Risk Tolerance and Portfolio Allocation

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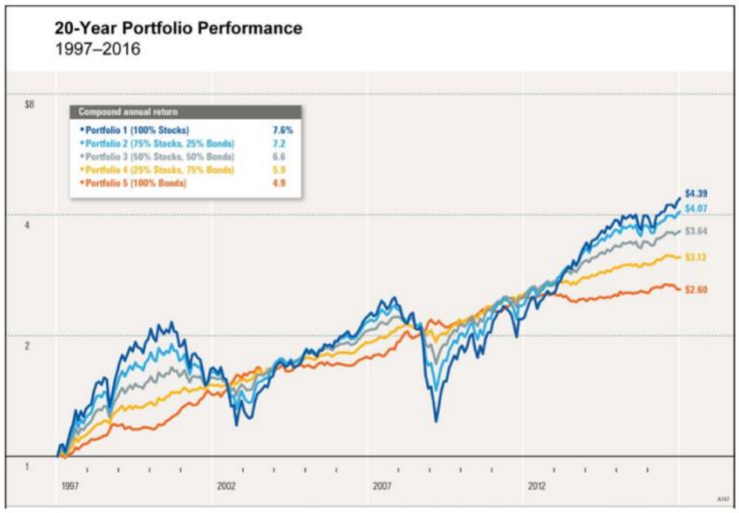
Introduction

- Factors influencing wealth
  - Income
  - Saving
  - Assets allocation
- Assets allocation
  - Definition
  - Importance
  - Determinant

Introduction



Source: Morningstar

Introduction

- Risk tolerance
  - An important factor in determining an appropriate asset allocation
  - Positively associated with holding risky financial assets
- Risk tolerance measurement
  - A psychological characteristic
  - Objective measure vs. Subjective measure

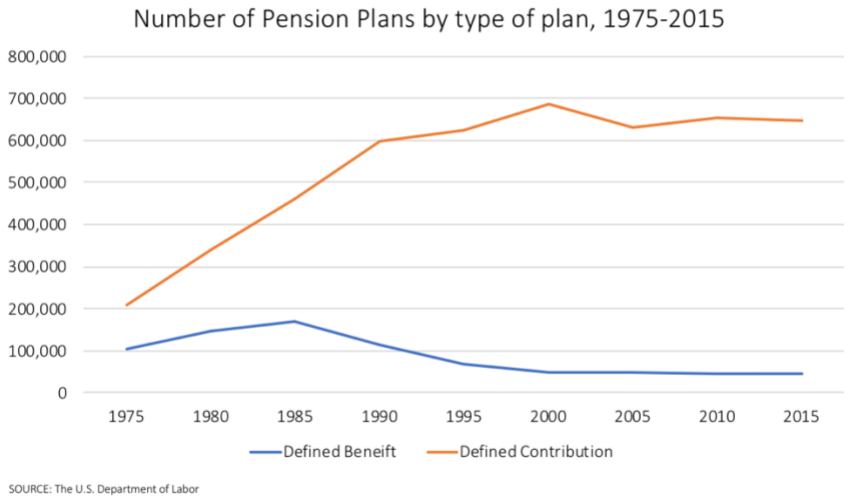
Introduction

- Risk tolerance and actual portfolio risk consistency
  - Taking less portfolio risk than desired
    - Failing to achieve adequate growth
    - Difficult to achieve financial goals
  - Taking more portfolio risk than desired
    - Unnecessary financial losses
    - Lead to financial mistakes

Introduction

- Purpose of this study
  - To explored the relationship between risk tolerance and households' portfolio of risky financial assets
- Why this study?
  - The shift from DB to DC plans
  - Longevity risk

Introduction



SOURCE: The U.S. Department of Labor

Introduction

- Contribution of this study
  - Identity the inconsistency between risk tolerance and portfolio risk
  - Provide clear implications for financial planners and investors.

Literature review

- Previous studies about households' consistency in financial risk attitude and behavior
  - Individuals' self-reported willingness to take financial risks and their actual allocation of assets often differ (Riley & Chow, 1992)
  - Individuals' perception of their risk tolerance is inconsistent with the actual investment risks they are taking (Grable, McGill, & Britt, 2009)

Literature review

- The effect of financial risk attitude on assets allocation
  - Attitude toward investment risk positively affected ratio of stock investments to financial assets (Embrey & Fox, 1997; Gilliam, J., Chatterjee, S., & Grable, J., 2010)
  - Being willing to take at least some financial risks positively affected the ratio of risky assets to net worth (Chang, DeVaney, & Chiremba, 2004; Gutter, M. S., & Fontes, A., 2006)

Literature review

- The effect of financial risk attitude on assets allocation
  - Risk tolerance positively affected stock ownership (Fan & Xiao, 2006)
  - Higher risk tolerance does not affect the composition of an individual's portfolio of risky assets (Hariharan, Chapman, & Domian, 2000)

Literature review

- Factors associated with risk tolerance

Variables	Effects	Relative studies
Age	Older adults were less risk tolerant than younger adults	(Grable 2000; Grable 2008)
	Risk tolerance first increased with age then decreased	(Hallahan et al., 2004)
Education	Higher levels of education associated with greater risk tolerance	(Grable 2000; Yao et al., 2011)
Race	Whites were more risk tolerant than were other racial/ethnic groups	(Hawley & Fujii, 1993)
	Blacks and Hispanics were more risk tolerant than Whites.	(Halek & Eisenhauer, 2001)
Marital status	Being married were positively associated with a higher level of risk tolerance	(Hariharan, Chapman, & Domian, 2000)

Literature review

Employment status	There is a positive relationship between self-employment and higher risk tolerance	(Sung & Hanna, 1996)
Financial knowledge	Financial knowledge positively affected risk tolerance	(Fan & Xiao, 2006; Gibson et al., 2013)
Income and net worth	Income and wealth had a positive relationship with risk tolerance	(Yao et al., 2005)
Health condition	Investors with poor health were less likely to own risky assets	(Coile & Milligan, 2009; Edwards, 2008)
Use a financial planner	No significant effect of consulting with a financial advisor on financial risk tolerance	(Gilliam, J., Chatterjee, S., & Grable, J., 2010)
Have 3 month emergency funds	Having 3 months emergency funds increased the likelihood of risky asset ownership	(Gutter, M. S., & Fontes, A., 2006)

Methods

- Data
  - The 2016 Survey of Consumer Finances (SCF)
  - Total sample size= 6,248
- Sample selection criteria
  - Excluded "other" race group
  - Final sample size for this study= 5,905
- Data analysis
  - Binary logistic regression

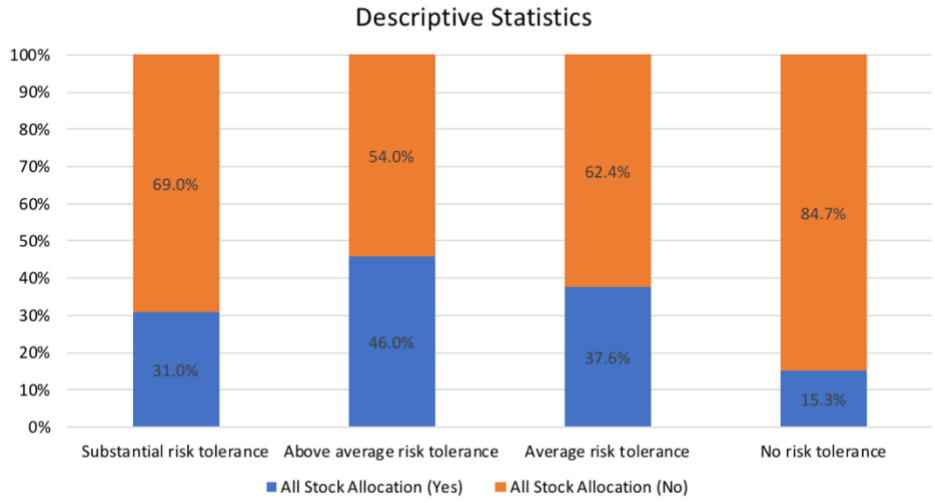
Methods

- Dependent variable
  - Whether households invest all their risky financial assets in public traded stocks and/or private business stocks (1=yes/0=no)
  - Financial assets invested in stock
    - Directly-held stocks
    - Stock mutual funds
    - IRA/Keoghs invested in stocks
    - Other managed assets with equity interest
    - Thrift-type retirement accounts invested in stocks
    - Savings accounts or other accounts invested in stocks

Methods

- Primary independent variable
  - Respondents' level of risk tolerance
    - Take substantial financial risks expecting to earn substantial returns;
    - Take above average financial risks expecting to earn above average returns;
    - Take average financial risks expecting to earn average returns;
    - Not willing to take any financial risks.

Main Results



Main Results

- A higher level of risk tolerance was associated with a higher probability of investing all risky financial assets in stocks.
- The portfolio allocations of respondents who reported they would be willing to take substantial financial risks were not found to be statistically significantly more likely to invest their entire risky financial portfolio in stocks.

Main Results

- About 15% of households who were unwilling to take any risks allocated 100% of their risky assets in stocks.
- Age, race, level of education, family composition, employment status, self-perceived health condition, homeownership, investment horizon, using financial planners, emergency fund adequacy, household income, and household net worth were also found to be significantly associated with the all-stock allocation.

Discussion

- This study indicates a possible overestimation of risk tolerance or the portfolio risk on the part of the investors.
- When the risk tolerance assessment output shows a substantial level of risk tolerance, explanations of portfolio risks and a more in depth of conversation may be necessary to find out whether the client's understanding of the portfolio risks matches his/her self-perceived risk tolerance.

Question?

Thank you!

American Millennials' Investment Risk Tolerance

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Introduction

- Many prior studies have studied risk tolerance
- Very few have examined the risk tolerance of Millennials
- Millennials are at an important stage of investing for their financial future.
- This study uses a national dataset to examine the factors related to American Millennials' investment risk tolerance.

Introduction

- Millennials
  - born between 1982 and 2000 (U.S. Census Bureau, 2015)
  - have exceeded baby boomers and become the largest living generation in the United States (Fry, 2016).

Introduction

- Millennials are expected to assume more responsibilities in financial decision-making than older generations.
  - Shift from DB to DC plans
  - Uncertain Social Security future payouts
  - Increased longevity

Introduction

- Investment risk tolerance
  - the degree to which households accept investment risks
  - plays an important role in households' financial decision-making

Introduction

- Studies show that households with high risk tolerance are more likely to invest in assets that produce higher returns over the long-run (Yao et al., 2004).
- Households with low risk tolerance are less likely to invest in those assets and may have difficulty reaching their long-term financial goals (Yao et al., 2004).

Introduction

- It is very critical for Millennials to invest in assets with a level of portfolio risk that is consistent with their investment risk tolerance.

Literature Review

- Existing research has shown that a number of factors affect risk tolerance.
- Many prior studies agree that women are less risk tolerant than men in general.
  - Single men > married or unmarried women (Yao & Hanna, 2005)

Literature Review

- Age is one of the widely studied factors related to financial risk tolerance.
  - Many researchers found that older adults were less risk tolerant than younger adults (Yao et al., 2004; Yao et al., 2011; Gibson et al., 2013).

Literature Review

- Education has been frequently examined as a factor related to risk tolerance.
  - Higher levels of education is found to be associated with greater risk tolerance (Yao et al., 2011; Hawley & Fujii 1993).

Literature Review

- Race/ethnicity has been examined in previous research on risk tolerance.
  - Researchers found that Whites were more risk tolerant than other racial/ethnic groups (Hawley & Fujii 1993).
  - Black and Hispanic respondents were more likely to take substantial financial risk, but significantly less likely to take some financial risk than White respondents (Yao et al., 2005) .

Literature Review

- Financial knowledge has been found to be important in explaining risk tolerance.
  - Financial knowledge is positively related to risk tolerance (Yao et al., 2004; Gibson et al., 2013; Fan & Xiao, 2006).

Literature Review

- Higher income has been found to be positively related to risk tolerance (Yao et al., 2004; Gibson et al., 2013; Hawley & Fujii 1993).
- The level of non-financial assets was associated positively with higher risk tolerance (Yao et al., 2004).
- Employment status was also significantly related to financial risk tolerance (Yao et al., 2005).

Literature Review

- Although many prior studies have focused on investment risk tolerance, very few have examined the investment risk tolerance of Millennials.
- It is necessary to examine whether these factors affect American Millennials' investment risk tolerance.

Data

- 2015 National Financial Capability Study dataset(NFCS)
  - state-by-state survey conducted online from June to October 2015.
  - sample size: 27,564 (approximately 500 per state)
  - this study uses weights recommended by NFCS in order to determine estimates for the full population.

Data

- Sample selection criteria:
  - Millennials
  - included “Single”, “Divorced” or “Widowed/widower” (Married were excluded)
  - “Don’t know” or “Prefer not to say” were excluded
- Final sample size: 3,510

Dependent Variable

- Risk tolerance score
- The 2015 National Financial Capability Study asked the following risk tolerance question:
  - "When thinking of your financial investments, how willing are you to take risks?"
  - This risk tolerance level was measured on a ten-point scale ranging from 1 (not at all willing) to 10 (very willing).

Independent Variables

- Independent variables measured at the respondent level:
  - age, gender, race/ethnicity, education
  - employment status, credit card ownership, having an adequate level of emergency fund
  - financial knowledge score, financial satisfaction score

Independent Variables

- Independent variables measured at the household level:
  - presence of children
  - household annual income, recent income drop, health insurance coverage, having any retirement plan through a current or previous employer, investment asset ownership outside of retirement accounts, home ownership and auto loan ownership
  - saving horizon

Analysis

- In this study, the dependent variable (risk tolerance score) was treated as a continuous variable and we used a general linear model and the model assumptions were met.

Descriptive Results

Table 2 Descriptive Statistics by Gender

	Total Sample N = 3,510	Women N = 1,954 (55.7%)	Men N = 1,556 (44.3%)
Age			
18-24	49.3%	52.7%	45.1%
25-34	50.7%	47.3%	54.9%
Average risk tolerance score	5.61	5.06	6.30
Average financial knowledge	2.80	2.63	3.01
Credit card ownership	71.1%	69.6%	73.1%
Household Income			
Income <$15,000	23.5%	24.4%	22.5%
At least $15,000 and <$25,000	14.9%	16.2%	13.2%
At least $25,000 and <$35,000	15.8%	16.6%	14.8%
At least $35,000 and <$50,000	15.9%	15.8%	16.0%
At least $50,000 and <$75,000	15.8%	15.4%	16.4%
At least $75,000 and <$100,000	7.2%	6.1%	8.6%
At least $100,000 and <$150,000	5.0%	4.3%	5.9%
$150,000 or more	1.9%	1.3%	2.6%
Race			
White	55.2%	54.5%	56.0%
Non-White	44.8%	45.6%	44.0%

Descriptive Results

Education			
Less than high school	1.8%	1.4%	2.3%
High school	23.9%	21.7%	26.8%
Some college	32.4%	32.4%	32.5%
College	33.2%	35.8%	29.9%
Postgrad	8.7%	8.8%	8.6%
Presence of Children	26.4%	29.1%	23.0%
Saving Horizon			
Short (less than 2 years)	54.1%	56.1%	51.5%
Medium (2-4 years)	24.3%	24.0%	24.6%
Long (5-10 years)	12.3%	12.0%	12.7%
Very long (more than 10 years)	5.1%	4.4%	6.1%
Employment Status			
Self employed	5.8%	4.2%	7.9%
Work for others	59.3%	57.9%	61.1%
Unemployed	13.5%	14.6%	12.0%
Student	21.4%	23.3%	19.0%
Average financial satisfaction score	5.36	4.84	6.02
Emergency fund	41.1%	35.6%	48.1%
Recent income drop	26.5%	28.0%	24.6%
Retirement plan	38.0%	38.1%	37.9%
Health insurance coverage	83.2%	86.6%	78.9%

Descriptive Results

Other investments	23.4%	18.0%	30.2%
Home ownership	30.9%	26.1%	37.0%
Auto loan	24.2%	25.2%	22.9%

Analysis of the 2015 National Financial Capability Study; weighted results; sample size = 3,510

Results

Table 3 Ordinary Least Squares Analysis of Risk Tolerance

	Model
Intercept	2.820***
Age (ref: 18-24)	
25-34	-0.152
Financial knowledge	0.054*
Credit card ownership (ref: no)	0.275**
Household Income (ref: income<$15,000)	
At least $15,000 and <$25,000	-0.018
At least $25,000 and <$35,000	0.181
At least $35,000 and <$50,000	-0.123
At least $50,000 and <$75,000	0.029
At least $75,000 and <$100,000	0.299
At least $100,000 and <$150,000	0.265
$150,000 or more	0.004
Male (ref: female)	0.707***
White (ref: non-white)	-0.560***

Results

Education (ref: less than high school)	
High school	0.118
Some college	0.152
College	0.104
Postgrad	0.159
Presence of Children (ref: no)	0.341***
Saving Horizon (ref: less than 2 year)	
Medium (2-4 years)	0.002
Long (5-10 years)	0.173
Very long (more than 10 years)	-0.170
Employment Status (ref: unemployed)	
Self employed	0.538**
Work for others	0.129
Student	0.053
Current financial satisfaction score	0.340***
Emergency fund (ref: no)	-0.026
Unexpected recent income drop (ref: no)	0.452***
Retirement plan (ref: no)	0.396***
Health insurance (ref: no)	-0.236*
Other investments (ref: no)	0.588**
Home ownership (ref: no)	0.353***
Auto loan (ref: no)	-0.017

NOTE: *p<0.05; **p<0.01; ***p<0.001. Analysis of the 2015 National Financial Capability Study; sample size = 3,510

Conclusion

- This study used data from the 2015 NFCS dataset to examine the investment risk tolerance of American Millennials.
- It is among the first that examined the investment risk tolerance of Millennials.
- Regression analysis indicated that some factors that affected other generations also affected Millennials.

Conclusion

- Findings show that factors that positively affected Millennials' risk tolerance include
  - being a male, having children
  - experienced recent income drop, owning credit cards, being self-employed, having a retirement plan, having other investments and owning a house
  - having higher financial knowledge, satisfied with current financial situation

Conclusion

- Findings show that factors that negatively affected Millennials' risk tolerance include being White and having health insurance.

Conclusion

- The findings from this study help us better understand factors related to Millennials' investment risk tolerance.
- Understanding factors that are related to their risk tolerance is the first step into helping Millennials to make informed financial decisions and accomplish their financial goals.

Limitation

- One limitation of the study is that the risk tolerance score is self-reported and measured by respondents' answer to the question: "When thinking of your financial investments, how willing are you to take risks?"
- This measure should be tested for validity and reliability.

Research on the "Announcement Effect" of Conduct Risk of International Commercial Banks

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Abstract

In this paper, 109 conduct risk events occurred in 10 international large commercial banks are taken as samples for research, including Barclays, Citibank, Royal Bank of Scotland, HSBC, JP Morgan, Bank of America, Lloyds Banking Group, Goldman Sachs, BNP Paribas and Societe Generale. Taking disclosure date of conduct risk events as the announcement date, the the event research method is used to calculate the volatility of stock prices and stock indexes. We study the announcement effect of the conduct risk events disclosure, and the result shows that the disclosure of conduct risk events has a negative effect in commercial banks.

Key words: Commercial Bank, Conduct Risk, Announcement Effect

Although commercial banks may suffer losses from conduct risk events since their establishment, it didn't attract the attention of financial institutions and regulatory authorities until the financial crisis in 2008. A series of conduct risk events, such as the fraud of Societe Generale in 2008 and the "London Whale Incident" in 2012, have caused widespread concern about the conduct risk of commercial banks. The Financial Services Authority (FSA) published "Outlook for Retail Behavior Risks" in 2011, after drawing on the "Twin Peaks" regulatory theory proposed by Taylor (1995). FSA pointed out that the conduct risk of retail business is the risk of adverse consequences for consumers due to the retail business of commercial banks and other financial institutions, such as concealing product information to consumers, misleading consumers to invest, disclosing consumer personal information, discriminating consumers, cheating consumers and the improper way of debt collection to the consumer. With the development of financial markets, various conduct risk events happened, including irregular operations, fraud, manipulating interest rates and prices, violating sanctions, insider trading and condoning money laundering. These events have caused huge economic losses to commercial banks. Therefore, it is necessary to prevent and control the conduct risk events of the commercial banks, which is of great significance to the stability of the entire financial industry and the healthy development of the macro economy in the whole country.

This paper studies the volatility of stock prices and stock indexes of the 10 large commercial banks in the world after the disclosure of the conduct risk events by systematic theoretical analysis and empirical test. The research has positive implications for the sustainable development of commercial banks in the case of frequent occurrence of conduct risk events. It can not only help the majority of investors to make investment analysis and decision more effectively, but also provide policy recommendations for commercial banks in risk prevention and risk management.

1. Literature review

1.1 Research status of conduct risk at home and abroad

Taylor(1995) proposed the theory of " Twin Peaks ". He argued that the financial institutions should focus on prudential supervision and behavior supervision. Regulators should distinguish the two objectives and deliver them to different regulators. But the theory of " Twin Peaks " has not been widely used in practice. The domestic and foreign regulatory authorities still rely on prudential

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supervision. After the financial crisis in 2008, strengthening the regulation of conduct risks and protecting the rights of financial consumers have become the new direction of the global financial reform. The regulatory practices in various countries have proved that countries which have independent prudential supervision and behavior regulation are more able to resist risks. Relatively speaking, they are better able to withstand the impact of the international financial crisis. Nevertheless, scholars still have different opinions on the relationship between prudential supervision and behavior supervision. Nout Wellink, the governor of the Dutch central bank, believed that there are conflicts between prudential supervision and behavior supervision. The behavioral supervision is mainly conducted in an open manner, while the prudential supervision is operated in the back office. Therefore, it is likely that conflicts will arise when financial regulators undertake the two duties simultaneously. Geithner, the Treasury Secretary of the United States, proposed that regulators should be monitored according to the Basel New Capital Accord at the International Bankers Association in 2004. He cited the specific performance on the failure of financial consumer protection system before the financial crisis. He believed that the structural failure must be addressed through establishing the Consumer Financial Protection Agency (CFPA). Conversely, McCarthy (2006), the former chairman of the UK Financial Services Authority (FSA), argued that protecting the rights of the financial consumers should adhere to the principle of moderation. The market shouldn't be hindered because of the excessive attention on protecting the rights of financial consumers. He advocated the inherent unity of prudential supervision and behavioral regulation. Adamson and Zywicki (2007) believed that CFPA had some hidden dangers. It couldn't protect the rights of consumers well. Evans and Noel (2008) argued that consumers might have no access to sophisticated financial derivatives in their daily life, such as credit default swaps and interest rate swaps. So traditional protection measures for consumers were sufficient. Establishing a new financial consumer protection agency was likely to protect only the interests of the rich.

Domestic studies on conduct risk are rare, and all of them are qualitative. Lin (2009) put forward that all kinds of risks faced by commercial banks were closely related and intertwined. Therefore, it was necessary to examine the market risk system from the perspective of overall risk management, taking into account the integrity and uniqueness. Liao (2012) argued that regulators should save resources and enhance initiative. They should strictly discipline the consumers who default on breach of contract and implement the accountability system to senior management. Moreover, the regulatory information and policy should be disclosed regularly to ensure that regulatory actions are open and transparent. Liu (2014) believed that commercial banks should enhance the protection for financial consumers by promoting the cognition of behavior supervision and strengthening the technical research on the behavioral regulation. Hui (2015) proposed that commercial banks can enhance their ability to control conduct risks by strengthening internal governance and improving the internal supervision measures.

In summary, the majority of the researches on conduct risk by foreign scholars are qualitative researches. Moreover, they mainly focus on the relationship between behavioral regulation and prudential regulation. Before the financial crisis in 2008, foreign supervision focused on prudent supervision. But after that, the behavioral regulation has received attention. Foreign scholars are controversial about whether there is a need to establish a consumer financial protection agency (CFPA). This paper argues that it is not important to establish a consumer financial protection agency. Only by properly handling the relationship between prudential supervision and implementation supervision can we truly protect the consumers. Domestic researches on conduct risk are mainly in regulation and prevention. We think that commercial banks should strengthen the internal control and supervision,improve the information disclosure system and balance the relationship between prudential supervision and behavior regulation.

1.2 Research status of announcement effect at home and abroad

Announcement effect refers to the impact of information disclosure on the market in the coming period. The main research method of the announcement effect is the event research method, which takes a publicly disclosed event as the research object and analyzes the market reaction within a certain period before and after the event. At present, the research on the announcement effect of stock market at home and abroad mainly involves five aspects: earnings announcement, additional announcement, holdings announcement, issuance of convertible bonds and announcement of corporate bonds issuance.

Firstly, Rendleman et al. (1982) based on the empirical study of the earnings announcement effect on the stock market in developed countries, come to two rules: "transaction in turn ahead of time" and "post-order and orderly continuation". That is, the stock price had already reacted before the earnings

announcement and remained unchanged after the announcement. Tan (2008) studied the "concentration announcement effect" and the "calendar effect" in the earnings announcement of the two stock exchanges in Shanghai and Shenzhen. He found that Chinese public companies were trying to reduce the market's attention by releasing bad news on Saturday. Quan and Wu (2010) found a significant negative correlation between the profit announcement effect of shanghai stock exchange and the market investors' attention.

Secondly, the study found that public offering stocks usually showed the negative announcement effect, while non-public offering stocks showed a positive announcement effect. The theory of publicly offering stocks with a negative publicist effect includes the information asymmetry theory proposed by Masulis and Korwar (1986), the adverse selection theory proposed by Myers (1984), the price pressure theory proposed by Kalay and Shimrat (1986), etc. Hu et al. (2002) and Liu et al. (2003) found that the behavior of the non-tradable shareholders was the main reason why the public offering stocks has negative announcement effect in China. However, the hypothesis of supervisory effects proposed by Wruck (1989), the price pressure hypothesis proposed by Scholes (1972), the hypothesis of investment opportunities proposed by Cooney and Kalay (1993), the information effect hypothesis proposed by Wu and Wang (2005) and the corporate governance hypothesis proposed by Heinkel and Schwartz (1986) constitute the cause of the positive announcement effect of the non-public offering stocks.

Thirdly, Hillier and Marshall (2002) and Fidrmuc et al. (2006) studied the American market and the German market respectively from the perspective of internal opportunism and external blind follow-up behavior. The researches showed that overweight behavior would have a significant positive reaction, and stock prices would show positive abnormal returns over a period after the announcement. Li et al. (2011) found that the phenomenon also existed in the Shanghai market, and the announcement effect would be more obvious in the bull market.

Fourthly, from the perspective of pecking order theory, Kang et al. (1995), Roon and Veld (1998) found that the issuance of convertible bonds had significant positive effect on the share price of listed companies in Japan and the Netherlands. However, Abhyankar et al. (1999), Burlacu (2000) and Kohlman et al. (2011) found that the issuance of convertible bonds had significant negative effect in the U.S, Britain and France. Liu and Wang (2005) also obtained the conclusion that the issuance of convertible bonds had significant positive effect on listed companies through empirical research and gave the reasons. Zhang (2008) proved that the issuance of convertible bonds had significant negative effect, and the effect was related to the size of company and the net cash flow of company operations.

Fifthly, scholars at home and abroad have carried out corresponding empirical studies on the announcement effect of corporate bond issuance from the perspective of pecking order theory. Datta et al. (2000) studied the announcement effect of corporate bond issuance in developed countries and found that the stock price would have a negative abnormal yield after the issuance of corporate bonds. Fu et al. (2010) pointed out that the issue of corporate bonds in China would have a negative announcement effect. Chen and Fan(2012) did a research on the announcement effect of offshore RMB bonds issued in Hong Kong and concluded that bond issuance had the negative announcement effect.

To sum up, foreign scholars focus on the public announcement effect on earnings, public issuance of additional shares, holdings of shares, issuance of convertible bonds and issuance of corporate bonds. And the majority of researches are based on stock market data in developed countries and regions. As for the researches on conduct risk, all the scholars at home and abroad do qualitative researches, but few do empirical researches. The innovation of this paper is to combine "the conduct risk of commercial banks" and " the announcement effect" to study the announcement effect of commercial banks' conduct risk. As there are few domestic cases, we take the conduct risk events of the ten large commercial banks in developed countries and regions as samples and study their announcement effect.

2. Data source and research design

2.1 Data sources and processing

Event research method is based on a publicly disclosed event. By analyzing the reaction of the stock market before and after the event, the impact of the event on the stock price is judged. It is judged by two indicators: the average abnormal return and the cumulative average abnormal return. If the market is valid, the impact of the event will be shown by changes in stock prices.

We choose the announcement date or the date of first disclosure by the media as the event day. If the announcement day is a non-trading day, the first trading day after the announcement is used as the

event day. if the announcement day is a trading day but the shares are suspended, the next trading day is used as the event day. If the companies are suspended simultaneously on the announcement day and the next trading day, they will be removed. In the research, it is important to determine the window period of the event, which is used to test the impact of the event on the stock price, as shown in Figure 1.

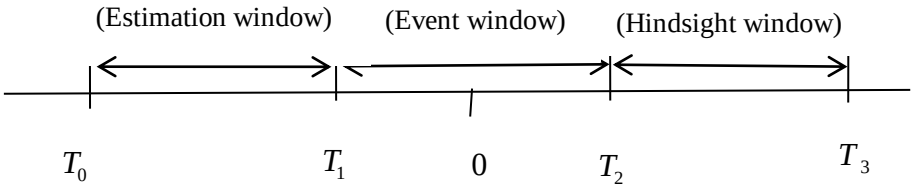

Figure 1. The various periods of the event.

In the Figure 1, *t=0* indicates the announcement day of the event. $t=T_1+1$ to $t=T_2$ is the event window. $t=T_2+1$ to $t=T_3$ refers to the hindsight window. T_0, T_1, T_2, T_3 represent the time before and after the event day respectively. The event mentioned in this paper refers to the conduct risk events of commercial banks. We choose the announcement date or the date of first disclosure by the media as the event day. The event window covers each of the 10 trading days before and after the event day. Since the announcement day is also included in the event window period, the event window contains 21 trading days. We choose 120 trading days before the event window as the estimation window. According to the Figure 1, $T_0=-130$, $T_1=-10$, $T_2=10$. the estimation period is *(-130, -11)* and the event period is *(-10, +10)*.

The research selects the conduct risk events of the 10 international large commercial banks as samples, including Barclays, Citibank, Royal Bank of Scotland, HSBC, JP Morgan, Bank of America, Lloyds Banking Group, Goldman Sachs, BNP Paribas and Societe Generale. A total of 306 conduct risk events of the ten commercial banks from 2008 to 2016 are collected, which are derived from their annual reports, announcements by various exchanges (including the New York Stock Exchange, the London Stock Exchange, the Paris Stock Exchange, and the Hong Kong Stock Exchange), data from the UK Conduct Cost Project and reports from relevant media. A total of 109 valid samples are obtained by removing the samples with missing financial data during the estimation period and the event period, the samples with more than two consecutive days of suspension during the estimated period and the samples that occurred other significant events during the event window.

All data and announcements in the research are sourced from the British Behavioral Costs Project Research Foundation, the New York Stock Exchange, the London Stock Exchange, the Paris Stock Exchange, the Hong Kong Stock Exchange, Yahoo Finance, Wind Info Financial Database and annual report of the ten commercial banks. We use the S&P 500 Index, the FTSE 100 index, the French CAC40 index and the Hang Seng Index to reflect the stock market yield in the United States, Britain, France and Hong Kong respectively, and select the S&P financial sector index, the S&P UK financial sector index, the S&P European financial sector index, the Hang Seng financial index to reflect the financial index yield of the United States, Britain, France and Hong Kong respectively. The data are all derived from Wind Financial Information Database.

2.2 The design of the research

This paper analyzes the announcement effect of conduct risk event in several methods, including the descriptive statistical analysis of single-day abnormal return *AR*, event window trend analysis, t-test, etc.

(1) Calculate the normal return

The abnormal return on the stock is equal to the actual return minus the normal return. R_{it} represents the actual return of stock *i* in the *t-th* period. AR_{it} is the abnormal return of stock *i* in the *t-th* period. $\hat{R}_{it}$ is the normal return of stock *i* in the *t-th* period.

$$AR_{it} = R_{it} - \hat{R}_{it} \tag{1}$$

Since the logarithmic return has good statistical characteristics in practical research, the actual

return can be obtained by formula (2).

$$R_{it} = \ln P_{it} - \ln P_{i(t-1)} \quad (2)$$

P_{it} and $P_{i(t-1)}$ represent the closing price of stock i on day t and day $t-1$ respectively.

The market return is replaced by the logarithmic return of the stock . The financial industry index return are calculated from the corresponding financial index.

$$R_{mt} = \ln S_{it} - \ln S_{i(t-1)} \quad (3)$$

$$I_{it} = \ln F_{it} - \ln F_{i(t-1)} \quad (4)$$

R_{mt} and I_{it} denote the market return in the t-th period and the financial industry index return respectively in the securities market corresponding to the samples. S_{it} and $S_{i(t-1)}$ represent the closing price at the t-th and ($t-1$)-th day respectively in the securities market corresponding to the samples. F_{it} and $F_{i(t-1)}$ represent the closing price of the financial index at the t-th and ($t-1$)-th day respectively in the securities market corresponding to the samples.

We choose the market model and the multi-factor market model as the method to calculate the normal return. The market model evolves from Capital Asset Pricing Model (CAPM), which is used to describe the relationship between stock return and market return. It assumes that the stock return is linearly correlated with the market return. The formula is shown in (5)

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \quad \varepsilon_{it} \sim N(0, \sigma_{\varepsilon_i}^2) \quad (5)$$

To make estimated parameters more accurate, we use the multi-factor market model as supplement. That is, the financial industry index is added on the basis of the formula (5). The calculation of financial industry index return is shown in the formula (4). The formula (6) is the improved market model.

$$R_{it} = \alpha_i + \beta_i R_{mt} + \gamma I_{nt} + \varepsilon_{it} \quad (6)$$

(2) Estimate the abnormal return

According to formula (1), the abnormal return on the stock is equal to the actual return minus the normal return. The actual return can be calculated directly, so we only need to estimate the normal return. The normal return can be calculated by the model chosen, using the relevant data within the estimated window period. We estimate the normal return using the data of the 120 trading days prior to the event window. That is, the estimated window period is (-130, -11). Then R_{it} can be calculated using the estimated parameters and the data corresponding to the event window.

(3) Add up the abnormal return

The abnormal return is summed horizontally and vertically. Horizontal summation is from the perspective of sample banks. Vertical summation is from the perspective of time. We choose to conduct the study by adding up the sample banks firstly and then summing up the time.

Add up the average abnormal return of the sample banks. The simple arithmetic mean of the abnormal returns of all sample banks at the same time in the event window period is calculated. The average abnormal return can be obtained in formula (7).

$$AAR_t = \frac{1}{N}\sum_{i=1}^{N} AR_{it} \quad (7)$$

AR_{it} is the abnormal return of sample bank i on the t-th trading day. AAR_t is the average abnormal return of all sample banks on the t-th trading day. N is equal to 109, which is the number of sample banks in this paper. The range of t is (-10, +10). The next step is to get the cumulative average abnormal return by aggregating the abnormal returns vertically, shown in formula (8).

$$CAAR(t_1, t_2) = \sum_{t=t_1}^{t_2} AAR_t \quad (8)$$

$CAAR(t_1,t_2)$ is the cumulative average abnormal return of all sample banks in the period (t_1,t_2). in the formula, t_1 is the initial period and t_2 is the terminal period within the event window period.

(4) Do t-test on abnormal return

In the research, we use t-test method to test the significance. Assuming that the announcement of the conduct risk event has no effect on the stock price, AAR_t and $CAAR_t$ obey the normal distribution with a mean of zero. In this paper, the t-test is performed on the abnormal return of all samples. That is, the t-test will be performed on AAR and $CAAR$ respectively. The null hypothesis H_0 indicates that the announcement of conduct risk event has no effect on the stock price. And the alternative hypothesis H_1 indicates that the announcement of conduct risk event has an impact on the stock price.

Do t-test on AAR_t . The null hypothesis is H_0 : $AAR_t = 0$. The alternative hypotheses is H_1 : $AAR_t \neq 0$. The t-statistics is shown in formula (9).

$$t(AR_t)=\frac{AAR_t}{s/\sqrt{n-1}} \quad S^2=\frac{\sum_{i=1}^{N}(AAR_{it}-\overline{AAR_t})}{N-1} \tag{9}$$

Do t-test on $CAAR_t$. The null hypothesis is H_0: $CAAR_t=0$. The alternative hypotheses is H_1: $CAAR_t\neq 0$. The t-statistics is shown in formula (10).

$$t(CAAR_t)=\frac{CAAR_t}{s/\sqrt{n-1}} \quad , \quad S^2=\frac{\sum_{i=1}^{N}(CAAR_{it}-\overline{CAAR_t})}{N-1} \tag{10}$$

(5) Do robustness test

We use the daily stock return to do the empirical research. However, the data don't completely meet the assumption of normal distribution. Therefore, in addition to using the t-test for significance test, the non-parametric test will be used for the robustness test, which can increase the credibility of the test results. There are two non-parametric test methods, including the sign test and the rank test. The Wilcoxon signed-rank test requires that the sample population is continuous without knowing the specific probability distribution. Its probability distribution is symmetrical about the median M_0, so the mean is equal to the median. Its assumptions are not as strict as the assumption of normal distribution. Therefore, the single-sample Wilcoxon signed-ranks test is used as the robustness test for the parametric test to verify whether there is a significant difference between the median of abnormal return of the sample and zero.

The basic principle of single-sample Wilcoxon signed-ranks test is as shown below. suppose a random sample of size n is taken from the population and denoted as $X_1, X_2, ..., X_n$. Then the difference between $X_1, X_2, ..., X_n$ and the median M_0 is calculated, which is equal to $X_i - M_0$, denoted as D_i $(i=1,2,...,n)$. The absolute value of D_i is $|D_i|$. The value of $|D_i|$ is sorted and given the rank number. Add up the positive rank and the negative rank in D_i respectively to obtain the sum of positive rank and negative rank, denoted as T^+ and T^-. If M_0 is the median of the population M, T^+ and T^- should be approximately equal. If T^+ is far greater than T^-, it indicates that most of the high rank have the positive difference. In this case, the data supports $M>M_0$. The other situation is the opposite. T^+ and T^- have the following relationship.

$$T^+ + T^- = \frac{n(n+1)}{2} \tag{11}$$

If the population distribution is symmetric about 0, and both T^+ and T^-obey the symmetrical distribution, the center of symmetry will be $\frac{n(n+1)}{4}$. We can find the right-tailed probability of T^+ and T^- according to the cumulative distribution table and get the corresponding *p-value* when n is given. By comparing the *p-value* with the significance level α, we can determine whether to accept the null hypothesis $H_0: M=M_0$.

3. Empirical results and analysis

3.1 Descriptive statistics of single-day abnormal return AR

We conduct an empirical research on 109 conduct risk events of 10 large international commercial banks from 2008 to 2016 , including Barclays, Citibank, Royal Bank of Scotland, HSBC, JP Morgan Chase, Bank of America, Lloyds Banking Group, Goldman Sachs, BNP Paribas and Societe Generale. According to the event research procedure, the announcement day of the conduct risk events is taken as the *0-th* day (If the announcement day is not the stock exchange day, it will be postponed to the next trading day as the *0-th* day). 10 trading days before and after the event is taken as the event window period. Then we study the volatility of stock price in these 21 days. Descriptive statistics of single-day abnormal return is shown in Table 1.

Table 1. Descriptive statistics of single-day abnormal return.

	Market model				*Multi-factor market model*			
Date	*Mean*	*Maximum*	*Minimum*	*Standard deviation*	*Mean*	*Maximum*	*Minimum*	*Standard deviation*
-10	-0.0008	0.0875	-0.1171	0.0237	-0.0002	0.1240	-0.1171	0.0239
-9	-0.0002	0.0491	-0.0364	0.0140	-0.0016	0.0494	-0.0377	0.0139
-8	-0.0024	0.0558	-0.1865	0.0246	-0.0024	0.0555	-0.1865	0.0231
-7	0.0000	0.0760	-0.0885	0.0182	0.0001	0.0760	-0.0697	0.0165
-6	0.0006	0.0620	-0.0808	0.0193	0.0005	0.0620	-0.0808	0.0173
-5	0.0025	0.0481	-0.0306	0.0125	0.0023	0.0482	-0.0335	0.0117
-4	-0.0033	0.0586	-0.0878	0.0182	-0.0021	0.0573	-0.0874	0.0179
-3	-0.0004	0.0308	-0.0458	0.0122	0.0006	0.0276	-0.0458	0.0114
-2	-0.0006	0.0433	-0.0263	0.0119	0.0003	0.0433	-0.0255	0.0105
-1	0.0030	0.0478	-0.0823	0.0187	0.0029	0.0720	-0.0845	0.0192
0	-0.0048	0.0384	-0.1190	0.0242	-0.0033	0.0393	-0.1190	0.0216
1	-0.0055	0.0367	-0.1570	0.0248	-0.0037	0.0485	-0.1240	0.0225
2	-0.0045	0.0595	-0.1161	0.0212	-0.0031	0.0551	-0.1062	0.0215
3	-0.0021	0.0753	-0.0721	0.0181	-0.0007	0.0753	-0.0713	0.0178
4	0.0009	0.1099	-0.0436	0.0224	0.0015	0.1099	-0.0404	0.0196
5	-0.0024	0.0449	-0.0507	0.0164	-0.0018	0.0449	-0.0467	0.0155
6	-0.0004	0.0553	-0.0825	0.0173	-0.0017	0.0329	-0.0845	0.0163
7	-0.0004	0.0507	-0.0578	0.0173	-0.0010	0.0395	-0.0458	0.0144
8	0.0036	0.0574	-0.0555	0.0185	0.0021	0.0504	-0.0329	0.0155
9	-0.0025	0.0541	-0.0631	0.0174	-0.0022	0.0709	-0.0631	0.0166
10	-0.0024	0.0443	-0.0998	0.0206	-0.0020	0.0436	-0.0998	0.0188

In the market model, the mean of abnormal returns on the announcement day and 3 days after the announcement day are negative, which are -0.0048, -0.0055, -0.0045 and -0.0021, respectively. And the abnormal returns for the four days are the smallest during the window period. It can be seen that the number of event days with positive average abnormal returns is three before the announcement and decreases to two after the announcement. In the multi-factor market model, the mean of abnormal returns on the announcement day and 3 days after the announcement day are also negative, which are -0.0033, -0.0037, -0.0031 and -0.0007, respectively. The abnormal returns for the four days are also relatively small during the event window. The number of event days with positive average abnormal returns is six before the announcement and decreases to two after the announcement. Comparing the maximum and minimum, the abnormal returns on the announcement day and 3 days after the announcement day are small and negative, but the absolute values are large both in the market model and the multi-factor market model. It means that the stock price falls sharply. To some extent, the result shows that the conduct risk event has the greatest impact on the stock price on the announcement day and the next three days. Overall, both the market model and the multi-factor market model show that the average abnormal returns are negative on the announcement day, the *1-th* day, the *2-th* day, the *3-th* day, the *5-th* day, the *6-th* day, the *7-th* day, the *9-th* day and *10-th* day, which illustrates that the announcement of a conduct risk event has a negative impact on the stock price.

3.2 Event window trend analysis

The graphs can visualize the changes in average abnormal return (*AAR*) and cumulative average abnormal return (*CAAR*) before and after the announcement day. From Figure 2 and Figure 3, we can see that the trend of *AAR* and *CAAR* in market model and multi-factor market model in the event window are roughly the same. As can be seen from Figure 2, except *t=4* and *t=8*, the *AAR* are negative both in the market model and the multi-factor market model in the ten days after the announcement (*t=0 to t=10*). It shows that the negative impact on stock price volatility caused by conduct risk event is significant. The *AAR* of commercial banks both in the market model and the multi-factor market model are positive on the day before the announcement (*t=-1*). However, the *AAR* and the *CAAR* drop significantly on the announcement day and 3 days after the announcement day. It shows that the response of the capital markets to the conduct risk event are timely.

From Figure 3, we can intuitively find that the *CAAR* are almost negative during the event window period, indicating that the stock price has already had a significant reaction before the announcement day. In the event window, the *CAAR* shows a declining trend both in market model and multi-factor market model. Before the announcement day (*t=-10, t=-2*), the *CAAR* in the market model and the multi-factor market model decrease by 0.378% and 0.241% respectively, indicating that the information maybe have been leaked earlier or predicted by investors before the conduct risk events disclosed.

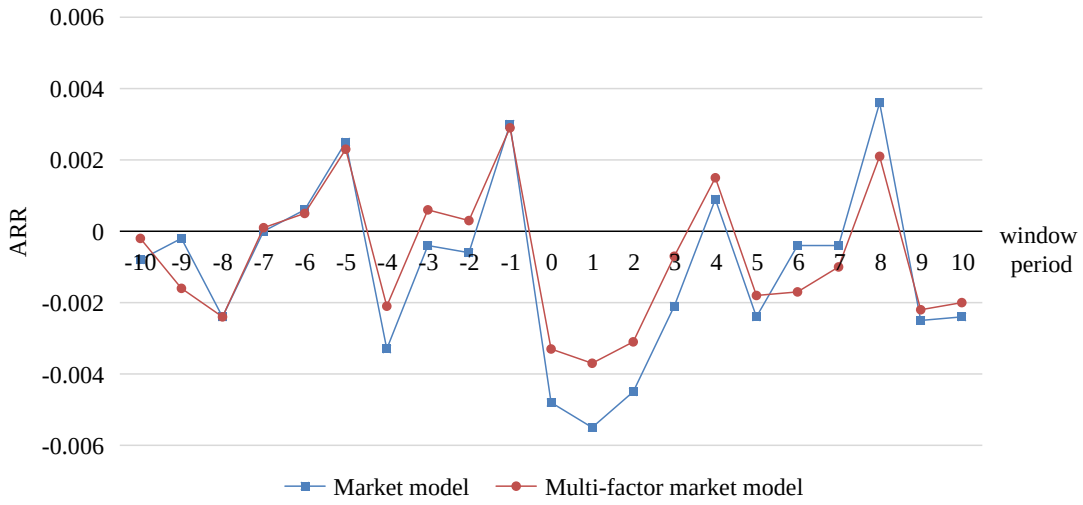

Figure 2. The average abnormal return (*AAR*) of all samples in a single trading day.

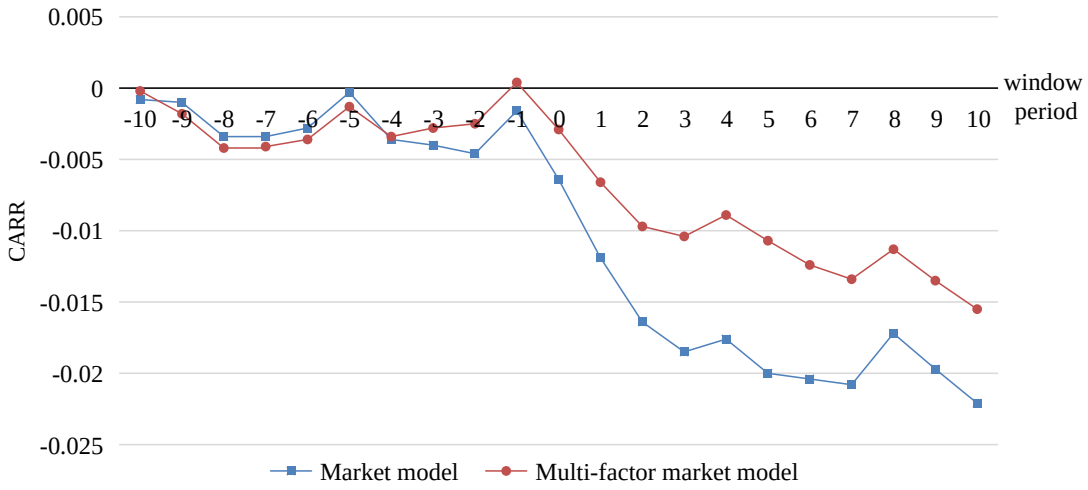

Figure 3. The cumulative average abnormal return (*CAAR*) of all samples.

3.3 Significance test

In order to test the significance of the abnormal return during the event window, the t-test is performed on the complete sample. Table 2 shows that for the *AAR* significance test, the null hypothesis is rejected in the market model at the level of 1%, and the null hypothesis is rejected in the multi-factor market model at the level of 5%. For the *CAAR* significance test, the null hypothesis are rejected both in the market model and the multi-factor market model at the level of 1%. The stock price responds significantly to conduct risk event. Finally, the significance of the *AAR* and the *CAAR* during the event window are tested respectively. The results are shown in Table 3 and Table 4.

Table 2. The significant test results of the *AAR* / *CAAR* of the complete sample during the event window.

Sample	*AAR*		*CAAR*	
	Market model	*Multi-factor market model*	*Market model*	*Multi-factor market model*
Event window	（-10，10）	（-10，10）	（-10，10）	（-10，10）
Mean	-0.00105	-0.00074	-0.01024	-0.00667
Standard deviation	0.01910	0.01782	0.66253	0.06065
t-statistic	-2.626	-1.995	-7.392	-5.264
p-value	0.009	0.046	0.000	0.000
Test result	reject H_0	reject H_0	reject H_0	reject H_0

Table 3. The significant test results of the *AAR* of the complete sample on single trading day during the event window.

	Market model		*Multi-factor market model*	
	Mean	*t-value*	*Mean*	*t-value*
-10	-0.0008	-0.337	-0.0002	-0.088
-9	-0.0002	-0.116	-0.0016	-1.210
-8	-0.0024	-1.015	-0.0024	-1.084
-7	0.0000	-0.018	0.0001	0.045
-6	0.0006	0.310	0.0005	0.276
-5	0.0025**	2.127	0.0023*	2.073
-4	-0.0033*	-1.871	-0.0021	-1.210
-3	-0.0004	-0.353	0.0006	0.516
-2	-0.0006	-0.559	0.0003	0.250
-1	0.0030*	1.694	0.0029	1.595
0	-0.0048**	-2.077	-0.0033	-1.597
1	-0.0055**	-2.322	-0.0037*	-1.702
2	-0.0045**	2.221	-0.0031	-1.486
3	-0.0021	1.201	-0.0007	-0.429
4	0.0009	0.417	0.0015	0.784
5	-0.0024	1.557	-0.0018	-1.239
6	-0.0004	0.223	-0.0017	-1.060
7	-0.0004	0.221	-0.0010	-0.717
8	0.0036**	2.041	0.0021	1.390
9	-0.0025	1.513	-0.0022	-1.383
10	-0.0024	1.217	-0.0020	-1.117

Table 4. The significant test results of the *CAAR* of the complete sample during the event window.

	Market model		*Multi-factor market model*	
	Mean	*t-value*	*Mean*	*t-value*
-10	-0.0008	-0.337	-0.0002	-0.088
-9	-0.0009	-0.325	-0.0018	-0.732
-8	-0.0033	-0.850	-0.0042	-1.234
-7	-0.0033	-0.844	-0.0041	-1.185
-6	-0.0028	-0.575	-0.0037	-0.876
-5	-0.0002	-0.047	-0.0014	-0.310
-4	-0.0035	-0.696	-0.0034	-0.768
-3	-0.0039	-0.743	-0.0029	-0.601
-2	-0.0045	-0.810	-0.0026	-0.524
-1	-0.0015	-0.258	0.0003	0.060
0	-0.0063	-1.028	-0.0030	-0.529
1	-0.0118*	-1.794	-0.0066	-1.076
2	-0.0163**	-2.205	-0.0097	-1.372
3	-0.0184***	-2.611	-0.0104	-1.538
4	-0.0175	-2.448	-0.0090	-1.326
5	-0.0200***	-2.684	-0.0108	-1.558
6	-0.0203**	-2.577	-0.0125*	-1.733
7	-0.0207**	-2.543	-0.0135*	-1.818
8	-0.0171**	-2.121	-0.0114	-1.574
9	-0.0196**	-2.371	-0.0136*	-1.777
10	-0.0220**	-2.526	-0.0156	-1.948

In Table 3, the *AAR* in the market model on the announcement day and two days after the announcement (*t=0, t=1, t=2*) are significantly negative at the 5% significance level. The *AAR* on the *5-th day*, the *6-th day*, the *7-th day*, the *9-th* day and the *10-th* day after the announcement day are negative, but not significant. This indicates that the conduct risk event has the most significant impact on the stock price on the announcement day and 2 days after the announcement. In the multi-factor market model, except for the *4-th* day and the *8-th* day after the announcement, the *AAR* during the post-announcement period (*t=0* to *t=10*) are negative. However, the *AAR* is significant at the level of 10% only on the day after the announcement day, which shows that the conduct risk event has the most significant impact on stock price on the day after the announcement day in the multi-factor market model.

In Table 4, the *CAAR* during the post-announcement period (*t=0* to *t=10*) are negative in the market model. And it is significant at 10% significance level at *t =1*, significant at 5% significance level at *t=2, 6, 7, 8, 9, 10* and significant at 1% significance level at *t=3* and *t=5* , indicating that conduct risk event in the market model has a negative impact on stock price after the announcement day and last longer. In the multi-factor market model, the *CAAR* during the post-announcement period (*t=0* to *t=10*) are also negative, but only significantly at 10% significance level at *t=6, 7, 9,10*. It means that the announcement of a conduct risk event has had negative impact on the stock price.

3.4 Robustness test

In order to make the results more reliable, the single-sample Wilcoxon signed-rank test is used as the robustness test for the parametric test to verify whether the median abnormal return of the sample is not significantly equal to zero. The null hypothesis of Wilcoxon signed-rank test is that the median of *AR* is equal to zero (due to the symmetry, the median of *AR* is equal to the mean of *AR*). The alternative hypothesis is that the median of *AR* is not equal to zero. The result is shown in Table 5.

Table 5. The single-sample Wilcoxon signed-rank test of *AR* of the complete sample on a single trading day during the event window .

Relative date	*Test statistics*	*p-value*	*Test result*
-10	-0.656	0.512	Accept the null hypothesis
-9	-0.771	0.441	Accept the null hypothesis
-8	-1.119	0.263	Accept the null hypothesis
-7	-0.018	0.985	Accept the null hypothesis
-6	0.342	0.733	Accept the null hypothesis
-5	2.162	0.031**	Reject the null hypothesis
-4	-1.847	0.065*	Reject the null hypothesis
-3	-0.242	0.809	Accept the null hypothesis
-2	-1.234	0.217	Accept the null hypothesis
-1	2.298	0.022**	Reject the null hypothesis
0	-1.261	0.207	Accept the null hypothesis
1	-2.032	0.042**	Reject the null hypothesis
2	-2.450	0.014**	Reject the null hypothesis
3	-1.548	0.122	Accept the null hypothesis
4	-0.933	0.351	Accept the null hypothesis
5	-1.670	0.095*	Reject the null hypothesis
6	0.156	0.876	Accept the null hypothesis
7	-0.178	0.858	Accept the null hypothesis
8	1.968	0.049**	Reject the null hypothesis
9	-1.421	0.155	Accept the null hypothesis
10	-0.186	0.852	Accept the null hypothesis

In Table 5, the *AR* are significantly not equal to zero at the 5% significance level on the fifth day (*t=-5*) before the announcement day and the day (*t=-1*) before the announcement day. It is significantly not equal to zero at the 10% significance level on the fourth day (*t=-4*) before the announcement day. The *AR* is significantly not equal to zero at the 5% significance level on the *1-th* day, the *2-th* day and the *8-th* day after the announcement day, significantly not equal to zero at the 10% significance level on the *5-th* day after the announcement day. The result shows that the conduct risk event has the most significant effect on stock price on the first day and the second day after the announcement. In general it is consistent with the t-test result, indicating that the parameter test and conclusion above are robust.

4. Conclusion and policy recommendations

4.1 Conclusion

We take 109 conduct risk events occurred in 10 international large commercial banks, including Barclays, Citibank, Royal Bank of Scotland, HSBC, JP Morgan, Bank of America, Lloyds Banking Group, Goldman Sachs, BNP Paribas and Societe Generale as samples and study the announcement effect of conduct risk events by using event research method. The result shows that the announcement of conduct risk event in commercial banks has a significant negative impact on the stock price,and the effect is most significant on the announcement day and 2 days after the announcement.

4.2 policy recommendations

In recent years, the conduct risk event of commercial banks in China are endless. With the reinforcement of the domestic financial system and the innovation of the domestic capital market, the disclosure of conduct risk events in China increases, which inevitably has negative impact on the listed commercial banks. Therefore, the conclusions obtained in the research have an important implications for the prevention and control of the conduct risk in our country. The commercial banks should deepen their understanding of conduct risk, enhance the prevention of financial crimes and protect the rights of financial consumers. They should take effective measures to improve the identification and prevention of conduct risk. In addition, establishing a scientific conduct risk management system is also necessary.

(1) Strengthen corporate governance and culture building

Commercial banks should create a corporate culture of "risk prevention and control" and guide each employee to realize the risk they may face in work. In order to avoid business mistakes caused by inadvertent operation, banks can use electronic systems to restrict operation authorizations and set permissions to enable real-time monitoring. In addition, when commercial banks promote business development, they should be premised on the concept of protecting customer rights. From the design of products, business operations, marketing to front-line service, customer rights protection should be placed at the core of business development.

(2) Strictly fulfill relevant information disclosure obligations

Commercial banks are obliged to prompt their customers in providing services and selling financial products. This distinguishes them from the sales of other common commodities. Commercial banks should also reinforce the information disclosure mechanism to cope with some irregularities frequently occurred in the business field. Commercial banks shall provide their customers with information and risk warnings about the products and services they sell or resell so that the clients can have a fuller understanding of products and services, which prevents banks from selling privately and avoids customers buying non-bank sales of wealth management products.

(3) Improve internal control and supervision measures

Commercial banks should improve the internal control. Commercial banks should clarify the power and responsibility of each post and refine their business processes when establishing internal risk control mechanism. Furthermore, they should highlight the supervision and management of key or core positions and pay attention to the mutual supervision of positions to ensure the smooth operation of the business. It is necessary to implement a clear and effective accountability mechanism, clarify the boundaries of all posts and strengthen staff awareness of risk prevention. It is necessary to ensure the independence of the internal control department and the internal audit department in order to achieve better corporate governance.

Financial institutions should strengthen the establishment of a risk monitoring system. In addition to improving internal analytical testing methods, they should also actively construct feedback systems such as customer visits and reporting violations to monitor.

Financial institutions should strengthen the construction of risk supervision system. In addition to improving the internal analysis, they should also construct customer feedback actively such as customer visits and irregular report.

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The New 11-level Risk Tolerance Measure and the Old 4-Level Risk Tolerance Measure in the U.S. Survey of Consumer Finances: Which Measure is Better?

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Abstract

Starting in 1983, the Survey of Consumer Finances (SCF) has included a 4-level risk tolerance measure. In 2016, the SCF introduced an additional 11-level risk tolerance measure. We compare the new and old measures, with a regression on the new measure, plus three logistic regressions on cumulative components of the old measure. Results from the OLS regression with the dependent variable of 11 scale financial risk tolerance as a function of 4 scale financial risk tolerance indicated that the new risk tolerance measure increased gradually as the level of old risk tolerance measure increased. Further, results from OLS and three logistic regressions, with the following dependent variables, new financial risk tolerance and three composite variables of old risk tolerance, i.e., some risk, high risk and substantial risk showed that many effects of household characteristics were consistent between the regressions, but some characteristics had inconsistent effects, for instance, racial/ethnic status effects. In order to provide one approach to evaluating the validity of the two risk tolerance measures, we conducted multivariate analyses of the effect of risk tolerance and other household characteristics on the likelihood of owning stock assets, i.e., equity ownership. Both risk tolerance measures were positively associated with the likelihood of equity ownership but logistic regressions on stock ownership had slightly lower explanatory power with the new measure than with the old measure. The new measure is simpler than the old measure, but use of it as a linear measure may have less validity than use of the old measure.

Keywords: Risk tolerance; Equity ownership; Survey of Consumer Finances
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