Article

Research on Factors Influencing the Demand of Chinese Commercial Health Insurance Caused by COVID-19

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Abstract: The COVID-19 pandemic in 2020 enhanced the need for commercial health insurance to address the sudden and overwhelming healthcare costs faced by families. This also led to an increase in the demand for health insurance services requiring insurance companies to innovate and develop suitable services. However, in the context of China, despite the huge potential for growth, health insurance market faces numerous challenges such as inadequate availability of tailored services, educational issues, income limitations, and emphasis on social insurance. To examine the issues and consider areas for improvements, this research investigated the impacts and effects of commercial health insurance from a macro perspective and considered potential recommendations to enhance the effective demand. This paper performed an empirical investigation by using the short panel data for regression analysis. The data was collected over ten years (2010 to 2019) involving 31 provinces in China to establish a fixed effect model. It employed FE and FGLS method to compare and analyze the impact of 9 factors while the health insurance premium was set as the dependent variable. Results showed that domestic economic development led to increasing residents' wealth and consumption levels has increased, including healthcare investments. Elevating the awareness of people through education can promote the development of the commercial health insurance demand, but the influence of urbanization level and the aging of the population remain to be demonstrated.

Keywords: Commercial Health Insurance; Effective Demand; COVID-19; Panel Data Analysis

1. Introduction

Commercial health insurance, as an important component of insurance coverage, has consistently maintained a rapid growth rate, with premium income continually increasing (Xu, 2019) [1]. The growth rate has been sustained at around 30% over the past five years. The COVID-19 pandemic also led to a substantial influence on the insurance industry owing to the strict measures taken by governments globally including China and the increasing awareness of people concerning the awareness of self-prevention and health risk protection (Xiao et al., 2021) [2].

Health insurance, as an effective measure to address emerging challenges, should play a critical role. Despite that the social medical insurance is more universal, there is only the provision of the most basic medical security for the public based on its characteristics of wide popularization and low

security. However, in emergencies such as acute and severe illnesses, patients may struggle to cover high medical expenses promptly. In such cases, commercial health insurance to fill the gaps. Nevertheless, commercial health insurance, given its partial substitutability, has a limited scope of coverage owing to concerns regarding public understanding and a mismatch between supply and demand. The Chinese commercial health insurance market is in the early stages of development (Sun et al., 2021) [3]. Although data collection has improved, challenges persist such as the difficulty of aligning insurance types with the target audience, a lack of product innovation, and insufficient effective demand from consumers. Therefore, addressing the demand for commercial health insurance is essential to expand its market size and further development.

With the growing attention from the government and relevant authorities towards commercial health insurance, various policies have been promulgated. For example, according to Tan et al. (2019) [4], the "Healthy China 2030" planning outlines a multi-level medical security system. It states the need to "improve the multi-level medical security system with basic medical security as the main body, other forms of supplementary insurance and commercial health insurance as supplements, … actively develop commercial health insurance, implement tax and other preferential policies, and encourage enterprises and individuals to participate in commercial health insurance and various forms of supplementary insurance." The plan also encourages the development of commercial health insurance, the implementation of tax incentives, and the active participation of enterprises and individuals. Further, it is aimed that "By 2030, the modern commercial health insurance service industry will further develop, and the proportion of commercial health insurance expenditure in the total health costs will increase significantly." The 14th Five-Year National Health Plan has also adopted the target to increases the supply of new health insurance products. The plan "encourages social forces to provide differentiated and customized health management service packages, and explores commercial health insurance as a financing or channels of cooperation". Further, in 2006, the China Insurance Regulatory Commission (CIRC) promulgated China's first health insurance-specific regulations, the "Health Insurance Management Measures". Since 2013, CIRC has introduced a series of policies to support serious illness insurance and tax-preferred health insurance, thereby advancing these systems from promotion and development to standardization and improvement (Sun, 2019) [5]. Commercial health insurance is playing an increasingly important role in China's multi-level medical security system, with its functional orientation gradually being defined.
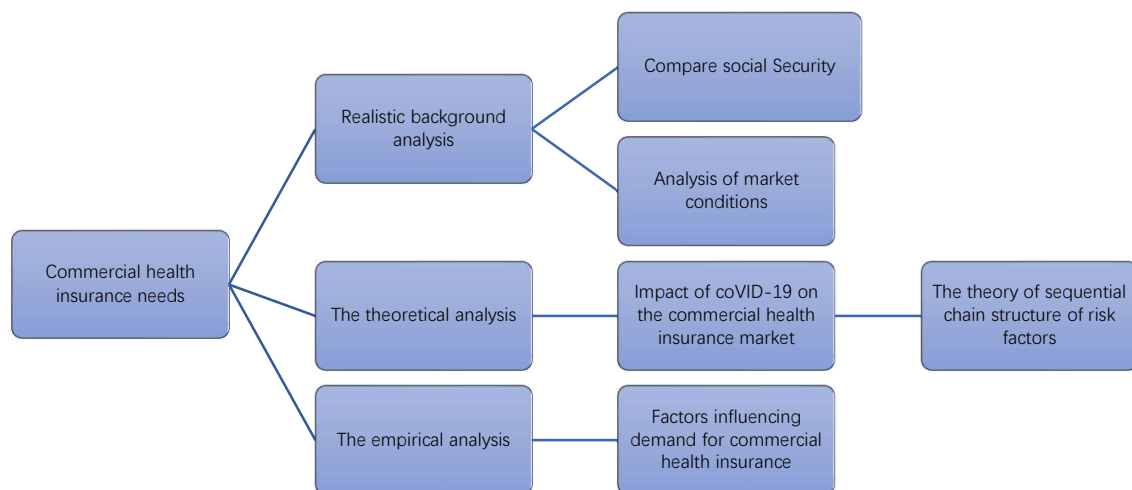

Figure 1. Structure and Methods.

This research paper assists insurance companies in the context of an epidemic in devising strategies for insurance product development and innovation. It supports relevant government departments' regulators in formulating more practical policies. Moreover, it offers policyholders with comprehensive consideration to select suitable commercial health insurance, ultimately fostering a breakthrough in developing commercial health insurance market in China. The structure and methods of analysis are outlined in Figure 1.

2. Materials and Methods

The demand for commercial health insurance is influenced by environmental, policy, and social factors. Environmental factors mainly concern the outbreak of widespread infectious diseases, such as severe acute respiratory syndrome (SARS) in 2003 and COVID-19 in 2020. Xu et al. (2020) [6] analyzed SARS framework for reference and suggested that the COVID-19 outbreak has influenced the commercial health insurance industry. The pandemic enhanced people's intentions to acquire health insurance owing to greater awareness and consciousness concerning health risks. Further, it has prompted companies to increase capacity and offer product liability insurance and exclusive product development leading to the provision of a higher variety of products and the integration of medical service level, correspondingly meeting short-term incremental risk guarantee for residents' demand. Additionally, it stimulated the increase of residents' demand for health insurance.

A prominent policy factor is reflected in the implementation of preferential tax policies. Zhu and Tong (2020) [7] calculated people's willingness to pay for commercial health insurance under different conditions and concluded that government intervention would reduce consumers' price sensitivity to commercial health insurance products' supply. Improving the implementation of tax-preferred policies would further stimulate the demand for tax-preferred health insurance. Zhu and Wang (2016) [8] employed the Heckoprobit model and illustrated that the premium individuals are willing to pay for tax-advantaged commercial health insurance increases with income and vice versa owing to the direct relationship. Accordingly, the preferential tax policy is a major lever to promote the development of commercial health insurance, as it can help convert potential demand into increased purchasing ability. Moreover, in the context of the United States, Thomasson (2003) [9] found that after the comprehensive tax incentives for group health insurance in 1954, the price of insurance products decreased, and the demand increased. On the other hand, Gruber (2011) [10] demonstrated that if the tax benefits were reversed, the health insurance demand would be reduced as well. In addition to tax incentives, the relevant penalty systems set up in other countries can prompt consumers to purchase commercial health insurance. Saltzman (2018) [11] analyzed the existence of mandatory penalties rather than the penalty amount by employing a nested logit discrete choice model to find out that the existence of mandatory penalty can promote some consumers to buy insurance.

Another aspect of policy factors is reflected in social medical insurance influence on commercial health insurance. Its influence is divided into two kinds: the extrusion effect and the promotion the effect. Fang et al. (2019) [12] held the idea that when consumers have no obvious preference for commercial health insurance, and the social insurance provides a basic similar level of coverage, people will reduce or abandon commercial health insurance to enjoy social insurance due to the extrusion effect. Most domestic scholars' research results, however, are contradictory. Yan (2018) [13] explained that Chinese commercial health insurance has a promoting effect on deposit insurance

coverage due to the structure of the product formation from the supply end. Peng and Zheng (2017) [14] found that because of the difference in the social medical insurance development degree, there can be varying effects on commercial health insurance demand. The view was supported by Wang et al. (2020) [15] that the development of social medical insurance plays a significant role in promoting the demand for commercial health insurance.

Social factors influence the demand for commercial health insurance in various ways. Yu and Zhou (2019) [16] compared four municipalities by constructing the commercial health insurance development index, and concluded the influences on commercial health insurance development. Qi et al. (2018) [17] employed the generalized moment estimation model from the perspective of population and found that factors such as aging population bring-up ratio, and the dependency ratio in children and adolescents have positive relationship with health insurance density. Sun et al. (2023) [18] suggested that individual characteristics can an effect on purchase intention of tax commercial health insurance. Wang (2023) [19] investigated the residents' health status associated with the potential commercial health insurance, insurance demand, purchasing power, and personal risk appetite. Economic and commercial health insurance at the community level of market coverage reflects the development and the relevant effect on the commercial health insurance demand. Results in terms of social and geographical factors involving urban and rural areas are generally similar with slightly different details. Further, studies have highlighted that the important factors influencing the health insurance requirements normally include the household head's education level, the diversification of income sources, and the position of the demand and tendency (Wang & Rosenman, 2007 [20]; Nshakira-Rukundo et al., 2019 [21]). However, increasing rural incomes is an effective strategy to boost insurance demand.

2.1. Comparison of Commercial Health Insurance and Social Medical Insurance

The distinctiveness of commercial health insurance lies in its difference from the core of the social medical insurance system. The specific distinctions between the two are highlighted in Table 1.

Table 1. Comparison of commercial health insurance and social medical insurance.

Difference Between	Commercial Health Insurance	Social Health Insurance
Scope of protection	Groups and individuals who purchase insurance	Mainly take the laborer as the safeguard object
Implementation of the way	Sign an insurance contract	Cover in the unit "five social insurance and one housing fund", more contracted
Security level	Insurance gold and policy-holder place pay premium concerned, more insurance types, higher safeguard level.	"Wide coverage, low security", the level of security is limited, cannot meet all the needs of consumers
Nature of the insurance	The purpose of operation is profit, commercial and voluntary	welfare
Premium source	Business or individual	Enterprises, individuals, and financial subsidies
Legal basis	Contract law, civil law, and insurance law	Constitution, Labor law and Social Insurance Law

2.2. Market Analysis of Commercial Health Insurance Over the Years

Over the last decade, the overall market size of the insurance industry has exhibited a consistent expansion. Figure 2 shows that the original premium income increased year by year along with the

proportion of the premium income in GDP, referred to as insurance depth. Original premium income has accounted for over 4% in the past four years. In 2019, the original premium income reached a new high of 4,264.5 billion yuan, representing a 4.3% of GDP.

The position of commercial health insurance within the insurance industry has steadily improved over the years. In recent years, while the original premium income of commercial health insurance continues to rise, the proportion of original premium income in the total annual life insurance premium income has consistently increased. In 2019, the premium income of China's commercial health insurance reached 3,099.5 billion yuan, comprising 16.57% of the annual original premium income and 22.80% of the annual life insurance premium income, both achieving highest values. Specific data is illustrated in Figure 3.

In addition, regarding compensation, the proportion of commercial health insurance compensation within the annual insurance compensation and life insurance compensation has also increased. This suggests that the commercial health insurance business is growing and consumer participation is on the rise.
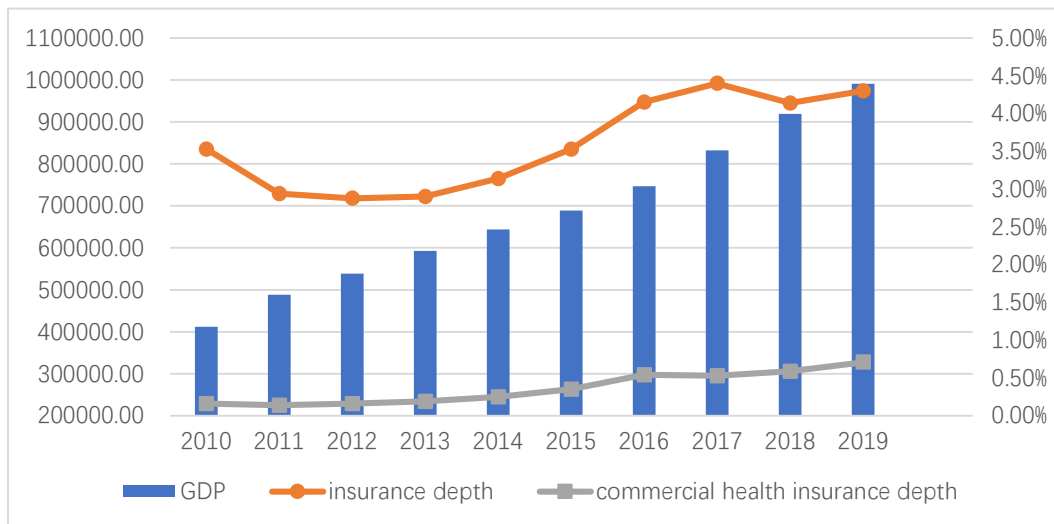

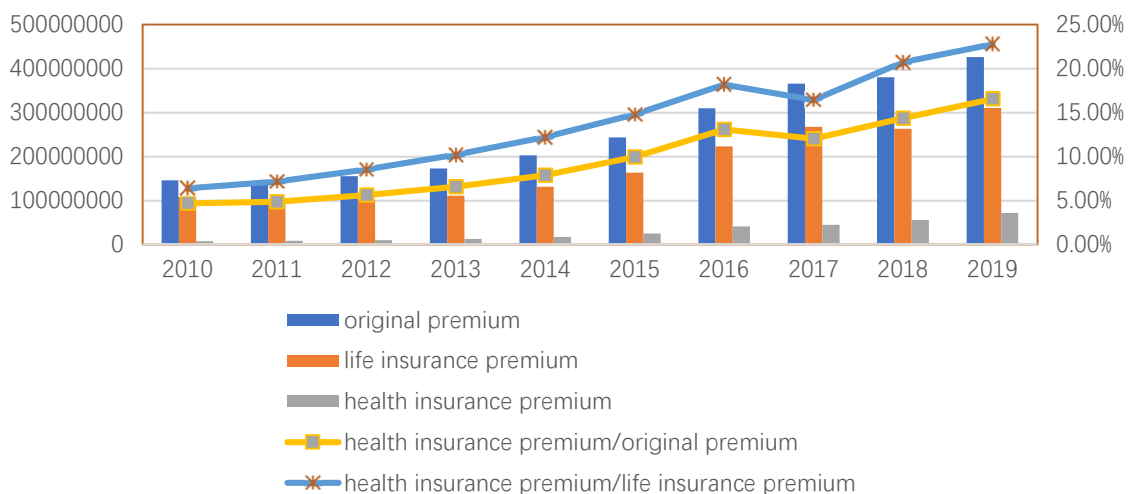**Figure 2.** Insurance depth from 2010 to 2019.

Figure 3. The proportion of health insurance original premiums from 2010 to 2019.

2.3. Analysis of Commercial Health Insurance

Despite the growth in premium income, compensation, and the proportion of commercial health insurance, China's commercial health insurance market remains in the early stages of development. The primary issues concern the large number of insurance types and inadequate development of the commercial health insurance.

Insurance companies are focused on developing health insurance; however, a detailed examination reveals a high degree of overlap and strong sustainability. This can lead to inefficiencies and inappropriate usage of resources leading to impacting revenue. Product design should be more targeted and differentiated, avoiding unnecessary complexity, and ensuring that health management and product sales are connected. Additionally, since commercial health insurance is designed to complement social medical insurance, it faces concerns regarding being deemed as a substitute. The general perception exists among consumers that social insurance can meet their medical needs without having to buy commercial health insurance. Therefore, effectively developing insurance services covering diseases and costs beyond the social medical insurance coverage is an important challenge to address.

China's insurance industry has been growing relatively slow, and commercial health insurance being a part is also affected. However, the increasing figures indicate that it is expanding and playing an increasingly meaningful role in healthcare. The inadequate development can be due to a lack of motivation among the key stakeholders. For example, auto and life insurance policies have a wider demand and bring sufficient profits to insurance companies, there is limited motivation to innovate and design commercial health insurance products to better meet consumers' needs. Further, due to the complementary nature of commercial health insurance, it often takes a back seat to social health insurance policies, resulting in unclear boundaries and challenges for consumers in making decisions. Consequently, the commercial health insurance growth has been inhibited despite the overall development of health insurance.
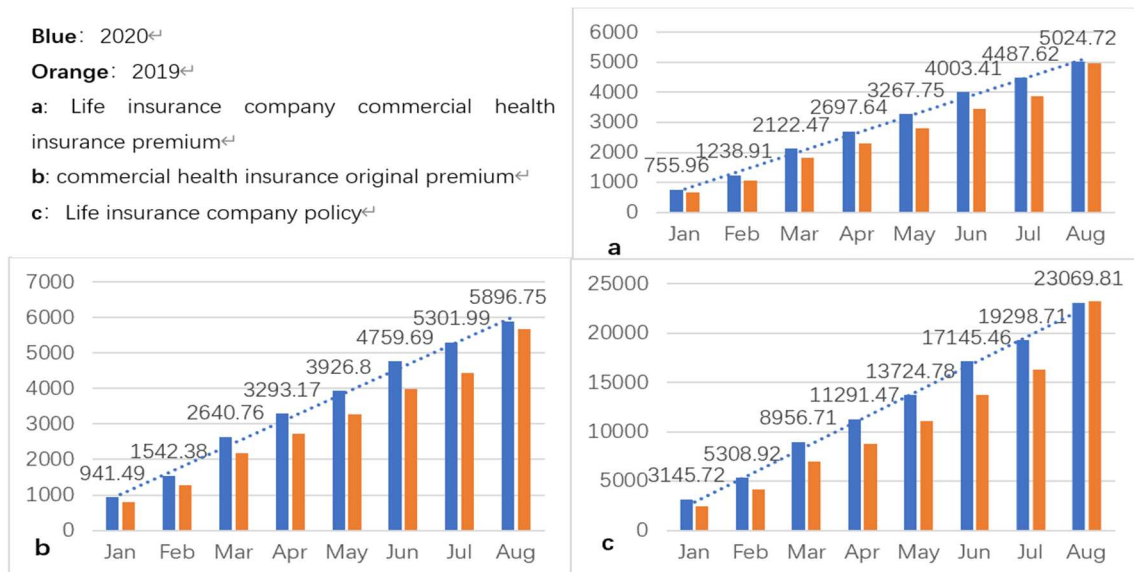
2.4. Background Analysis

Figure 4. Comparison between 2020 and 2019.

The COVID-19 pandemic started in Wuhan, Hubei Province, and spread to different regions in China at the end of January 2020. The author has selected insurance data from January to August 2019 for comparison with the same period in 2020 to analyze the specific impact of COVID-19 outbreak on commercial health insurance. Data released by the China Insurance Regulatory Commission (CIRA) shows that the business situation of commercial health insurance remained relatively stable from January to August in 2020. Compared to the previous year's data, the initial stages of the epidemic resulted in a gradual increase in premium income considering that various provinces and cities were in a state of emergency pandemic prevention and control, causing numerous industries to pause operational activities, as illustrated in Figure 4. Nevertheless, as the situation started to improve with an increasing number of people returning to work, their awareness of the importance of health protection was strengthened due to the COVID-19 pandemic impact, resulting in an enhanced understanding of health insurance. Consequently, the gap between the commercial health insurance premium income in 2020 and the previous year started to increase, with a gap of around 100 billion. In the later stages, as China gradually controlled the situation, the industry operations returned to normal, commercial health insurance premiums gradually aligned with the last year's level. Accordingly, health insurance became one of the only three insurance businesses to achieve a double-digit growth in the first half of the year.

According to the report titled "18 Discoveries on China's Insurance Needs in the Post-epidemic Period" released by Fudan University and Tencent, the COVID-19 epidemic has significantly influenced the understanding of insurance needs, marking a qualitative leap compared to the same period in 2019. While insurance demand and awareness in developed regions has been significant, the epidemic also stimulated increased insurance awareness in less developed regions. In terms of regions, areas that had previous experience with SARS reflected a much higher level of risk-consciousness, with a higher number of newly insured users leading the country. Moreover, during the outbreak, insurance consumers' attitude towards online services transitioned from "passive acceptance" to "active seeking". This reversed transmission upgraded the online insurance abilities and the technology, aspects, improving service levels and enhancing the mobility and intelligence of the services. Consequently, this led to higher internet insurance conversion rates and expanded the age range of those interested in buying insurance coverage and extending it to less developed areas. The report also noted that 44% of new policies during the outbreak were COVID-19 insurance policies, with the highest number purchased in developed regions such as Beijing, Shanghai, and Guangzhou.

2.5. Theoretical Analysis

This paper examines the impact of the COVID-19 pandemic on commercial health insurance through the lens of sequential chain structure of risk factors. The risk factors in this sequential chain structure consists of six parts: environmental hazards, formative factors impacting the strength of hazards, the impact on hazard's target, the resulting risk events, losses of the final risk, and the risk main body, as shown in Figure 5.

For the outbreak, the risk factor is the novel coronavirus spreading widely in the environment through respiratory droplets and close contact, with both humans and animals serving as carriers. Due to the virus's highly contagious nature, areas with high population density are substantially vulnerable to the risk. In this context, people are the primary victims of the COVID-19. However, not all people who are in a risk environment may be affected by risk factors, which means becoming

infected and dealing with illness, which is a manifestation of risk uncertainty. For COVID-19, the disease leads to loss, resulting in compromised physical health and suffering, affecting those in this risk chain, namely the risk subjects. The affected population primarily consists of the elderly, people with low immunity, and those who have direct or indirect contact with the infected people. The number of these individuals is notable owing to the high degree of infection and widespread transmission.
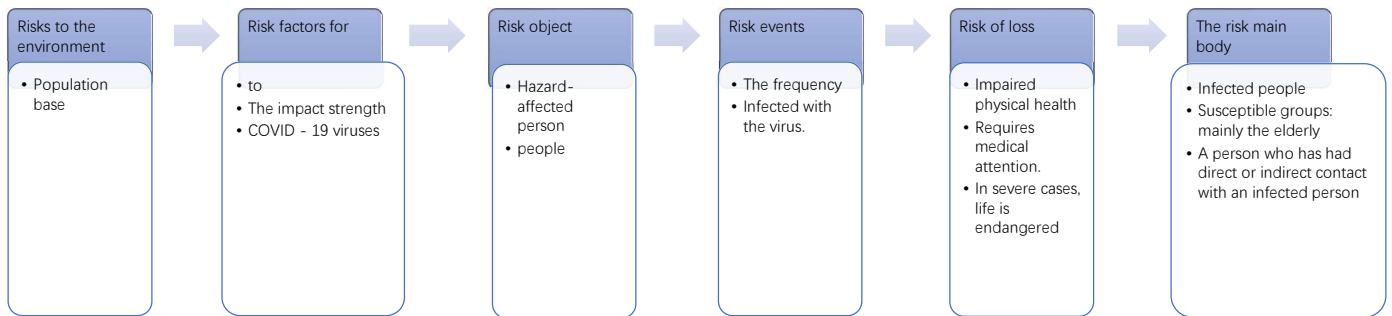

Figure 5. Sequential chain structure of risk elements.

In terms of the demand for commercial health insurance, the COVID-19 outbreak's medical costs were reimbursement by insurance, with the remainder covered by fiscal subsidies. The cost will not result in residents' medical burden, however, the early outbreak severed as a call for residents. The severe situation in Wuhan, with major restrictions and lockdowns, had a notable psychological influence on individuals, resulting in demand for insurance services. From a theoretical model perspective, the risk subjects are most significantly affected by risk events. However, they are the victim of risk, the effect of risk prevention on commercial health insurance is not as notable as on the risk object and not all risk objects are risk subjects. The COVID-19 epidemic stimulated the insurance awareness of risk objects and increased visits and insurance turnover among residents in Xinjiang, Xizang, Inner Mongolia, and other central and western regions where the population density is relatively small. In addition, the epidemic reduced the proportion of men and women covered by insurance, and increased the number of women opting to insure their entire families leading to an overall expansion of commercial health insurance coverage. Thus, the COVID-19 pandemic has contributed to an increase in effective demand for commercial health insurance.

3. Results

The influencing factors of commercial health insurance can be categorized into two categories: general factors and specific factors. The preceding analysis focus on the impact of COVID-19 on commercial health insurance and concludes that it will stimulate effective demand. General factors are the primary determinants that influence the effective demand for commercial health insurance in a typical environment. This paper discusses the general factors that affect the effective demand for commercial health insurance under normal circumstances, encompassing economic, demographic, and social factors. The three factors have been selected and disguised to ensure that a comprehensive analysis of the factors can be carried out to provide detailed insights.

3.1. Economic Factors

Economic factors are mainly reflected in the growth of GDP, per capita disposable income, and consumer price index. Economic expansion drives the rapid development of various economic industries, which has driven the expansion of the demand for corresponding products as well. In this respect, commercial health insurance has undergone substantial growth and development. The depth of commercial health insurance in China illustrates a gentle rising trend, with significant development potential though the potential demand still needs to be explored.

Income also stands out as a critical factor affecting residents' decision to purchase commercial health insurance. Figure 6 shows income level changes among urban and rural residents from 1981 to 2019. Higher incomes offer residents with the means to meet their essential living requirements and extend their coverage to other areas, thus boosting their demand for commercial health insurance. Moreover, income growth tends to increase people's awareness of insurance, increasing their willingness to invest in commercial health insurance.
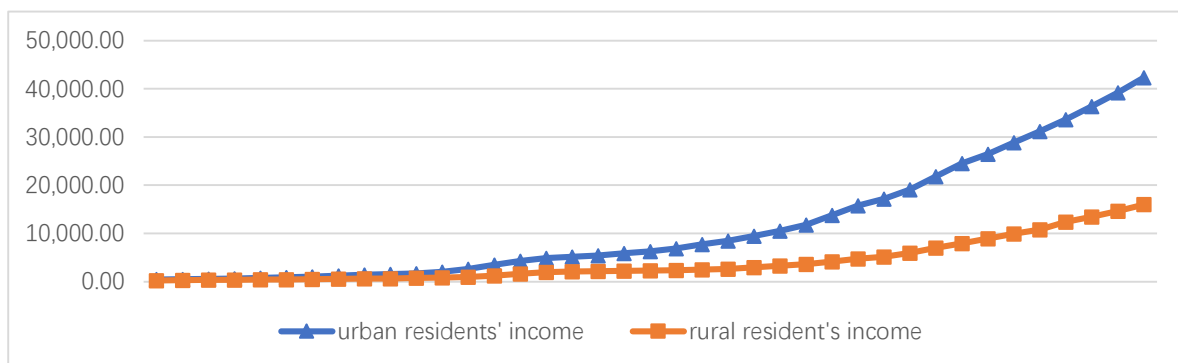

Figure 6. Statistics of residents' income from 1981 to 2019.

The rate of change in the consumer price index reflects the extent of inflation or deflation. A sustained overall increase in the index suggests the occurrence of inflation. Economic development is often accompanied by inflation, and when inflation is at an appropriate level, it can promote production and play a positive role. China's consumer price index (CPI) shows a gradual upward trend, remaining relatively stable, indicating that China's inflation is in a moderate state. This has a positive impact on the economy and, in turn, exerts a certain promoting influence on the demand for commercial health insurance.

3.2. Demographic Factors

Changes in population dynamics and residents' behavior significantly impact the demand for commercial health insurance. This paper identifies four key aspects: population aging, increased resident medical and health expenditure, improved education levels, and elevated insurance awareness, as given in Figure 7.

The aging of China's population is becoming increasingly pronounced as the proportion of the elderly in the total population has increased significantly over the last few decades. According to the standards in China's statistical yearbook, residents aged 65 or older are defined as the elderly and in the past five years, their population has increased significantly, from 10.1% to 11.9%. Thus, the aging of the population may also increase the demand for commercial health insurance. Residents' personal consumption habits also directly affect the demand for commercial health insurance, as an increase of residents' medical and health expenditure indicates that they pay higher attention to their physical

conditions. Further, improvement of residents' insurance awareness indicates that they pay greater attention to insurance products. The two factors collectively drive effective demand for commercial health insurance.
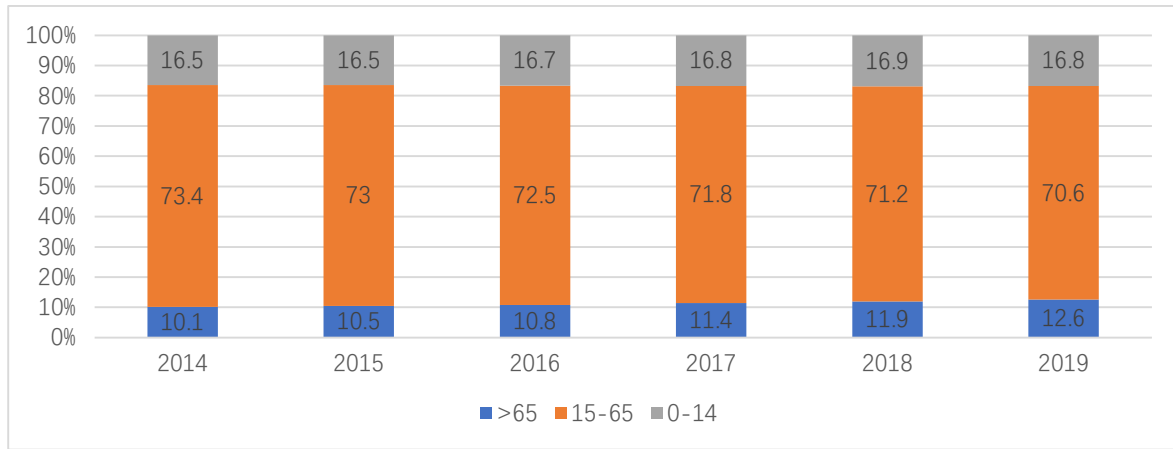

Figure 7. Age distribution of Population in China.

In theory, higher levels of education are expected to improve residents' overall quality of life. Individuals with better education can better understand the unique role of commercial health insurance, value risk control, and develop the willingness to purchase appropriate insurance to mitigate risk. Additionally, people with higher levels of education tend to secure better employment opportunities, earn higher wages, and have the capacity to acquire additional insurance. Figure 8 shows the insurance density and insurance depth in China from 1980 to 2019, which may correspond with the increasing education levels.
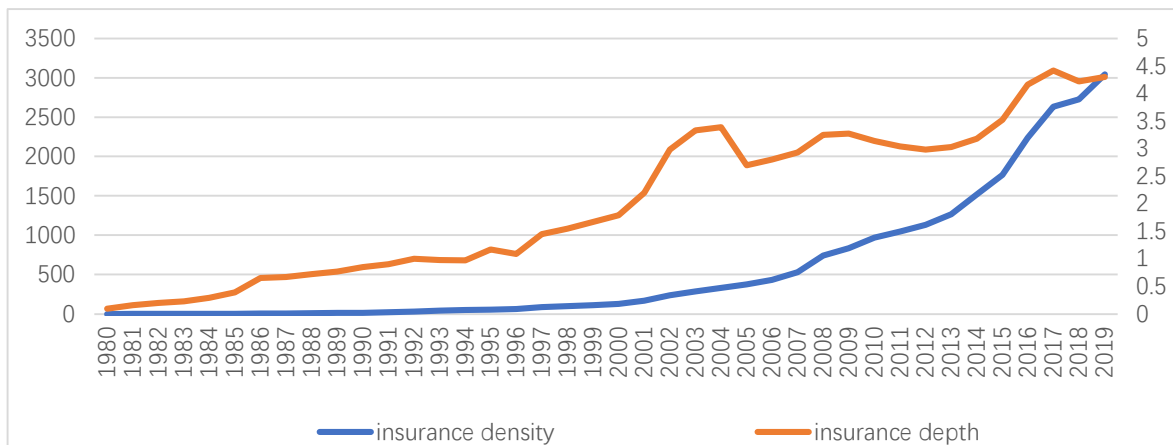
Figure 8. Insurance density and insurance depth in China from 1980 to 2019.

3.3. Social Factors

This paper also addresses social factors, apart from economic and behavioral changes, and examines the influence of urbanization levels and social medical expenditure. China's urbanization level is steadily increasing year by year, and an increased percentage of people are adopting the urban lifestyle. This trend promotes the development of China's commercial activities and drives the consumption of commercial health insurance.

Social medical expenditures reflect the government's investment in public healthcare and reflect

the development level of social medical insurance. Increased investment and project expenditures indicate better development under the social medical insurance system. Currently, China's social medical expenditure is increasing along with improvements in the domain of the social medical insurance system.

Further, the impact of social medical insurance on commercial health insurance should be analyzed from two perspectives: firstly, from the front view, social medical insurance stresses healthcare in the medical sector, and with the development of medical insurance, the public can be educated concerning their demand leading to a higher percentage of people utilizing commercial health insurance. Nevertheless, a certain substitution exists between social medical and commercial health insurance, which can have negative effects on various individuals pertaining to the utilization of commercial services. Therefore, empirical analysis is required to draw conclusions about the relationship between these different forms of insurance services.

4. Discussion

The applicable models in this thesis include time series models, panel data models, section data models, and others. Among these, the time series model places a high demand on the sample's temporal dimension. However, given that the development of commercial health insurance in China is still in the early stages, the available statistical data do not meet the requirements for a time series model. Similarly, cross-sectional data at a single time point struggle to reflect the development and changes of commercial health insurance over a period. Compared to the time series data models, the panel data model effectively addresses the challenges that the other two models cannot resolve. In view of the above reasons, this paper has opted for the use of short panel data for regression analysis.

Regarding data selection, this paper has collected data from China Statistical Yearbook and the Yearbook of China Insurance for thirty-one provinces and autonomous regions in China spanning from 2010 to 2019.

Table 2. Variable description.

Variable	Symbol	Show	Variable Description
Original health insurance premium	Y_{it}	*Chiop*	Original premium income of commercial health insurance in all provinces and cities
Gross domestic product	X_{1it}	*Gdp*	The annual GDP of each province
Per capita disposable income	X_{2it}	*Aincom*	Annual per capita disposable income of all provinces and cities (weighted between urban and rural areas if no direct data are available)
Consumer price Index	X_{3it}	*Cpi*	The annual consumer price index of all provinces and cities
Level of urbanization	X_{4it}	*City*	The proportion of the annual urban population in each province
Aging index	X_{5it}	*Elder*	The proportion of people over 65 years old in the total population in each province
Education level	X_{6it}	*Educ*	The proportion of people with college degrees or above in the population over 65 years old in each province
Per capita health expenditure	X_{7it}	*Amedi*	The amount of medical and health expenditures in the annual residential expenditure of all provinces and cities
Financial medical expenditure	X_{8it}	*Finanmedi*	The proportion of medical and health expenditures in the annual fiscal expenditure of all provinces and cities
The density of insurance	X_{9it}	*Density*	The ratio of the annual original premium of each province and city to its total population

The model is structured as follows. α_i represents the unobservable and constant factor over time that affects Y_{it}, which is called non-observable effect. ε_{it} represents the non-observable factors affecting Y_{it} due to time variation, termed specificity error or time variation error. Here, i represents 31 provinces and autonomous regions, and t denotes the ten-year period from 2010 to 2019.

$$Y_{it} = \alpha_i + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + \beta_6 X_{6it} + \beta_7 X_{7it} + \beta_8 X_{8it} + \beta_9 X_{9it} + \varepsilon_{it}$$

$$i = 1, 2, 3, ..., 31$$

$$t = 2010, 2011, 2012, ..., 2019$$

The variable description is given in Table 2. Descriptive statistics of variables are shown in Table 3.

Table 3. Descriptive Statistics variables.

Variables	N	Mean	SD	Min	Max
Chiop	310	872803	1.089 e+06	2083	6.090 e+06
Gdp	310	22946	19257	507.5	107671
Aincom	310	21339	10602	6597	69442
Cpi	310	102.6	1.212	100.6	106.3
City	310	56.09	13.39	22.67	89.60
Elder	310	9.942	2.317	4.824	16.27
Educ	310	13.16	7.216	2.391	50.49
Amedi	310	1187	599.7	142.5	3742
Finanmedi	310	347.3	239.0	32.04	1580
Density	310	1785	1505	168.5	12432
Number Of Province	31	31	31	31	31

4.1. Model Selection

Given the hysteresis effect on health insurance demand, this paper sets the health insurance premium as a dependent variable one period in advance, that is, "Fchiop" is adopted for regression. The model is as follows:

$$fchiop_{it} = \alpha_i + \beta_1 gdp_{it} + \beta_2 aincom_{it} + \beta_3 cpi_{it} + \beta_4 city_{it} + \beta_5 elder_{it}$$
$$+ \beta_6 educ_{it} + \beta_7 amedi_{it} + \beta_8 finanmedi_{it} + \beta_9 density_{it} + \varepsilon_{it}$$

For the above model, if it is related to any explanatory variable, it is deemed a fixed-effect model α_i and when it is independent of all explanatory variables, it is a random effect model α_i. In this paper, Stata software is used for the regression analysis of panel data. First, based on the F test results, p-value is 0, the null hypothesis of "=0" is rejected, suggesting that the fixed-effect model should be selected over the mixed regression model α_i. Following, according to the Hausman test results, where the P-value is 0, the null hypothesis that "is not related to any explanatory variable" is rejected. Therefore, the fixed-effect model is preferred over the random effect model $\alpha_i X_{it}$.

After conducting a heteroscedasticity test, the original model rejected the hypothesis of homoscedasticity, indicating the presence of heteroscedasticity. Therefore, this paper has employed two regression methods for comparative analysis: fixed effect regression with robust standard error (Method 1) and feasible generalized least square regression (Method 2), considering the assumption of heteroscedasticity of the error term.

The regression results are shown in Table 4:

Table 4. Empirical regression results.

Variables	Method 1	Method 2	Variables	Method 1	Method 2
Gdp	58.32***	17.25***	Amedi	314.8**	421.9***
	(9.606)	(3.039)		(136.6)	(61.40)
Aincom	-4.482	10.09**	Finanmedi	2,731***	2,349***
	(13.08)	(4.974)		(451.8)	(209.4)
Cpi	50,696**	41,894***	Density	9.942	115.3***
	(19,545)	(14,369)		(30.92)	(28.39)
City	-36,856**	-13,792***	--	--	--
	(17,680)	(3,042)	Constant	-5.680e+06**	-4.457e+06***
Elder	108,030**	-30,932***		(2.695e+06)	(1.500e+06)
	(41,758)	(10,956)	Observations	279	279
Educ	-1,801	10,570*	No. Province	31	31
	(10,701)	(5,899)	R-Squared	0.798	--
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1					

4.2. The Empirical Results

Upon comparing the above results, the empirical findings of most variables are generally consistent and have passed the significance test. The GDP coefficient is positive in both tables and is significant with a $P < 0.01$. This confirms the driving effect of economic development on the effective demand for commercial health insurance.

Per capita disposable income was not significant in the fixed-effect case, but it was significant in the case of feasible generalized least square (FGLS) model and passed the significance test of 5%. This may be caused by the substantial disparity in per capita disposable income among provinces across the country. However, the overall positive impact can be recognized. The growth of per capita disposable income expands the effective demand range of residents, transforming the potential demand beyond the original economic conditions into effective demand, and fulfilling their increasing needs through higher disposable income. Hence, the increase in per capita disposable income is an influential factor in driving the demand for commercial health insurance.

The CPI coefficient is positive, and in both models, it meets or exceed the significance level of 5%. It reflects the state of inflation in China, which affects the economic situation of the country and the consumer demand. In recent years, China has experienced a moderate inflation situation, which has played a role in promoting residents' demand, thus driving the effective demand for commercial health insurance.

In theory, urbanization leads to higher income and quality of life and the shift should promote the change of residents' consumption values and enhance their understanding and awareness of commercial health insurance. However, the empirical results show a negative correlation with urbanization level coefficients, which is inconsistent with the initial prediction. The author speculates that this inconsistency might arise from varying levels of development in diverse provinces and cities, with China's first-tier cities experiencing rapid urbanization. For example, Beijing's urbanization level remained relatively stable around 2015, and the gap between Beijing and some western provinces and cities is significant, potentially affecting the overall result.

The proportions of the elderly individuals yielded differing results in the two regression methods. On one hand, according to the hypothesis above, the elderly deal with poor physical health and increased likelihood of are more affected by illnesses. Further, they have been a vulnerable group during the COVID-19 pandemic resulting in a greater demand for healthcare and commercial health

insurance. Nevertheless, China's social medical insurance currently covers a wide range of people, reducing the probability of severe emergencies for most of the elderly, which can be managed as well. Thus, the elderly no longer must buy additional commercial health insurance. In addition, due to the low-income levels of the elderly, commercial health insurance is not typically a consideration in their daily needs, and they may not proactively purchase it. Besides, under current circumstances, China's commercial health insurance has several restrictions, especially concerning the age of participation. This coupled with limited insurance types designed for the elderly makes it challenging for them to meet their needs. Therefore, the impact of the elderly population on commercial health insurance demand needs further verification and analysis.

In the case of FGLS, the coefficient for education level is positive and passes the significance test of 10%, indicating that the proportion of population with higher education level is increasing. Those with higher education level are better equipped to understand the importance of risk, improving their risk prevention awareness, in line with the initial hypothesis.

The data for per capita medical and health expenditure and insurance density have passed the significance test at 1% and 5%, respectively, indicating that improved resident health and insurance awareness encourage them to invest more in their health and purchase corresponding insurance.

Moreover, regression results showed that financial medical expenditure was positively correlated with the original premium of commercial health insurance, and passed the significance test at 1%. This indicates that social medical insurance offers utility to commercial health insurance than competitive pressure. The improvement of social medical insurance can raise awareness about health insurance, and even encourage them to actively seek out commercial health insurance that better suits their own needs. In general, fiscal medical expenditure has a positive impact on the effective demand for commercial health insurance.

5. Conclusions

Nevertheless, even though there is huge potential for the growth and development of the insurance industry in the context of China, various challenges exist including restricted development of commercial insurance services, limitations of the education of people about the effectiveness of insurance, substitution concerns with social insurance, and income factors. This research performed an empirical analysis to investigate the demand for commercial healthcare insurance so that insights can be developed to help insurance companies develop effective services in future. Accordingly, this paper empirically investigated the factors influencing the demand for Chinese commercial health insurance caused by COVID-19 by employing the short panel data for regression analysis. Data was obtained over ten years spanning from 2010 to 2019 and focusing on 31 provinces in China to establish a fixed effect model. FE and FGLS methods were employed to compare and analyze the impact of 9 factors while the health insurance premium was considered the dependent variable. Findings highlighted that domestic economic development led to enhancing residents' wealth and consumption levels, including healthcare investments. It can be valuable to build people's awareness through education so that their preferences to invest in commercial Healthcare insurance can increase. However, the study also highlighted that the impact of urbanization level and the ageing of the population are still needed to be investigated. . Based on the findings, recommendations have been developed from the policy, market, and individual level perspectives to increase the commercial health insurance demand.

5.1. Policy Level Recommendations

(1) Maintain Steady Economic Growth

Economic growth serves as the basis of driving the effective demand for commercial health insurance. The factors including the GDP, moderate inflation, and growth in per capita disposable income are closely related to economic development. To achieve this, the government should formulate fiscal policies and industrial plans beneficial to economic development to improve economic and employment levels. It may involve developing a better income distribution system to improve people's living standards through steady economic development, which may lead to elevating the demand foundation of commercial health insurance from all aspects. Further, a suitable environment be provided for the further development of commercial health insurance.

(2) Vigorously Develop the Insurance Industry

To enhance the overall demand for commercial health insurance, promoting the insurance industry is a prominent target. This approach may help people develop a better understanding of the insurance industry, realize the importance of insurance, and gain the preferences to invest for controlling their personal risks. Commercial health insurance be accepted by a greater percentage of people when it is generally included in the choice of medical expenditure.

(3) Coordinated Develop Both Social Medical Insurance and Commercial Health Insurance

Commercial health insurance in China has not been fully accepted by people due to the unique substitution with social medical insurance although it should play a complementary role. Numerous people have the view that commercial health insurance is dispensable since they believe that existing social insurance covers their daily health claims. To change this perspective, the policy should strengthen the support for commercial health insurance and improve the external environment for the development.

(4) Improve Welfare Policies for Residents

In the contemporary context, there is a huge gap between the rich and the poor in China. People with poor living standards can primarily avail basic social welfare security, but lack the capacity to obtain further health care services. To solve this problem, the government need to develop an effective welfare system, which is conducive to the improvement of residents' living standard, enabling people to elevate their investment in health care leading to stimulating demand for commercial health insurance. The improvement of social medical insurance system can also play a driving role in the demand for commercial health insurance.

5.2. Market Level Proposal

5.2.1. Strengthen Development of Commercial Health Insurance Products

Current commercial health insurance products do not sufficiently complement social medical insurance and there are substantial homogeneity and a lack of innovation between health insurance and life insurance products. To address this issue, insurance companies need to focus on developing health insurance products that better align with consumers' needs. These products should strike a balance between complexity and simplicity, ensuring consumers can comprehend the product without it being overly complex. Strengthening product development and quality can enrich and enhance the commercial health insurance system.

5.2.2. Improving the Service Level of Commercial Health Insurance with Digital Transformation

Based on big data and advanced technologies such as cloud computing, artificial intelligence, blockchain, and the Internet of Things, insurance companies can offer digital solutions that streamline business processes and services. This approach addresses key issues in product design, precision marketing, underwriting and compensation, operation management, and service in the context of commercial healthcare insurance and offers insights for insurance companies to optimize underwriting operation efficiency and user experience, and reduce operating costs. This may also involve the organizations to effectively realize digital transformation. Further, insurance companies can optimize their service processes by building online direct marketing platforms and connect with third-party traffic platforms to enhance the efficiency of commercial health insurance business.

5.2.3. Strengthen Cooperation with TPA to Promote Commercial Health Insurance Development

With the continuous development of the market economy and insurance services, many commercial health insurance companies, Third Party Administrator (TPA) for Group Medical Insurance, have emerged. They leverage the innovation of the commercial health insurance industry from data empowerment, medical service supply network construction, and pharmaceutical benefits. TPAs solve the pain points of traditional insurance companies' lack of professional operation ability concerning commercial health insurance and the inadequate medical service integration to the virtue of their advantages in resources and technology, and improve the operational efficiency of insurance companies. It also provides new ideas for expanding the commercial health insurance market segment and business model innovation.

5.2.4. Cooperation with Internet Platforms to Accelerate Commercial Health Insurance

The rapid development of the Internet in China has transformed commercial health insurance with online sales channels with low customer acquisition cost and broad reach being developed rapidly. For instance, Ant Financial launched a new initiative involving users receiving free health insurance after completing a payment. The insured amount accumulates, allowing users to claim medical expenses incurred during hospital stays. Simultaneously, the product system has been gradually enriched, with several commercial health insurance products such as first generation, second generation, serious illness insurance, health and happiness, and mutual treasure to meet the users' multidimensional needs. Further, technological advancements combined with improvements in user experience, effective marketing, online claims settlement, and intelligent underwriting, have laid a solid foundation for driving commercial health insurance businesses.

5.2.5. Meeting the Social Needs

Insurance companies should grasp the opportunities offered by current events and adjust meet the evolving social needs. For example, in response to the epidemic, insurance companies should optimize product claim standards and extend insurance liability to cover the serious illness caused by COVID-19. Emphasis should be placed on leveraging technology to innovate insurance services, and enhance the efficiency of online insurance services. There is also a need to make appropriate adjustments for customers in vulnerable circumstances so that the overall convenience for them to acquire services can be increased.

5.3. Personal Level Advice

Consumers should take stock of their own healthcare needs, as with increasing personal expenditures, social security's low level of protection is likely to be inadequate. Consumers should invest in commercial health insurance to attain comprehensive health insurance coverage. They should cultivate their own risk awareness and enhance their understanding of insurance so that their inclination to invest in insurance can increase. Alternatively, numerous people only possess basic knowledge of auto insurance, which leads to low participation. Therefore, it is necessary to publicize the insurance protection in various ways and build subjective will of people to acquire insurance services. This approach will enable consumers to understand the meaning of commercial health insurance and ultimately elevate their demand for insurance.

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