

# Information Asymmetry and Card Debt Crisis in Taiwan

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## Abstract

Following the Asian Financial Crisis, South Korea, Hong Kong, and Taiwan experienced card debt crisis in 2001, 2002 and 2005, respectively. Various countries have studied and tried to find the factors that lead to the card debt crisis, hoping that the proposed countermeasures can effectively solve the problem. However, these are only practical operations and observations. Therefore, through information asymmetry, this article constructs a model of card debt crisis from adverse selection and moral hazard, and theoretically provides the government or competent authority with a policy basis. This article employs document analysis, combined with qualitative and quantitative data, to test the research hypotheses. The verification result is supported regardless of hypotheses tests for adverse selection, or moral hazard and confirms that information asymmetry and market failure do exist in the Taiwan credit card market. The policy implication of the article is that the government or competent authority should stop the illusion of free market mechanism and have to be responsible for employing countermeasures to face the crisis.

**JEL classification numbers:** G01,G21,G28.

**Keywords:** Card debt crisis, Information asymmetry, Adverse selection, Moral hazard , Document analysis, Market failure.

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## 1 Introduction

Prior to the card debt crisis broke out in Taiwan in 2005, similar incidents occurred in South Korea and Hong Kong in 2001 and 2002 respectively. Although the timing of the occurrences is different, the severe impact of the card debt crisis on the three regions was almost the same. More importantly, the card debt crisis not only impacts the financial sector, but also further impacts the economy and society. In this debt crisis.

Firstly, taking South Korea as an example, the factors causing the card debt crisis were as follows:

1. Credit card companies ignore the importance of risk management, and consumers lack experience.
2. Lack of a complete personal credit data base.
3. Affected by the global economic slowdown.
4. No Symmetrical financial reform (Kang and MA 2009).

As for Hong Kong, the factors that were considered to be likely to cause the card debt crisis are as follows:

1. The general economic environment was is not good.
2. The amendment of the Bankruptcy Ordinance in 1998 has led to a sharp increase in personal credit bankruptcy cases.
3. The lack of positive credit information sharing mechanism by banks has led to excessive Issuing cards, contributing to the occurrence of the card debt crisis(Kang and MA 2007).

Finally, Taiwan listed the reasons that are considered to be likely to cause the card debt crisis:

1. The failure of the financial supervision authority to supervise the bank credit reporting system was the main source of trouble.
2. Banks issued cards indiscriminately without credit checking, and improperly promoted misconceptions about using cards for consumption.
3. The dual-card interest calculation method was inappropriate and the information was not fully disclosed
4. Excessive borrowing by most debtors due to excessive consumption.
5. The debtor had no source of income to repay, and the debt kept getting bigger and bigger.
6. Huge debts were concentrated in a few people, and the card debt problem had caused social problems.
7. The media over-hyped and exaggerated reports(Liao and Liu 2008).

Ironically, although Taiwan was at the final stage of the credit card crisis, most of the reasons cited for the crisis were the same as those cited in South Korea and Hong Kong. All of this highlights that in the face of the card debt crisis, Taiwan not only failed to make good use of international financial information for immediate countermeasures, but even made it worse. It was indeed a pity to lose the opportunity to prevent crimes.

Besides, many studies were also devoted to exploring the factors of increasing card debt. Nourzad et al. (2012) indicated that during economic downturns, more credit card debt is securitized. Worsening credit conditions also lead to an increase in the proportion of credit card debt that is securitized by banks . Selvanathan et al. (2016) took Malaysia as an example and proposed that attitude, income, financial knowledge and bank policies have significant relationship with credit card debts. Yoo (1997) separated household data into two categories: changes in the number of households with credit cards, and changes in average credit card debt for increased total credit card debt and found that the principal contributors to the increase are households with above-average incomes rather than low-income households. Sprenger and Stavins (2008) pointed out that credit card revolvers are significantly more likely to use debit and less likely to use credit than convenience users who repay their balances each month because revolvers are significantly less likely to view debit as superior with respect to ease of use and acceptability, but more likely to see debit as superior with respect to control over money and budgeting .Similarly, Choi and Laschever (2018) examined why households concurrently hold low-yield liquid assets while incurring costly credit card debt and found that "Big Five" personality traits have a statistically significant and economically important effect: households with a more agreeable, introvert, and less conscientious head of household are more likely to co-hold .

Aydin (2022) examined whether individuals' level of time preference, materialism, risk-taking, optimism, and intuitiveness along with their demographic characteristics influence their credit card debt payments and

revealed that optimism, intuitiveness, and materialism have a significant effect on handling credit card debt responsibility. Even further, credit card debt is thought myths because credit cards are one of those things that people think they know, but don't actually understand (Papushoy, 2016). Pugliese et al. (2021) also argued high and growing levels of credit card debt are attributable in part to rising economic vulnerabilities, combined with a thinning public safety net, credit cards being increasingly employed to make ends meet in this context. George and Leszczyszyn (2021) investigates the credit card debt puzzle, simultaneously holding credit card debt and liquid assets, given the sizeable difference between interest rates of debt and assets and revealed a new explanation for the credit card debt puzzle: consumers' overconfidence of their financial knowledge.

Due to the deep and far-reaching impact on the economy and society caused by the card debt crisis, countries or competent authorities have to propose countermeasures from various levels. In addition to solving the card debt crisis, it is also expected that economic and social problems can be solved at the same time. Different from other countries or research to explore the possible causes of the credit card debt crisis from practical operations, this article builds a theoretical model of the credit card debt crisis in Taiwan based on information asymmetry, from the two aspects of adverse selection and moral crisis. It proves that the card debt crisis does exist in the Taiwan's credit card market, and then further explores the reasons for the formation of the card debt crisis. As long as it is confirmed that the card debt crisis is a fact of market failure caused by information asymmetry, in addition to providing a theoretical basis for the government or competent authorities to solve the card debt crisis and take countermeasures, more importantly, the illusion of relying on the operation of the market price mechanism must be stopped. That is the reason why the government or the competent authority exists.

The rest of this article is presented as follows. First, this article begins with a literature review on information asymmetry, adverse selection, and moral hazard. Then, the establishment of the model and the related hypotheses are introduced. Then, the relevant hypotheses are tested for support in the discussions and results section. The last part ends with conclusions .

## **2 Literature Review**

### **2.1 Information asymmetry**

Since Akerlof (1970) proposed the lemon theory to explore the used car market in 1970, information asymmetry has been widely used in different markets or industries. Even high-tech or artificial intelligence industries are no exception. For instance, information asymmetry affects whether the supplier should share or hide the technology spillover information to create a 'win-win-win' outcome for the three players (Liu et al. 2022). As to the artificial intelligence (AI), information asymmetry is identified as an essential source of complementarity potential, and humans have access to different contextual information in many real-world situations (Hemmer et al. 2022). If humans attempt to infer an artificial agent's mental state based on mere observations of its behavior, information asymmetry is a key factor for conveying intentions with motions, because of the effect of information asymmetry between the agent and a human (Fukuchi et al. 2022).

In addition, it is argued that firms unable to manage the negative repercussions associated with information asymmetry will find it hard to survive or prosper. To overcome the obstacles, three vehicles are introduced: development of specific institutions that cope with adverse selection, management of moral hazard through controls built into financial contracts, and information transfer through social networks (Dutta and Folta, 2015). So, it can be indicated that as information asymmetry associated with portfolio increases, returns also expand to recompense investors for bearing information risk validating the existence of a significant positive relationship between information asymmetry and expected stock returns. In other words, strong information premium was observed such that high information stocks outperformed low information stocks which have strong inference for investors and portfolio managers (Goel et al. 2020). It is also observed that dividend payout policy can be enhanced or improved by decreasing the information asymmetry between agents and principals (Kinyua, 2022). On the contrary, the capital structure would influence the profitability

of public companies in the Brazilian market because information asymmetry acts as a potential factor in the negative effect of indebtedness on ROA and ROE (Return on Assets and Return on Equity) (Quiraque et al. 2022).

On the other hand, information asymmetry is accomplished with deception because investors are naive and almost half of them believe the message received. That means greater lying when the distribution of the multiplier is unknown by the investors than when they know the distribution from investors (Figueras et al. 2015). It is also true that the relationship between information asymmetry and fraud exists in the insurance market (Antonenko and Tetin, 2018). Similarly, information asymmetry in the stock market affects the quantum of audit fees paid by auditees which is positively related to the quantum of audit fees paid (Frino et al. 2022). In the subprime mortgage crisis, due to information asymmetry, the aspect of asset markets became overwhelming so that asset markets broke down completely (Hens and Rieger, 2016). And it is showed that a positive and significant relationship exists between information asymmetry items and the success of the crowdfunding campaign (Omrani et al. 2022).

Furthermore, information asymmetry has an influence on security issuance (LEE 2021), mutual funds (Lemeunier, 2020) and banking regulation and collateral screening (Hemingway, 2022). Based on the model of the Owner and the Intruder, it is beneficial for the individuals to know as much information as possible. However, several scenarios where knowing less seems better as well as show that an individual may not benefit from their opponent knowing less, due to information asymmetry (Bisen et al. 2021). To prevent or decrease the impact of information asymmetry, some respondent policies are employed. In the tourism industry, Instagram empowers individuals over corporations in the digital dialogue which can balance the information asymmetry between corporations and stakeholders (Gutiérrez-Barroso et al. 2021). Besides, because information asymmetry grows between earnings announcements and falls right after each new earnings announcement, this inter-announcement growth has implications for reporting frequency decisions, which reduces information asymmetry (Stoumbos, 2022). To valueate accounting software expenditures and its association with Information asymmetry, financial disclosure is demanded to disclose research and development expenditures as assets by International Financial Reporting Standards, which makes Information Asymmetry is less (Mozaffar and Ali, 2022).

## 2.2 Adverse selection

Following the previous research and discovery, adverse selection can be found in different types of markets and dimensions. For example, Dosis (2021) studied general economics with adverse selection in which symmetric companies supply plans to privately informed consumers and compete in terms of price schemes and noted that a basic price caps regulation which are endogenously determined by companies discouraged rusk selection over efficient allocations. Araujo et al. (2021) examined a common value dynamic matching environment where adverse selection accrues slowly over time and indicated that sequentially is inefficient for the large majority of participants to recognize the effects of adverse selection in an environment with persistent uncertainty. Beauchamp et al. (2020) highlighted the role of adverse selection in old-age social security which is the same challenges as private insurance markets and found the robust evidence that people who expect to live shorter lives both choose smaller annuities and are less costly to insure, implying adverse selection in the system. Krakel (2008) discussed the interrelation between the choice of technology and ranking and showed that players will reject profitable technologies (adverse selection) or underinvest if they anticipate excessive rent seeking. These findings can be explained why developing countries are more prone to rent seeking than industrial ones due to their stable property - rights structures.

Lauermann and Wolinsky (2008) analyzed a search model with asymmetric information of the common values variety to understand how the combination of search activity and information asymmetry affects prices and welfare and concluded that information is aggregated less well in the search environment than it is in the corresponding auction environment due to adverse selection. Hernandez-Murillo (2019) studied the welfare consequences of imposing alternative regimes of competition between two local governments that compete for mobile firms which have private information on their degree of mobility. Due to adverse selection, competition among jurisdictions raised the firms' rents to higher levels than if jurisdictions were

to cooperate. Kuhle (2015) developed a model to study the role of rationality in economics and biology and argued that the model's agents differ continuously in their ability to make rational choices because the agents' objective is to ensure their individual survival over time or to maximize profits, resulting from adverse selection. Xu et al. (2019) derived an optimal contract when the principal assigned two tasks to different agents or to a single agent, based on simple multitask assignments model with adverse selection and revealed that the principal preferred to combine tasks to a single agent except for the case in which the correlation of types is positive and strong enough.

Similarly, Li and Qiu (2020) also claimed that due to information asymmetry, adverse selection exists largely in the multi-agent market. Liao et al. (2020) considered an investor's choice of conservative reporting, bonus payments, and investment decisions in the presence of the hidden-information agency problem of a manager's productivity and the hidden-action agency problem of a manager's diversion of resources. Their findings provided insights into how the demand for conservatism arises in the presence of both hidden - information and hidden - action agency problems (adverse selection) and provided empirical guidance relating conservatism to investment efficiency.

Interestingly, Garcia et al. (2014) mentioned that adverse selection also occurred when a firm signed a contract with a potential worker but his/her key skill are still not known at that time, which lead the employer to make a wrong decision.

Although adverse selection famously leads to the crowding out of socially beneficial trades, and these "bad" trades may occur in insurance, credit and used-car markets because "lemons" fetch more under adverse selection in the absence of complete unraveling, the results are not always the same. For example, Bigelow (1990) studied ex-ante and interim constrained efficiency of market equilibria with adverse selection and found that with a continuum of qualities, allocations which are attainable are convex combinations of one-step allocations, which makes possible a simple geometric treatment of efficiency. Ing (2020) investigated the contractual relationship between a government and a firm in charge of the extraction of an exhaustible resource. The truth is that governments design taxation scheme to capture resource rent and they usually propose contracts with limited duration and process less information on resources than extractive firms do. In other words, though information asymmetry and adverse selection on costs and an inability to committed long-term contracts affect tax revenue and the extraction path, several unconventional results were given by the study. First, the inability to commit does not necessarily lower tax revenues when information asymmetry exists. Second, under asymmetric information without commitment, an efficient firm may produce during the first period more or less than under symmetric information. Third, an increase in the discount factor does not necessarily reduce the first-period extraction. These findings are obviously different from the traditional perception of adverse selection, and it is worth noting.

### **2.3 Moral hazard**

Concerning a financing problem for an innovative firm that is launching a web-based platform, Miglo (2021) argued that hybrid tokens can help the firm better deal with both the moral hazard problems and demand uncertainty. Jehan (2021) also recognized that risk is a big concern for anyone contemplating investing in new, especially innovative ventures and suggested an alternative venture investment approach called diminishing Musharakah (DM) which has roots in Islamic modes of investment and is more suited for ventures with a higher risk profile because it focused on four key ingredients, due diligence, flexibility, moral hazard reduction, and risk reduction.

Specifically, as a new development mode for solving urban water control problems, and a sponge city has been widely concerned and steadily promoted in China, governance mechanisms for preventing the moral hazard behavior are put forward (Ma et al. 2018). Therefore, to obtain higher yields, farmers may excessively use pesticides when they grow crops, causing moral hazard behavior, which showed that Chinese traditional culture has a positive effect on ameliorating the farmers' excessive use of pesticides in crop production (Zhang and Li, 2016). Similarly, Katz (2016) took water policies in Israel as an example and showed that a type of moral hazard phenomenon by which consumers, aware of the increases in potential supply, discount the importance of conservation. The similar situation existed in most of the

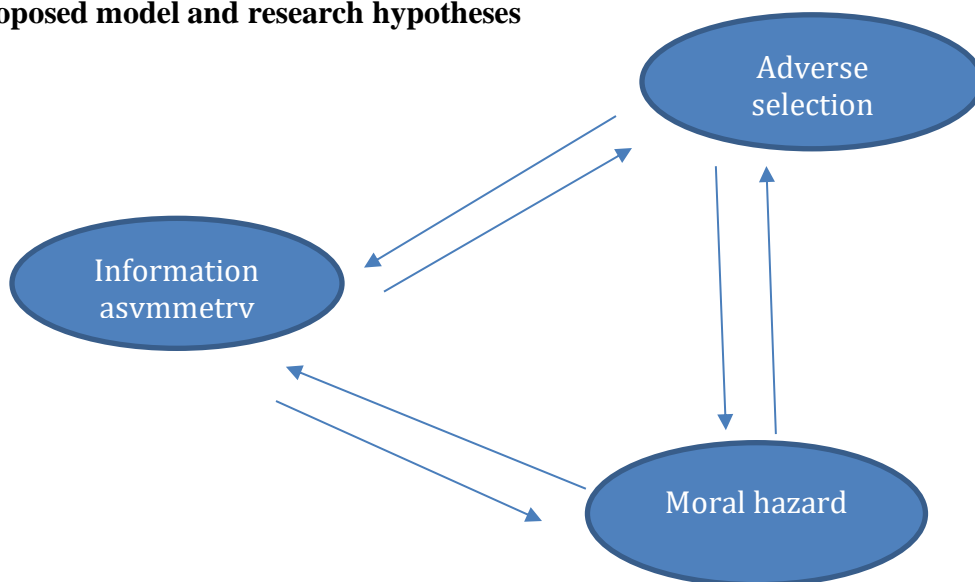
irrigated agricultural regions in Europe when surface irrigation networks need to be supplied and managed by local water authorities. Under such conditions, the water authority will suffer "price failure " if it decided to apply an incentive pricing strategy. As a result, farmers could exploit their information advantage by behaving in an opportunistic manner, withdrawing more water than declared, and ultimately paying less than they should (Lika et al. 2017).

Moreover, Dionne and Malekan (2017) used a principal-agent model to address the moral hazard problem of securitization where the investor is the principal and the lender is the agent. Marechal and Thomas (2018) studied the optimal contract offered by a risk-neutral principal to a risk-averse agent and found that if the agent is sufficiently prudent and able, the principal induces a higher probability of success than under moral hazard.

Apart from the industries mentioned above, moral hazard is presented in different dimensions. For example, moral hazard in teams influenced workers' wages, depending on types of performance measures, objective team output and subjective evaluations(Cheng, 2021). There is also a moral hazard from SMEs in centralized pollutant treatment because they may break their agreement concerning their quantities of production and pollutant emissions with the pollutant treatment enterprise (Li et al. 2016). Hence, overconfidence in the public sector resulted in the corruption which erodes tax compliance and leads to higher tax evasion. Most importantly, it's demonstrated that the increase in corruption via higher uncertainty exerts adverse selection on capital accumulation, thus leading to lower growth rates (moral hazard) (De La Rosa, 2007).

Lee (2019) studied the link between bequest and moral hazard in family and verified that inheritance custom evolves from unigeniture to equigeniture, leading to the result that a parent cares welfare of his children while he wants them to expend costly and unverifiable efforts for family. More interestingly, Bapat (2020) argued that the project to cement American dominance over the global energy market failed because the U.S. security guarantee created a series of perverse incentives. Consequently, terrorism escalated throughout the energy market due to moral hazard. Jebari et al. (2021) even thought that there's been a reluctance to embrace carbon removal and solar geoengineering, partly due to the perception that these technologies represent what is widely termed moral hazard and the debates over moral hazard in response to carbon removal and geoengineering are unhelpful and misleading, which makes it even more complex to mitigate moral hazard.

## 2.4 Proposed model and research hypotheses



**Figure 1: The proposed model of information asymmetry**

Based on the above literature review, the research model is constructed as Figure 1. Though information asymmetry is combined with or explained by adverse selection and moral hazard, the three actually have a causal relationship and influence each other. It can be seen that to use information asymmetry to explore the factors that form the card debt crisis, it is necessary to collect and analyze various variables that affect adverse selection and moral hazard at the same time. If the empirical results can support the coexistence of adverse selection and moral hazard, it is enough to confirm that these variables are the factors that explain or form the card debt crisis. Therefore, in this article, aiming at the two aspects of adverse selection and moral hazard, the research hypotheses on the relevant variables are designed as follows.

Hypotheses of adverse selection in existence:

**H1:** High revolving rates coming with high cards in circulation, combined with declining lending rate.

**H2:** High revolving rates coming with high monthly retail sales volume, combined with declining lending rate.

**H3:** High revolving rates coming with high cash advance amount, combined with declining lending rate.

**H4:** High revolving rates coming with high revolving balance, combined with declining lending rate.

**H5:** High cards in circulation, high monthly retail sales volume, or high cash advance amount in private banks is higher than that in public banks.

Hypotheses of moral hazard in existence:

**H6:** High overdue ratio or coming with adverse selection.

**H7:** High monthly write-off amount coming with adverse selection.

**H8:** High overdue ratio or high monthly write-off amount in private banks is higher than that in public banks.

**H9:** Pre-tax earnings of issuing card banks coming with adverse selection.

**H10:** High suicide ratios and criminal cases coming with adverse selection.

**H11:** Low economic growth rate coming with adverse selection.

### 3 Data

The article employs document analysis that is a form of qualitative research in which documents are interpreted by the researchers to give voice and meaning around an assessment topic (Bowen 2009). The document analysis is also the mixed-method studies, combined with qualitative and quantitative research techniques. In other words, there are two different levels of qualitative analysis. One is that without quantitative analysis, the conclusions of qualitative research tend to be generalized and speculative. The other is the higher-level qualitative analysis based on quantitative analysis.

Before qualitative research, quantitative research can be used to determine the object or nature of research. In the process of quantitative research, qualitative research can be used to determine the quantitative boundary of the qualitative change of phenomena. Therefore, the basic framework of this article is constructed from comprehensively grasping and evaluating the content that fits the theme, to collect relevant market information, survey reports and industrial development materials, discuss relevant literature according to the research purpose, and conduct empirical analysis.

In addition to collecting and analyzing literature, the article searches for relevant information on credit cards in Taiwan from the database of relevant government departments, the FSC and the Central Bank included, and refers to the relevant variables, such as cards in circulation, monthly retail sales volume, cash advance amount, revolving balance, overdue ratios, monthly write-off amount, pre-tax earnings, or even suicide cases, criminal cases, and economic growth rate. card revolving credit, usage limit, over-due ratio of domestic banks, and compares the operating trends of domestic private banks and public banks. Based on the document analysis and combined with qualitative and quantitative techniques, integrated, it's highly expected that the theoretical framework of the mutual causal relationship among information asymmetry, adverse selection and moral hazard can be used to define card debt crisis or market failure.

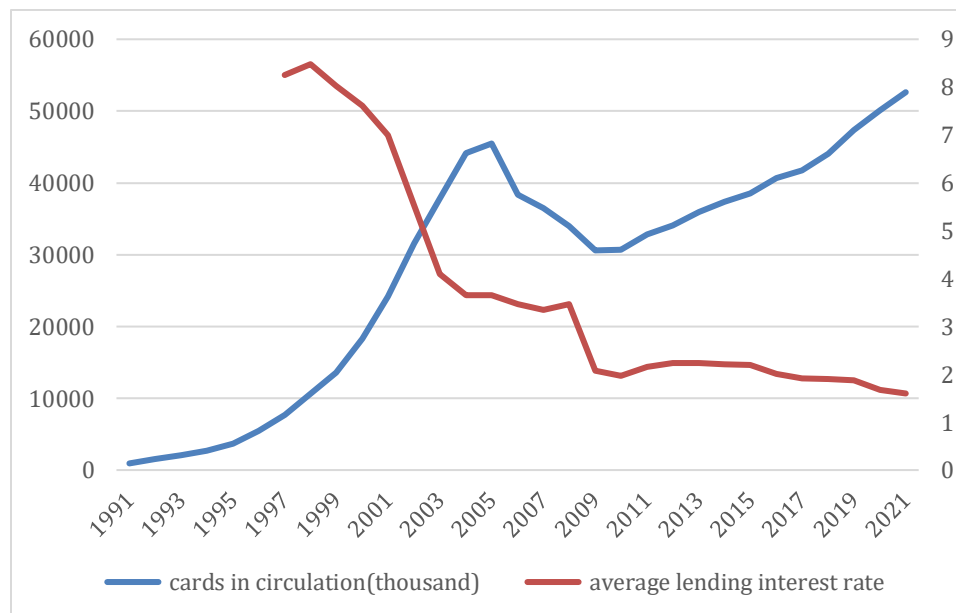
## 4 Empirical Results

### 4.1 Adverse selection

Compared with the average borrowing rate of domestic banks since 1998, which has continued to drop to 3-4% in 2005, most credit card revolving credit balances are still subject to the upper limit of 20%, especially for private banks. Under such a high interest rate level, this article will test the hypotheses of whether there has ever been adverse selection in the domestic credit card market according to the following variables.

#### 4.1.1 cards in circulation

As shown in Figure 2, although the interest rate of revolving credit balance is much higher than the average borrowing rate of domestic banks, the overall number of credit cards in circulation continued to grow until 2006. The high interest rate accompanied by the rising number of cards in circulation just interprets the adverse selection that violates the free market price mechanism. Therefore, H1: High revolving rates coming with high cards in circulation, combined with declining lending rate, is supported.



**Figure 2: Numbers of cards in circulation**

#### 4.1.2 monthly retail sales volume

Figure 3 shows that since 1991, the monthly retail sales volume has continued to rise, and reached a peak in 2005. When the interest rate on the revolving credit balance is still at a high level, it highlights the strong proof that the credit card market is in line with adverse selection. So, H2: High revolving rates coming with high monthly retail sales volume, combined with declining lending rate, is supported.



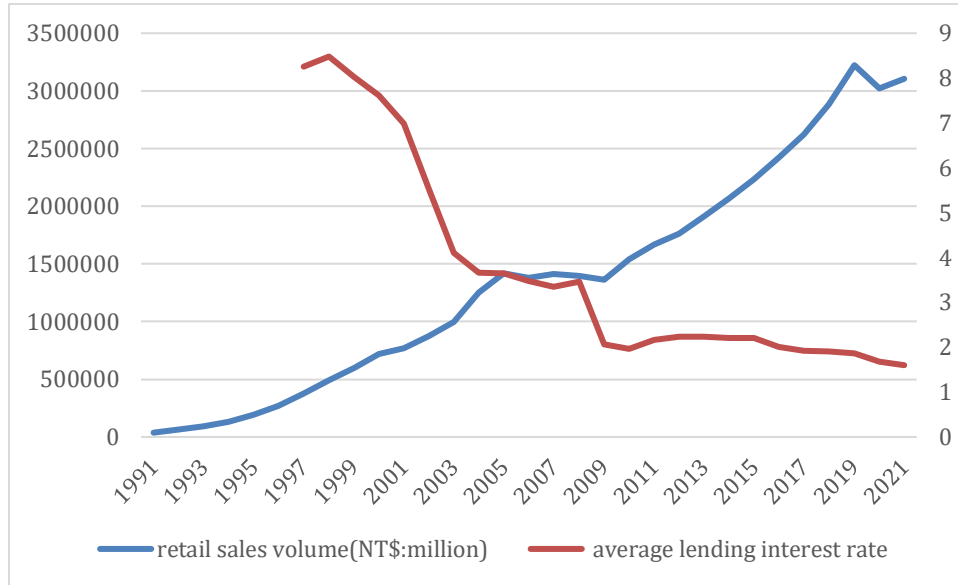


Figure 3: Retail sales volume

4.1.3 Cash advance amount

As shown in Figure 4, although the cash advance implied a high interest rate on the revolving credit balance, it continued to grow until 2005. It didn't drop significantly until 2006. When cardholders do not care about high revolving balance interest rates, but instead allow cash advances to continue to rise, it also provides one of the evidences of adverse selection in the credit card market. Visibly, H3: High revolving rates coming with high cash advance amount, combined with declining lending rate, is supported.

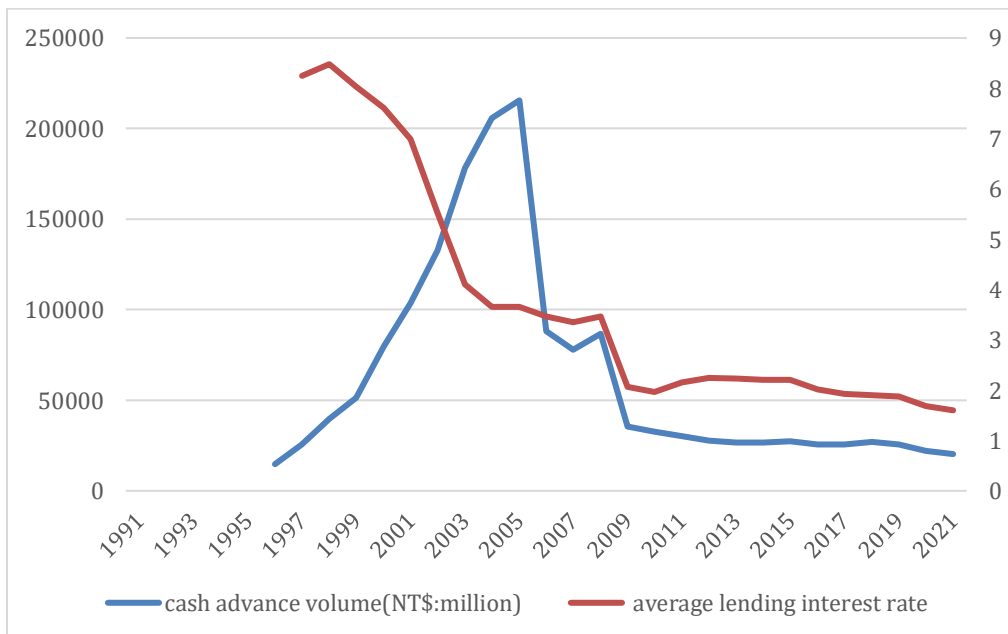
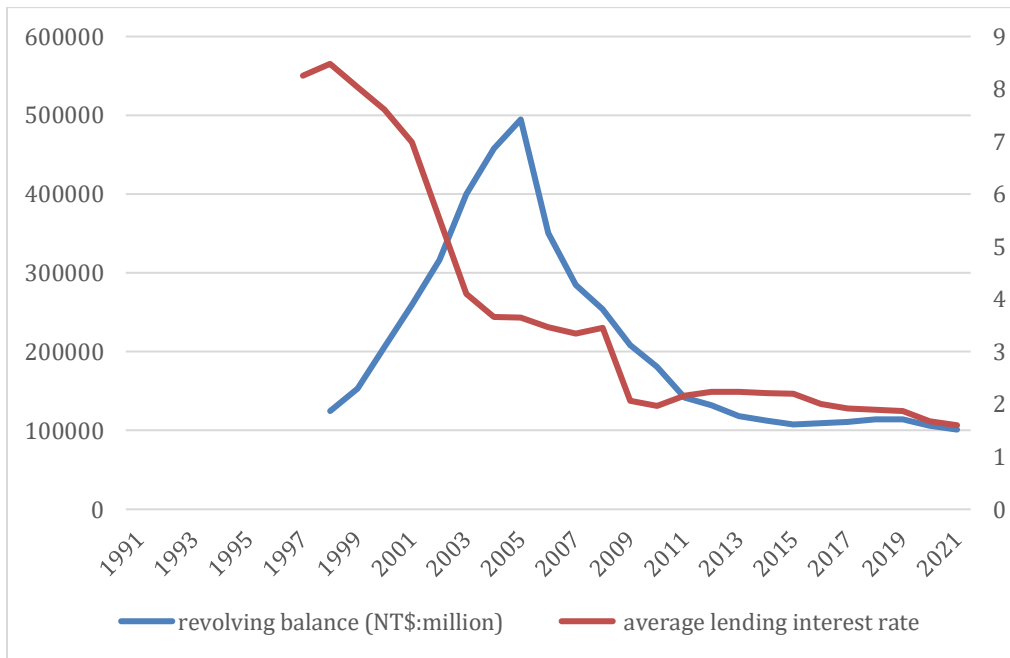


Figure 4: Cash advance volume

**4.1.4 revolving balance**

Comparing the trends of cards in circulation, monthly retail sales volume and cash advance amount, and revolving balance is more direct in revealing the phenomenon of adverse selection. According to Figure 5, since 1998, the revolving balance has continued to rise till 2005, although the interest rate of the revolving balance is significantly higher than the average borrowing rate of domestic banks. High revolving interest rate is accompanied by high revolving balance, which more directly shows the fact that adverse selection exists. H4: High revolving rates coming with high revolving balance, combined with declining lending rate, is supported.



**Figure 5: Revolving balance**

**4.1.5 comparing public banks with private banks**

Next, according to the classification of public and private banks in Taiwan, the above four variables are further analyzed, and it is found that the phenomenon of adverse selection of credit cards is more obvious in private banks, especially before 2005 (Figure 6; Figure 7; Figure 8; Figure 9). This result not only shows that there is adverse selection in Taiwan's credit card market, but also private banks are the main source of adverse selection. H5: Cards in circulation, high monthly retail sales volume, or high cash advance amount in private banks higher than that in public banks is supported.

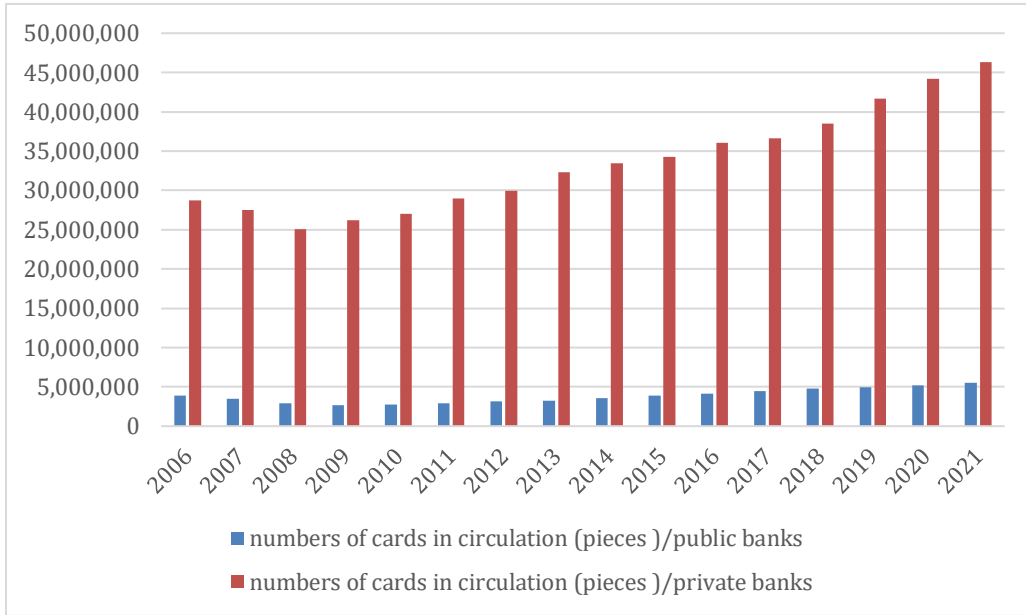


Figure 6: Numbers of cards in circulation / private and public banks

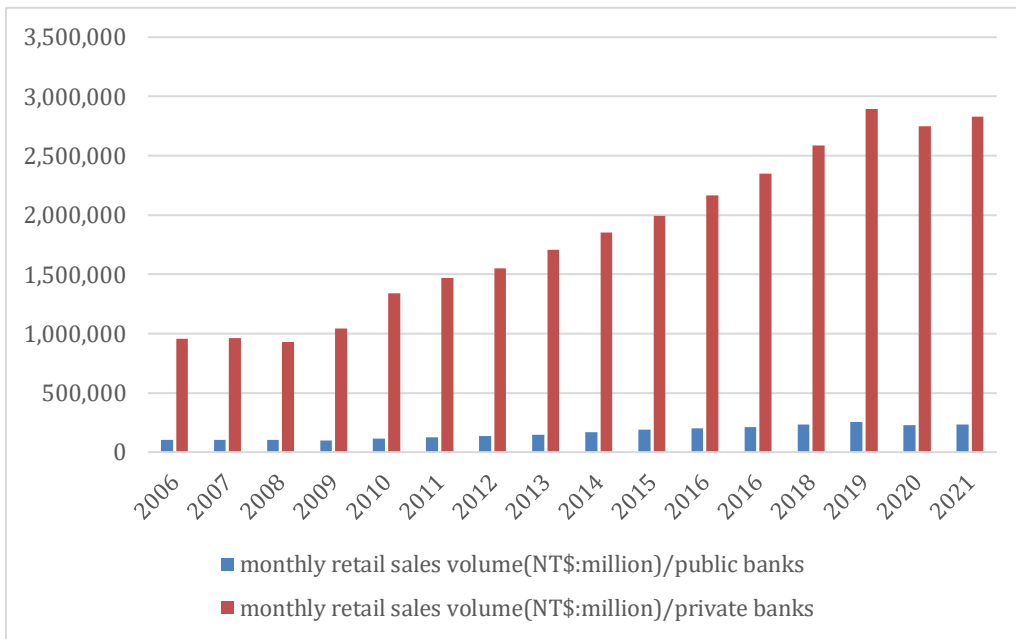
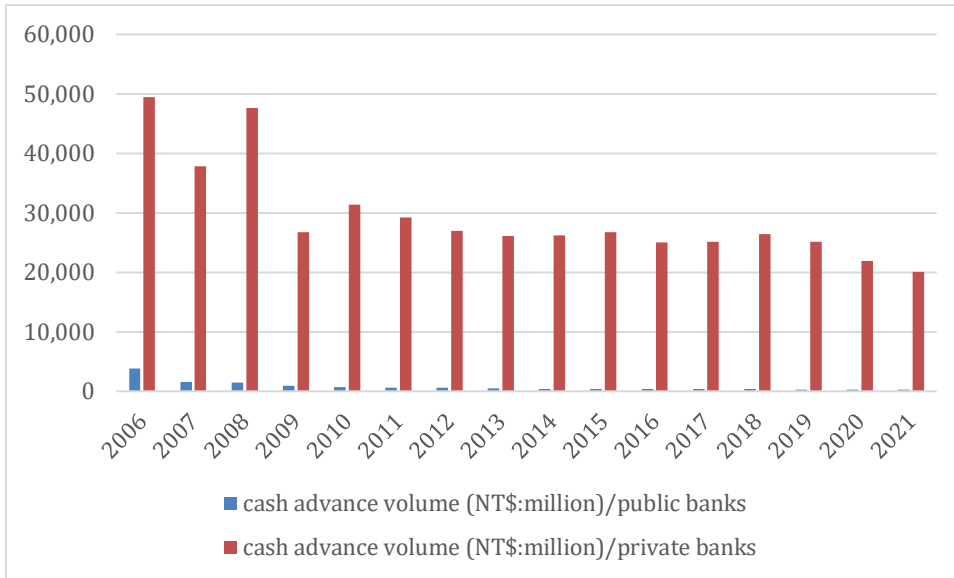
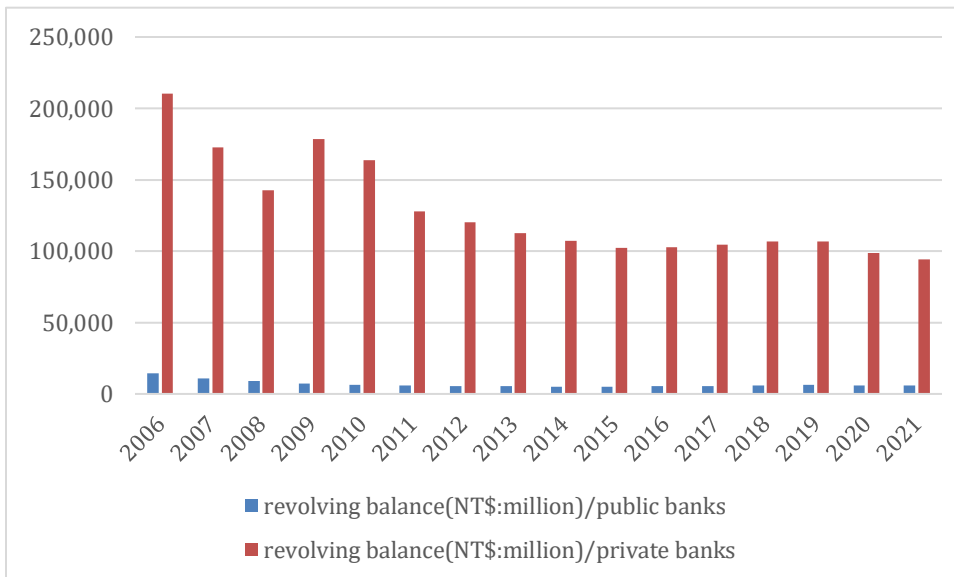


Figure 7: Monthly retail sales volume/private and public banks



**Figure 8: Cash advance volume / private and public banks**



**Figure 9: Revolving balance / private and public banks**

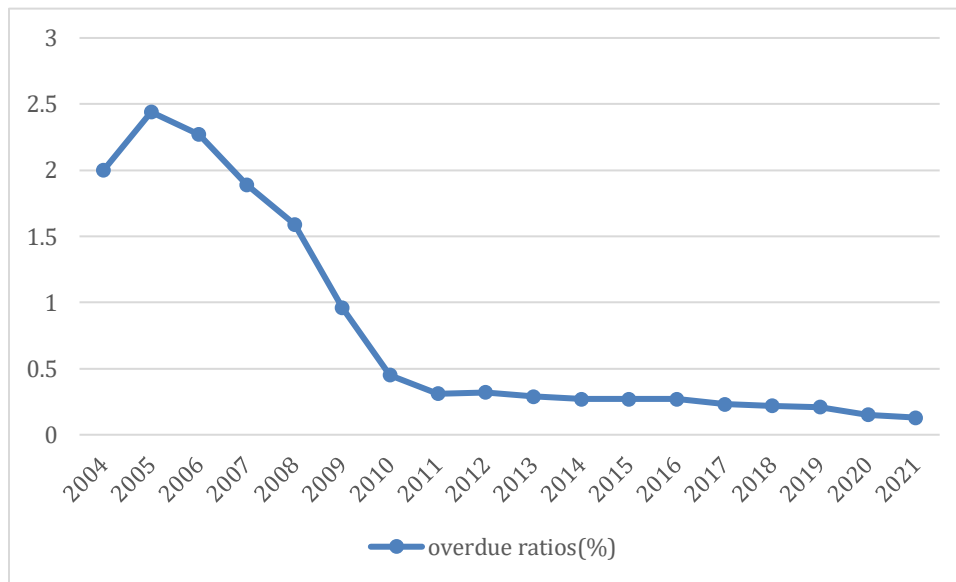
Since H1,H2,H3,H4, and H5 are supported, it's proven that adverse selection already exists in Taiwan's credit card market.

## 4.2 Moral hazard

In fact, adverse selection alone cannot fully explain the phenomenon of market information asymmetry. Only the phenomenon of adverse selection combined with moral hazard is sufficient to construct the model of information asymmetry. This shows that the hypothesis test of whether the selected moral hazard variable is supported is more important.

### 4.2.1 Overdue ratios

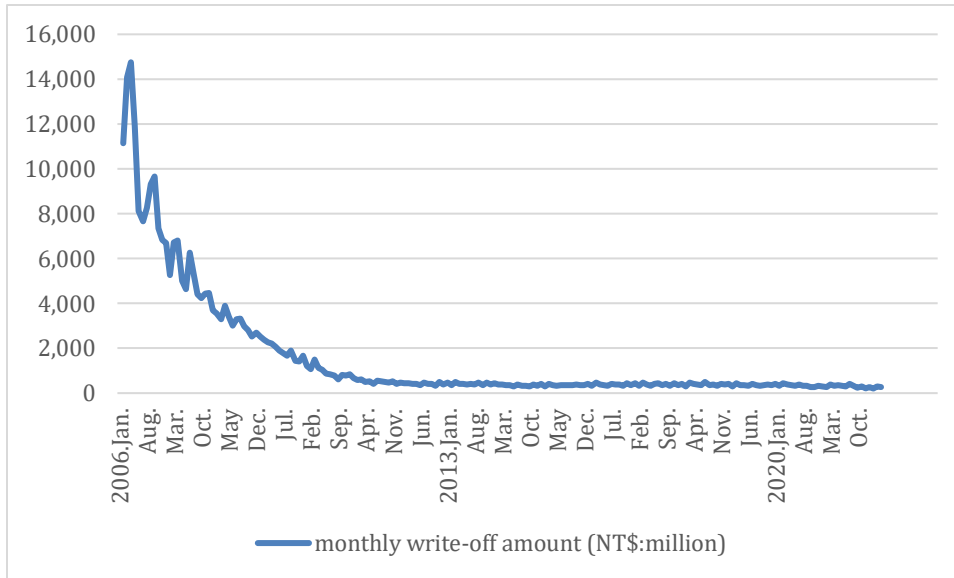
Under the premise of adverse selection, along with the rise of overdue ratios, it can explain moral hazard caused by adverse selection under information asymmetry. As shown in Figure 10, just after the adverse selection occurred in the credit card market in 2005, the credit card overdue ratios also reached the highest point at the same time. This is the fact that moral hazard exists in the credit card market. H6: High overdue ratio or coming with adverse selection is supported.



**Figure 10: Overdue ratios**

### 4.2.2 Monthly write-off amount

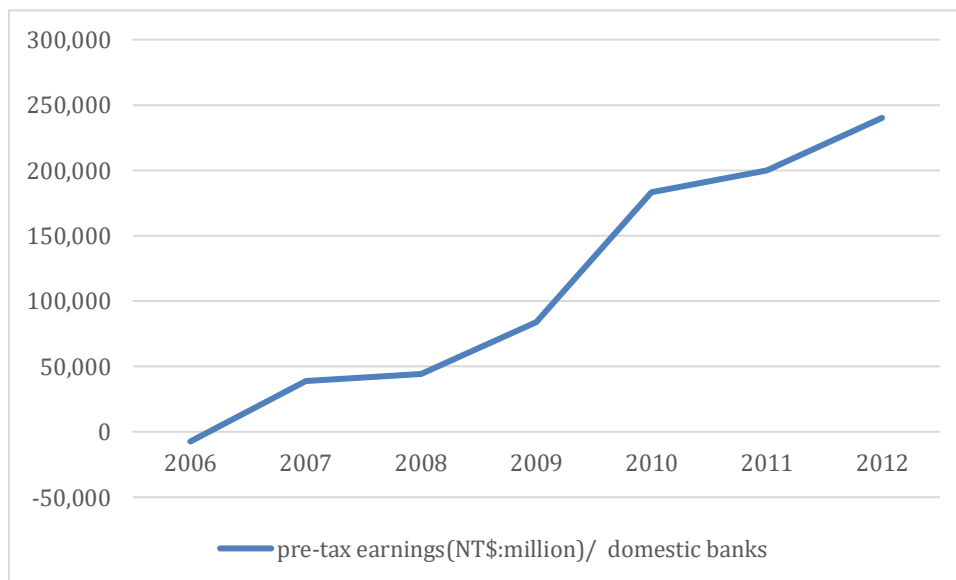
In addition to overdue ratios, the monthly write-off amount can also illustrate the moral hazard posed by the card-issuing bank due to adverse selection. As shown in Figure 11, the monthly write-off amount of the issuing bank also reached the highest point in the next year of the adverse selection peak, 2006, which directly shows the moral hazard loss caused by the adverse selection. So, H7: High monthly write-off amount coming with adverse selection is supported.



**Figure 11: Monthly write-off amount**

**4.2.3 Pre-tax earnings**

In Taiwan, banking is a high-paying industry that must be chartered. However, when overdue ratios or monthly write-off amount not only lead to a decline in the profitability of the card issuing bank, but even make the pre-tax earnings turn from negative to positive in 2006 (Figure 12), the moral hazard caused by adverse selection in the credit card market may have been proved again. Hence, H8: High overdue ratio or high monthly write-off amount in private banks higher than that in public banks is supported.



**Figure 12: Pre-tax earnings of domestic banks**

4.2.4 comparing private banks with public banks

According to the classification of public and private banks, either overdue ratios or monthly write-off amount in private banks are much higher than those in public banks (Figure 13; Figure 14). It can be seen that the moral hazard of private banks due to adverse selection are still much higher than that of public banks. H9: Pre-tax earnings of issuing card banks coming with adverse selection is supported.

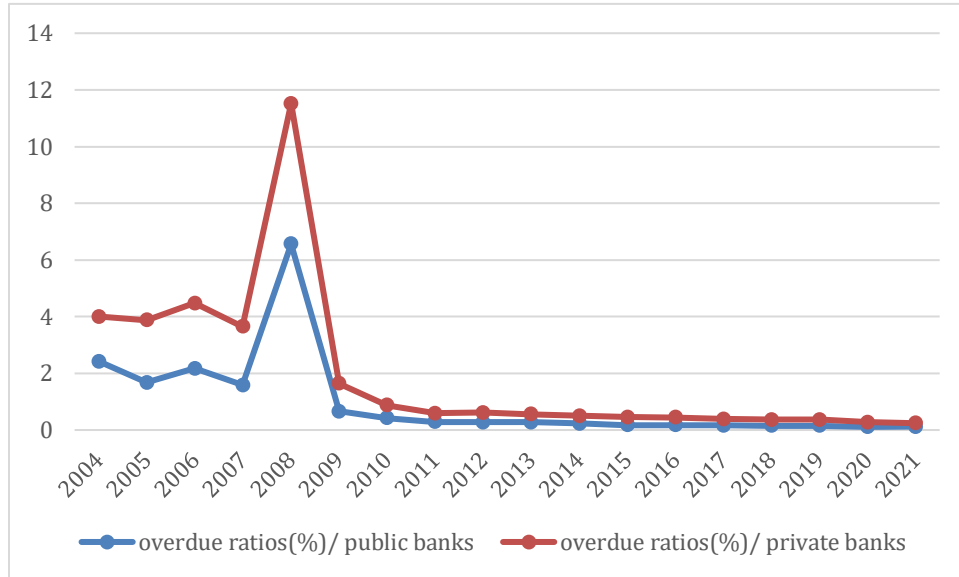


Figure 13: Overdue ratios / private and public banks

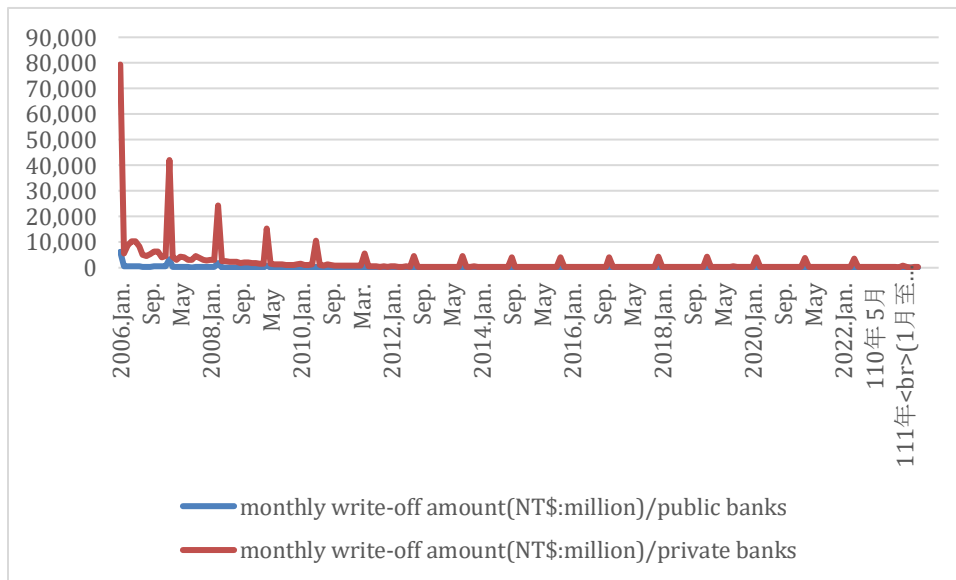
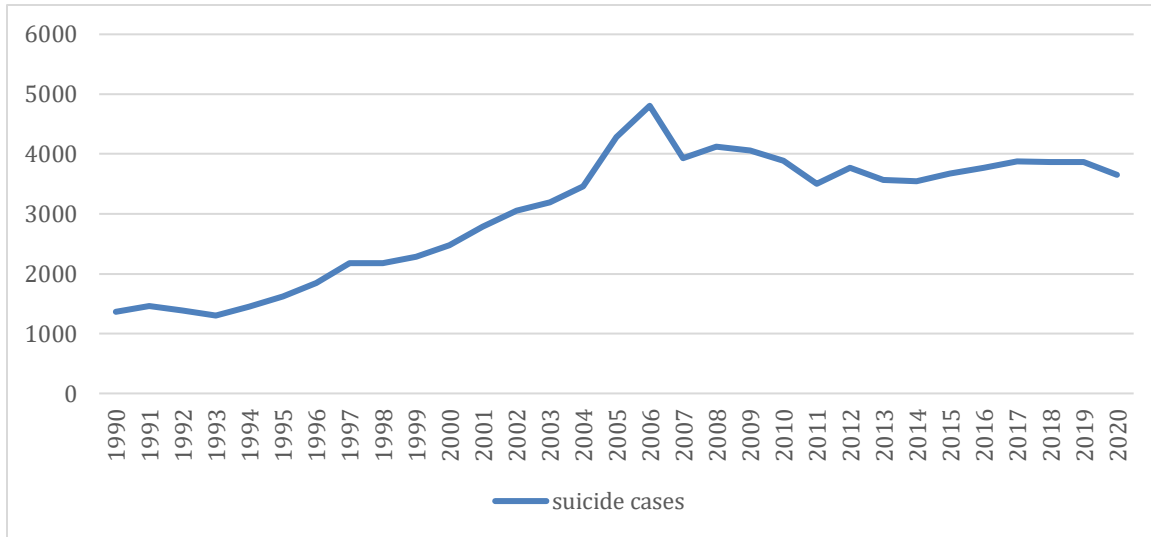


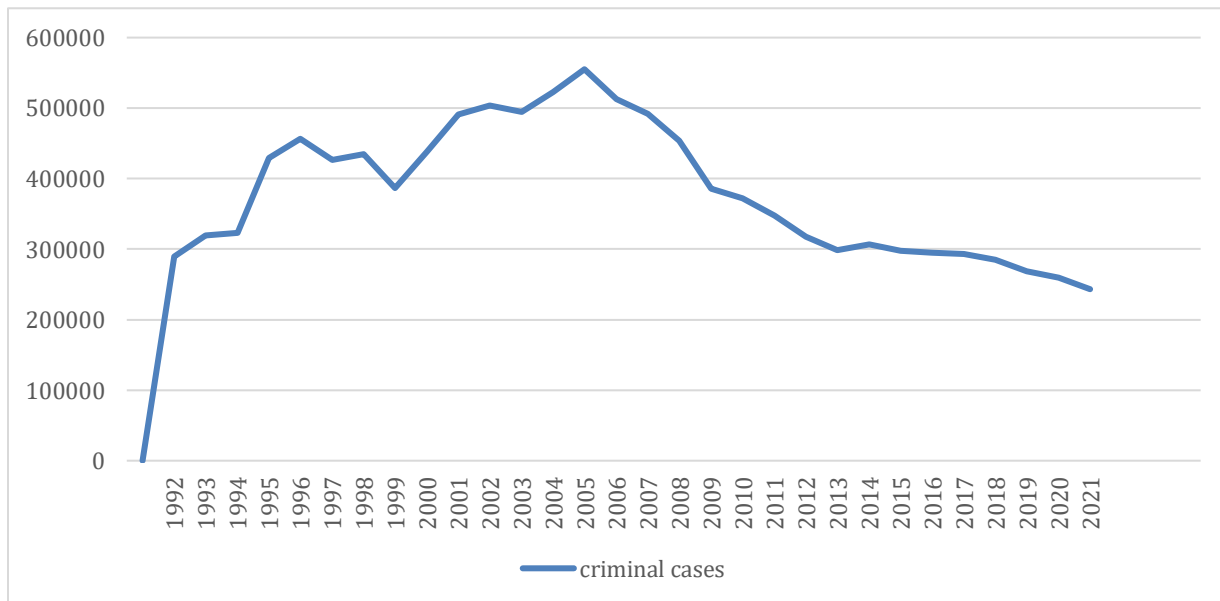
Figure 14: Monthly write-off amount /private and public banks

**4.2.5 suicide ratios and criminal cases**

In addition to the moral hazard of adverse selection in the credit card market in Taiwan, it also leads to serious social problems. When the suicide rate and the number of crime cases increased abnormally during the peak period of adverse selection in 2005 and 2006 (Figure 15; Figure 16), the worsening social problems became the co-bearers of the moral hazard caused by the card-issuing banks Accordingly, H10: High suicide ratios and criminal cases coming with adverse selection is supported.



**Figure 15: Suicide cases**

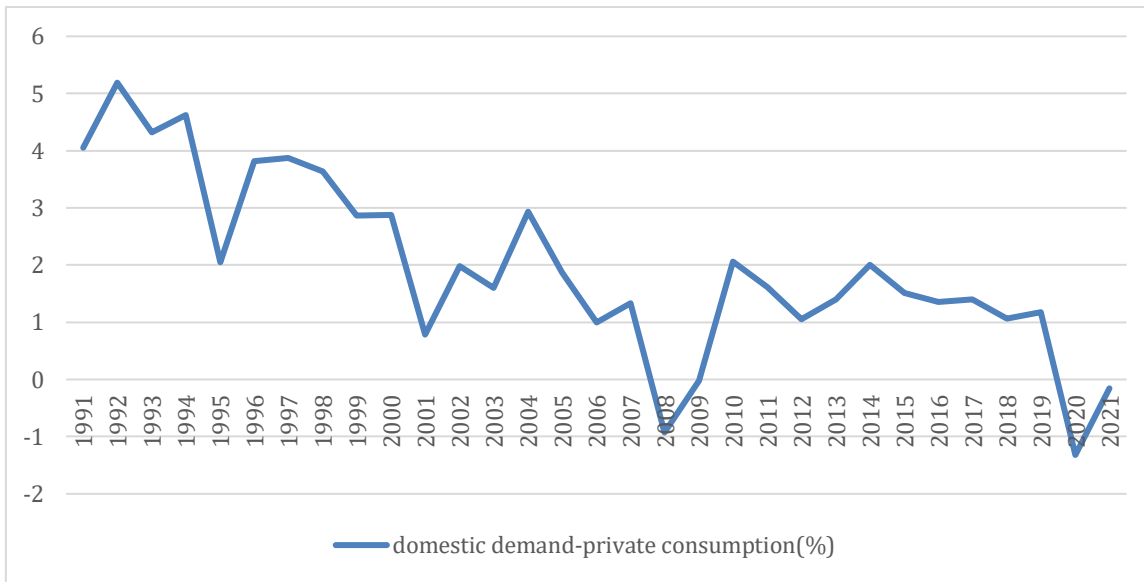


**Figure 16: criminal cases**

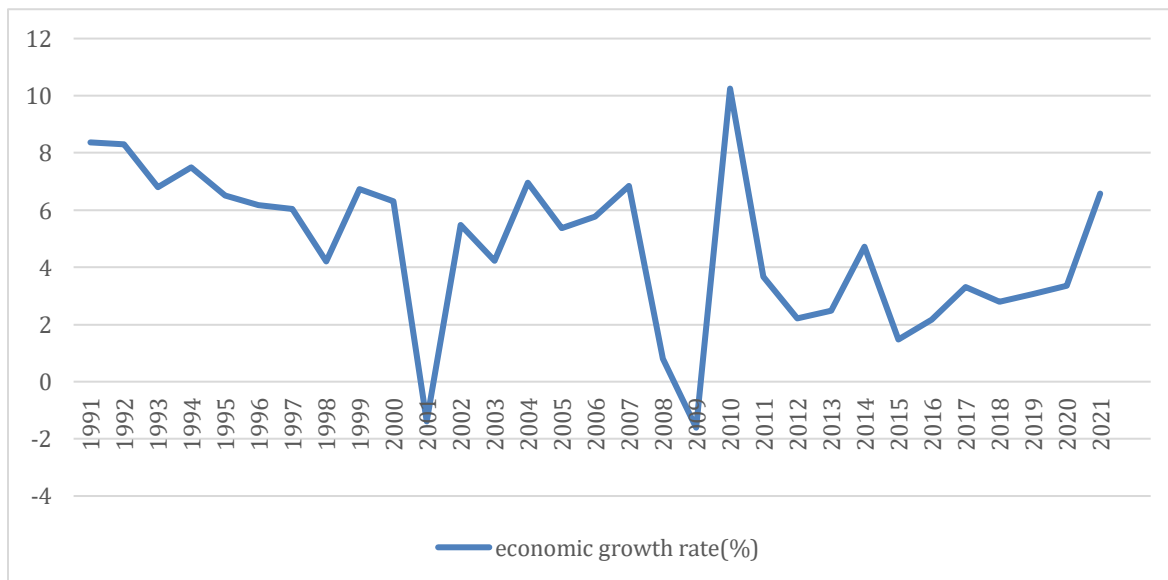


**4.2.6 economic growth rate**

In addition to the social problems caused by the bank's own operating losses and the heavy debts of the cardholders, the moral hazard caused by the adverse selection of card-issuing banks leads to a decrease in domestic consumption willingness since 2005 (Figure 17), and even a decline in the economic growth rate (Figure 18). The price is too high when the entire national economy has to pay for the moral hazard of the card-issuing banks. Therefore, H11: Low economic growth rate coming with adverse selection is supported.



**Figure 17: Domestic demand – private consumption**



**Figure 18: Economic growth rate**

When H6, H7, H8, H9, H10, and H11 are supported, it's proven that moral hazard in Taiwan's credit cards market already exists. Combined with these research hypotheses of adverse selection and moral hazard, all the hypotheses are supported after the empirical tests. This is true that card debt crisis or market failure in Taiwan has been constructed and confirmed by information asymmetry theoretically.

## **5 Conclusions and Recommendations**

### **5.1 Conclusions**

The research results of this article have confirmed that following Korea in 2001 and Hong Kong in 2002, the information asymmetry in Taiwan's credit card market reached its peak in 2005, when the credit card crisis hit the market most violently.

The article presents conclusions as follows. First, the hypotheses testing of the existence of adverse selection are carried out for various indicators, and the results are that all the hypotheses are supported. Similarly, after the hypotheses testing of the existence of moral hazard, the financial, social and general economic levels also show the results that all the hypotheses are supported, too. More importantly, this article also finds that private banks are significantly more affected by adverse selection or moral hazard than public banks.

Obviously, the research results have confirmed that the card debt crisis is a concrete manifestation of information asymmetry in Taiwan's credit card market. What's more, in addition to the phenomenon of information asymmetry, the joint monopoly behavior of card issuing banks to obtain huge profits from credit card consumer finance business has caused market failure.

Whether information asymmetry or market failure, the findings have significant policy implications for governments or authorities because they have to understand their rationale and value in the face of card debt crisis. In particular, when the research results reveal that private banks are the main driver of the card debt crisis, the government or competent authorities must abandon the illusion of a free market economy and take the responsibility for rebuilding the market order when the market is in fail.

### **5.2 Recommendations**

It is not declined that there is no statistical test for the research hypotheses though it is more a graphical presentation of some major indicators of card crisis in all over the article which support all the hypotheses. In other words, the results of the article might be suggested being more conservative implications. After all, the methodology adopted is a preliminary qualitative analysis of the credit card conditions in Taiwan even though the quantitative analysis is applied partially. The fact implies that more statistical investigation and hypotheses tests are needed for the advanced study in the future.

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