uses[J]. Journal of Economic Theory. 1969(1): 315– 329.

[133] Zhiyuan Jiang, Shunming Zhang, yitao Jiang, Bow shape value function in cummulactive theory[J], MSE2011. 492-498

Degree papers are in the "Xiamen University Electronic Theses and Dissertations Database". Full texts are available in the following ways:

1. If your library is a CALIS member libraries, please log on http://etd.calis.edu.cn/ and submit requests online, or consult the interlibrary loan department in your library.

2. For users of non-CALIS member libraries, please mail to etd@xmu.edu.cn for delivery details.