



INSTITUTO
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Price Dynamics of Farmland Transfer in Chengdu, China:
Evidence from a Multilevel Model

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Doctor of Management

Supervisors:

PhD José G. Dias, Associate Professor,

ISCTE University Institute of Lisbon

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University of Electronic Science and Technology of China

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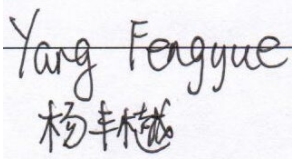
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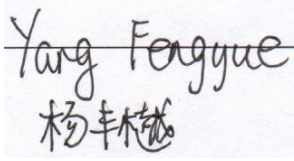
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Abstract

With the advancement of China's rural land system reform, the farmland transfer market is also experiencing a rapid development. Related to that, a reasonable price system is the basis for building an effective market. Research on the price dynamics and influencing factors of farmland transfer is of important insights and meanings for the policy makers and business participants.

This research takes the farmland transfer records (2016-2018) from Chengdu Agricultural Equity Exchange as the basic dataset, which is further supplemented by land quality data, map distances, and regional economic statistics of the 16 counties in Chengdu. Due to the intrinsic nested structure of the data, the Hierarchical Linear Model (HLM) approach is employed, as a specification of the Hedonic model, to analyse the impacts of different factors on the price, generate unbiased estimated results and differentiate the effects on individual level and county level. Results expressed that:

(1) Significant determinants that affect farmland price were land quality, distances to urban area, GDP per capita, proportion of primary industry, farm area per capita, highway density, and proportion of primary industry employment. The county level effects accounted for 27% of the total variance.

(2) Farmland transfer deals intermediated by the Exchange tend to have an 11.3% higher price. Among them, the deals through bidding would result in an even greater increase of 22.7%.

(3) Farmland transfer deals affected by performance bond insurance subsidy policy had a price increase of 7.8%. Thus, market effect was observed to be slightly more significant than the policy effect.

Several suggestions are proposed as: to optimise farmland appraisal methods; to strengthen the coordinated development of urban and rural areas; to give better play to the role of intermediary organisations; to strengthen financial support for farmland transactions; and to cultivate capable agriculture entrepreneurs.

Keywords: farmland transfer; price dynamics; intermediary organisation; performance bond insurance; HLM

JEL: Q15, R32

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Resumo

A reforma do sistema de terras rurais da China desencadeou uma transformação no mercado de transações de terrenos agrícolas. Neste processo, o desenvolvimento de um sistema de cotação/preços é uma condição necessária para o desenvolvimento, i.e., a análise das dinâmicas dos preços e os fatores que influenciam as transações de terras agrícolas são importantes indicadores para os decisores, sejam eles reguladores ou participantes no mercado.

Este estudo utiliza os registos de transações de terrenos agrícolas (2016-2018) da Bolsa de Agrícola de Chengdu, em complemento com informação sobre a qualidade do solo, distâncias de mapas e estatísticas económicas regionais dos 16 municípios da área metropolitana de Chengdu. Devido à estrutura hierárquica dos dados, aplicou-se um modelo multinível, tendo por base um modelo hedónico de análise do impacto dos diferentes fatores no preço, distinguindo efeitos aos níveis individual e de município. Os resultados mostram que:

(1) Os fatores que afetam o preço de forma significativa são a qualidade do solo, a distância à área urbana, o PIB per capita, a proporção de indústria primária, a área agrícola per capita, a densidade de rodovias e a proporção do emprego na indústria primária. Os efeitos ao nível do município explicam 27% da variância total.

(2) As transações de terrenos agrícolas intermediadas pela Bolsa tendem a ter um preço 11.3% mais elevado. Em particular, os negócios por meio de licitação resultariam num aumento ainda maior, de 22.7%.

(3) Os negócios de transferência de terrenos agrícolas afetados pela política de subsídio de seguro ao desempenho tiveram um aumento de preço de 7.8%. Assim, o efeito de mercado é mais importante do que o efeito de política.

Este trabalho recomenda a otimização dos métodos de avaliação de terrenos agrícolas, uma melhor coordenação do desenvolvimento entre as áreas urbanas e rurais pelas organizações intermediárias, o fortalecimento do apoio financeiro às transações de terrenos agrícolas e o fomento do empreendedorismo agrícola.

Palavras-chave: transferência de terras agrícolas; dinâmica de preços; organização intermediária; seguro de garantia de desempenho; HLM

JEL: Q15, R32

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摘要

随着中国农村土地制度改革的深入推进，农地流转市场也正在快速发展。同时，一个合理的价格体系则是建立高效市场的基础。研究农地价格的形成机制及其影响因素，可以为政策制定者和市场参与者提供重要的理论参考和启示。

本研究以成都市农村产权交易所 2016-2018 年的农地流转记录为基础数据集，并辅以成都市 16 个区县的耕地质量等别、地图距离和区域经济统计数据来进行实证研究。本研究以 Hedonic 模型为基础，且基于数据固有的嵌套结构，采用层次线性模型(HLM)作为特征模型，分析了不同因素对价格的影响，并生成无偏差的估计结果，且在个体因素和区域因素两个层面进行了区分比较。结果表明：

(1) 耕地质量等别，土地到城市的距离，区域人均 GDP，第一产业占比，人均耕地面积，公路密度，第一产业就业占比等因素对农地价格具有显著影响。其中，区域因素的影响占总影响的 27%。

(2) 由农交所作为中介组织来撮合的农地交易，价格比普通交易高 11.3%。其中，以公开竞价方式达成的交易价格更高，比一般水平高 22.7%。

(3) 受到农地流转履约保证保险政策影响的农地，其价格比其他土地高 7.8%。由此可见，市场化因素对价格的影响略强于政策影响。

基于研究结果，本文提出的主要建议有：优化耕地估价方法；加强城乡协调发展；更好地发挥中介组织的作用；加强对农地交易的金融支持；培养有能力的农业企业家。

关键词：农地流转；价格机制；中介组织；履约保证保险；层次线性模型

JEL: Q15, R32

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Chapter 1: Introduction

1.1 The significance of the research

With the in-depth reform of China's rural land system, a large-scale farmland transfer market with huge economic potential. In the market, farmers can transfer the management rights of their own farmland to others and get corresponding land rent. Farmland transfer has made important contributions to the overall growth of the economy and the development of agriculture and rural areas. Transferring actions not only liberated the surplus labor force in the villages and improved farmland use efficiency, but also promoted the development of moderate scale operation of agriculture. Furthermore, it helped solve the problem of "who cultivate the land", bringing new types of managing entities into agriculture production. The rent could also increase the income of rural residents. This research takes the farmland transfer market in Chengdu prefecture, Sichuan Province, as the research area. The unit price of transferred farmland is the focus in this thesis, since a reasonable price system is the indispensable precondition of a modern land transfer market.

This research is based on the farmland transfer records from Chengdu Agriculture Equity Exchange. As the earliest rural property exchange in socialist China, this organisation has significant capacity and experience in building and managing a farmland transfer market. By analysing the transaction data from it, this study can achieve a deeper understanding of the farmland market mechanism, thereby providing policy and managing suggestions, which would help improve farmland transfer market, construct a testified price system, protect the interest of participants, and promote the development of modern agriculture in China.

Price mechanism is the core mechanism of China's socialist market economy. As a spontaneous balancing function, it regulates the allocation of resources by regulating production, consuming, and investment. The history of China's land and real estate market had expressed that the price mechanism worked effectively in resource allocation. Land price is not only an important symbol of land use, land supply and demand, but also a powerful means to regulate the land market and make sound development. In the same way, a reasonable price system of farmland transfer is the basis for maintaining a good supply and demand relation and improving the efficiency of farmland utilisation, thereby promoting the

development of modern scale agriculture.

Due to the unique land system of China, there are many differences between Chinese farmland transfer market and the markets in other countries. Thus, farmland transfer price in China also has its own characteristics: (1) strong policies like land use control and cultivated land protection deeply influenced farmland supply-demand; (2) the fast process of urbanization changed the population structure in urban and rural areas; (3) intermediary organisations were built to provide marketised farmland transfer channels; (4) with the rapid growing economy, regional economic development differences greatly affect the price of local farmland.

Therefore, at present farmland transfer price in China cannot be measured as a fully marketised price. It needs to be observed from different perspectives, and exploring the influencing factors of the price helps enrich the price dynamics theory and could serve as a reference for improving the transfer price formation mechanism.

1.2 Research contents

This thesis first introduces China's basic land system, and then reviews the process of rural land system reform since 1978, highlighting the role of Chengdu Prefecture as a pilot zone in the whole country's reform, especially after 2003.

Through literature review, this thesis sorts out the ideological changes in China's land system, analyses the inevitability of the development of the farmland transfer market, and discusses the great potential and driving forces of this huge market. Several farmland appraisal methods being used are summarised, and the current status of Chinese farmland transfer market and the development of agriculture equity exchanges are briefly described, among which Chengdu Agriculture Equity Exchange is the key platform to be observed.

Based on the studies above, a theoretical analysis is conducted on those internal and external factors affecting farmland transfer price. Farmland transfer price is under the influence of numerous natural and economic factors. An analysis of those factors helps see the intrinsic law on how the price is formed, which is of significant value for the market's stable operation and participants' vital interests.

Based on the enlightenment of literature about Chinese and foreign markets, and the review of relevant theories such as property theory, five factors influencing farmland price are selected and discussed in this thesis, including natural endowments, location, regional

economic and social development, transaction attributes, and policy influence. Their impacts and theoretical mechanism are analysed.

Furthermore, Chengdu Agriculture Equity Exchange is an official organisation of market supervision and contract authentication. But it also serves as an intermediary deal maker. A part of the transactions are done in the matchmaking way and charged. Others are principal-to-principal deals authenticated officially. The more commercial way could affect the price tendency. To explore the effect of different transaction modes, it is helpful to make specific support and decisions, to promote efficient resource distribution.

However, the price is not only an outcome of those objective determinants. It is also greatly affected by administrative policies. Due to the unique land managing system and land reformation history, the price could not be explained by totally market-oriented analysis. Administrative policies had been always playing a powerful part in the market. The supply-demand relation, transaction willingness and tendency rely on the policies to a considerable extent. In 2017, Chengdu Government had issued the mentioned policy to give special fund subsidy for farmland transfer contracts' performance bond insurance. The impact of this policy is to be observed.

A regression model is to be specified to test the impacts of the factors, and the estimated results are to be further discussed. Several policy suggestions are given after that.

1.3 Research methods

For those influencing factors mentioned above, 13 specific indicators, including land quality grade, the distance to the central city, and the regional GDP per capita, were selected to specify a price model. An empirical analysis is conducted to observe the impacts of these factors on actual farmland transaction prices within the Chengdu Prefecture.

The issue of farmland transfer price in this research is essentially an issue of real estate appraisal. Thus, it is logical to use Hedonic Models as the basic model. The underlying idea of a Hedonic Model is to break down the commodity into its constituent characteristics, and obtain estimates the contributory value of each characteristic. The numerous factors that affect farmland transfer price will be reviewed and tested in a specified Hedonic Model, and their impacts will be identified.

As mentioned above, the indicators selected in this research are distributed on two levels. One is the individual level related to the farmland plot itself (natural endowments, locations, and so forth), and the other is the regional statistical figures on the county level (for example,

county GDP per capita). Each farmland transferred is located in one of the counties in Chengdu, and affected by the features of itself and the corresponding county simultaneously. The dataset is thus hierarchically structured, which needs to be analysed in a more suitable way. This research hires a hierarchical linear model (HLM) to analyse the data, instead of the traditional ordinary least square (OSL) approach. The basic idea of HLM is to separate the variance into within-group and between-group components, and comprehensively deal with the effects on each level. This approach could help generate unbiased estimated results, and distinguish the variances on each level, which reflects the real-world situation more accurately.

1.4 Research questions

China is undergoing a great reform of rural land system. As the pilot city of reform, Chengdu has accumulated rich implementation experiences, cases, and transaction data, and has nurtured a relatively big farmland transfer market, which is an ideal area for studying farmland transfer price dynamics. The role of Chengdu Agricultural Exchange and the performance bond insurance policy are also significant influencing factors to be observed. Therefore, it is meaningful to analyse farmland transfer price from multiple perspectives. This chapter can be concluded by the following research questions:

- (1) What are the factors that make basic impact on the price of farmland transfer? How are they affecting?
- (2) What is the impact of different transaction modes? Does the intermediary deal-maker influence farmland transfer price?
- (3) What is the impact of performance bond insurance subsidy policy?

Chapter 2: Research Background

2.1 Introduction

Agriculture, rural area and farmers, together known as the “Three Agricultural Problems”, have always been a core concern of China’s central government. In 2000, a village-level official in Hubei Province wrote the Chinese premier a letter saying “Farmers are so miserable, rural area is so poor, and agriculture is so perilous”. The letter was then published and drew national attention.

In 2005, in the 5th Plenary Session of 16th Party Central Committee, the formulation of “Three Agricultural Problems” was presented. The central government was expressing its concern about the rural area, people, and economy, once again. Meanwhile, the term “Central No. 1 Document” had been well-known to the Chinese people again. Literally, this term referred to the first important document published by the central government each year. But in China, it was a special term only referring to the annual policy document for agricultural issues. From 2004 on, the Chinese authority kept issuing “Central No. 1 Document” at the beginning of each year, with no exceptions. These documents emphasised the “top priority” of the “three agricultural problems” in the new era of China’s socialist modernisation.

Rural land was the basic resource for agriculture production and the most important matter for a farmers’ survival. The land problem is a main problem faced by ancient and modern China.

2.2 China’s land managing system

2.2.1 The land ownership

The sixth term of Constitution of the People’s Republic of China (1982) states that China implements “Production Material Socialist Public Ownership”. Since land is one of the most vital production materials, the Land Administration Law (National People’s Congress of China [NPCC], 1987) stipulates that in PRC all land is public-owned. But public-ownership does not necessarily mean state-owned. It has two forms: State-owned and Collective-owned.

The state-ownership means that the land is owned by all the people. The central government, on behalf of all the people of China has the authority of holding, managing, and

dealing with the land.

The collective-ownership means the land is owned by a special group of “working people”, named “collective”. A collective often consists of several hundred to several thousand people of a natural village. The collective-ownership is a victorious outcome of the communist party’s Land Revolution.

The Chinese Constitution (NPCC, 1982) states that all the urban land is state-owned, and the other land (except unused land), is collective-owned. This made it clear that “Urban land is of the state, and rural land is of the collectives”. An Urban-Rural Dual Structure in the land managing system was consolidated, which would have a huge impact on the later times.

In the Land Administration Law (NPCC, 1987), the same term (2nd term) about land ownership, it is also stipulated that no one can encroach, trade the land ownership illegally. The use rights of land can be transferred. The nation can expropriate land with compensation, for the good of “public interest”. State-owned land’s “Paid Use” principle is implemented. These clauses will be discussed later.

2.2.2 The land use control

Other than land ownership, Land use control is another important feature of China’s land problem. This is stated as “Land Use Control Regulation” in the 4th term of Land Administration Law (NPCC, 1987).

All the land in China is divided into three main use groups: agricultural land, construction land, and unused land. Agricultural land is those directly used for agricultural production, including cultivated land, forestry land, grassland, irrigation land, aquaculture waters, etc. Construction land includes land for housing, public infrastructure, commerce, industry, mines, transportation, tourism, military use, and so forth. Unused land is those wildlands neither for agriculture nor for construction.

The central government compiles “Comprehensive Land Use Plan”, which is like a long-term budget of land use for the whole country. All the actions about land use must obey this plan.

According to the 4th term, it is strictly confined to turn agricultural land into construction land (Land Use Variation). The government would impose a regulation on the scale of construction land and protect the amount of cultivated land.

Land use control, together with the urban-rural dual structure of land ownership, are the two main features of China’s land managing system. These two played the key role in land

issues and caused some problems for modern and contemporary China. To describe the origin and development of land problems in China, a review of the history of land management is provided in the next section.

2.3 China's farmland system

2.3.1 Land and the agricultural society

China has been unified for more than 2000 years since Qin Dynasty. As a country focused on agricultural production to satisfy the food demand of its large population, land was always a core political issue, rather than an economical one.

In Ancient China, the land was mainly owned privately by the landlords. There were also lands owned by the state (often royal family), or by yeoman farmers, but the ratio of the two was rather small. A classical model structure of the land system is the separation of ownership and use rights. The landlords owned the land and lease it to the peasants. The peasants use the land to produce food for the rent and then themselves. Land trade, transfer, rent, and mortgage happened frequently in the rural area. This resulted in large-scale land annexations.

Thus, in the 2000 years, more than 10 dynasties rose and fell, the land problem was not solved well. A typical "life cycle" of a dynasty is like this:

(1) At the beginning of a new, after years of war and chaos, the population is severely reduced. The new emperor gives the land to each household in the country, and encourages good labour work to restore the agricultural economy.

(2) The population grows, and land becomes scarce for individuals. In Chinese tradition, the sons would inherit one of the equally divided pieces of land from their farmer father, unlike the European or Japanese primogeniture. Some of the households get more and more land, with the help of official power, disaster or just good production skills and hard work. The ones who sold or lost their land become landless peasants, living on rented land and paying kind or money to their landlords. Thus, the landlord class and tenant class form into being and become opposite to each other.

(3) At the end, due to natural disasters or tyranny, too many people cannot feed themselves and are forced to uprising. The dynasty is hurt and destroyed; another one comes to the throne and commences a new cycle.

(4) Therefore, land annexation was a persistent ailment suffered by China and its people for thousands of years. It usually caused desperate peasant uprisings and the collapse of a

great dynasty. In 1850-1860, in the Qing Dynasty, the famous Taiping Heavenly Kingdom movement led by several farmers from Guangxi Province, occupied the bulk of southern half of China and caused the death of astonishingly around 70 million people. The movement's slogan was "the land belongs to everyone and should be cultivated by everyone". The farmers took the arms and went to fight when they lack food for survival, but the only thing they ferociously demand and die for was land (Qin & Jin, 2010).

In 1911, Sun Yet Sen's military uprising destroyed Qing Dynasty. Then, China stepped in the modern era. One of Sun's most impressing revolutionary ideals was "equalisation of land ownership". But unfortunately, his Kuomintang Party did not implement this well. On the other hand, the Chinese Communist Party prevailed by earning the support of the large peasant class. A communist movement often sticks to its proletarian value and try to take the cities with the workers. But Chinese Communist Party developed its own way of revolution by taking the vast rural area. It did Land Revolution in its controlling zone, suppressed the landlords and gave land to each peasant, then won the heart of poor rural people. Finally, the People's Republic of China was found in 1949.

2.3.2 The first thirty years of PRC

Since 1950, the new central government began a land revolution in the newly liberated area across the whole country, under the Law of Land Revolution. Two years later, the task is accomplished that more than 300 million landless and poor people got their own land. The government tried to set up a new type of private land ownership, by deeply intervening in transactions of land, in order to prevent the malicious land annexation and speculation.

To further eliminate the possibility of bipolar land flow, with the thought that individual farmers are unstable and fragile to policy and market changes, the central government began the "Agricultural Co-operation Movement" in 1952. In the years after that, the "working people's collective ownership" gradually took the place of individual farmer's private ownership of land. "Agricultural producers' cooperatives" were established everywhere in the country. In 1956, the Model Charter of Advanced Agricultural Producer's Cooperatives made the end of thousands of year's private land ownership in China.

In 1958, the central government launched a more radical programme named "People's Commune Movement", formally announcing the establishment of farmland collective ownership. In 1962, the People's Commune System was adjusted into "Three Level Structure", which are Commune, Production Brigade, and Production Team from top to

bottom. Each production team is a fundamental unit of rural economic life. It owns all the land within its compass (usually a natural village), and its members as a whole could use the land without any rent. The ownership and use right were, thus, unified and came to the hand of collectives.

The rural land's collective ownership is a realisation of the political ideal of land public ownership. However, after 20 years of practical experiments, this system proved quite inefficient. The members of a production team worked together in the field. They did farm work under the verbal command from the team head, like doing a kind of group exercise. Then, the agricultural product was equally divided and given to each member (after submitting some of it to the state). There was not any difference between those who worked hard and those who did not. Egalitarianism and cast theory hurt the production efficiency without any doubt.

As Coase's Theorem suggests, clear property rights lead to production efficiency (Coase, 1960). The trouble with collective production mode is that the property rights are quite vague. The land is said to belong to the collective but no one really owns it. Often the head of the collective deals with the land and production in the name of the collective, but actually out of his own interest. What is worse, a farmer could not get more if he worked harder. The enthusiasm for production of the farmers was seriously dampened; resources from land could not be effectively allocated. The Chinese agriculture experienced a long recession.

Under the background of Cold War, China learned and copied the whole set of rural collective social structure, especially People's Commune system, from the Soviet Union. It is argued that this copying was premature from the scratch because the agricultural situation and history of these two big countries are quite different (Qin, 2012). The rural communes (Mir) existed very early in Russia, as well as in some other European countries. In 1861 and 1907, Russian rural communes underwent two waves of brutal and unfair privatisation, imposed by upper prerogatives. The Bolshevik Party's land revolution in 1917 was just to return the land to rural communes and restore the traditional order. In China, the land integration tends to be a more gradual and "natural" economic process, not by some short-term struggle. Most the landlords were just common people with more effort and luck. Rural commune does not have a root in Chinese history either, so the farmers were rather suspicious and defensive to it.

2.3.3 Household Contract Responsibility System (HCRS)

2.3.3.1 Beginning of HCRS

After the Cultural Revolution (1966-1976), and the Reform and Opening policy was announced in 1978, the situation in rural China had not changed much. Many ones were hoping for a more efficient production system.

In the winter of 1978, a little village called Xiaogang in Anhui Province made a change, in the face of severe drought and pure poverty. The production team leader and the representatives of the members decided to contract the collective land to each individual household. Each house can cultivate its own contracted land and get its product. At that time, Fengyang people were taking the risk of being charged with “vicious Capitalism”, but the realistic predicament forced them to do so. One year later, in the autumn of 1979, the total grain yield of Xiaogang village was miraculously 66,000 kilograms, compared to 18,000 kilograms in 1978. The power of certain property rights was extremely released, though the farmers in Xiaogang did not hope for the land right. What they desired was just the agricultural product they sowed on their own.

The experience of Xiaogang village was soon learned by people across the country, secretly, and the production rate boomed. The “Contract to households” mode was not acknowledged by the government until the January of 1982, in “Summary of the National Conference on Rural work”, published by the central government.

In January 1983, the Central Committee of Chinese Communist Party promulgated a key file “Several issues about current rural economy policy”, Household Contract Responsibility System (HCRS) was confirmed and promoted by the administration.

In this new system, each farmer household is entitled to “contract” a part of the land from its collective production team. Thus, there came the special term: Contracted Management Right. This right may be roughly understood as a kind of use right, but these two are not identical for 3 reasons:

(1) Contracted management right is an embodiment of the membership power of a rural collective. Other people outside this collective do not have this right;

(2) Contracted management right is a basic means for a farmer household to keep its survival, and related to some other welfare right within its collective;

(3) From a legal perspective, the term contracted management right is written into the Constitution and several other laws related to land management in China. It is also a smart creation to circumvent the dilemma of public ownership principle.

2.3.3.2 The consolidation of HCRS

As the HCRS empowered the agricultural production in China and solved the food shortage for most of the Chinese farmers in several years, the people were still worried about its persistence. Because every household signed a contract with its collective to get the land and a contract usually has a time limit. The central government made a series of decisions in the next two decades, to consolidate the system and placate the farmers, thus keep the good development of agriculture. In 1984, the central committee of the party declared that the contract period of farmland should be no less than 15 years.

In 1993, the central government pointed out that the original land contracts should be extended for another 30 years. An even more significant guidance was made that “it is encouraged that during the contract period, land quota for each household remain unchanged.” In 1997, it was further emphasised by the government that the contract land boundaries should be stable between households, and the collectives cannot adjust and reallocate the land.

These two statements in 1993 and 1997 solved the vital flaw of the original HCRS: unstableness of land quotas. The land quota of a certain household was often decided by its population from the start, but the number of members of a household can change from time to time. One household may lose population by death or emigration; another one may increase population by birth or marriage. Under the untouched collective-ownership, the collective, usually with its head on behalf of all the members, may adjust the land for some household within or after the contract period. This situation was rather pernicious for reasons below:

- (1) The farmers did not have a certain expectation of the contracted land, so they were reluctant to invest on the land and improve its production rate;
- (2) Adjustment of land caused fragmentation of farmland, making it more difficult to manage and cultivate (Liao, 2003);
- (3) Adjustment work itself is costly and leads to conflicts and corruption easily (Q. Gao, 2016);
- (4) It was especially unfair for those families obeying the One Child Policy. They lose land because of fewer members, and those with more babies get more contracted land (W. K. Fu, 1999).

Thus, the “No Adjustment Policy” eliminated the risk of losing contracted land in a long period. The farmers got a secure and stable feeling of having the land of their own (though not namely). The HCRS was strongly consolidated.

In 2002, the Rural Land Contract Law was promulgated (NPCC, 2002). This law summarised many years' practical experience of land contracting, and give the specific and unambiguous direction of long-term stable contracting, which opened a new stage of managing the rural land by its usufruct.

2.3.4 The impact of urbanisation

Since the Reform and Opening in 1978, China's economy grew very fast, with the unstoppable process of rapid urbanisation and industrialisation. For example, Beijing city's established area (construction land) was 1248 square kilometres. In 1999 it was 1535, and in 2010 it became 1986 square kilometres (Liang & Jin, 2005). The expanding of cities demanded a huge amount of land posed big challenge to China's whole land system and conducted land pressure to the rural area (L. Jiang et al., 2013).

2.3.4.1 Shenzhen's experience

Shenzhen city of Guangdong Province is now the fourth largest city of China, an economical, manufacturing, and high-tech centre of the country. Shenzhen was only a little fishing village in 1980 when it was identified as a Special Economic Zone by Deng Xiaoping. Shenzhen was the experimental spot of China's opening-door policy, which developed very fast and set up an example for the whole country.

However, the land problem hampered Shenzhen's booming economy in the first decade of opening. As the city was eagerly inviting foreign companies to invest and build their industries in it, there was a fundamental question: How could the foreign companies set up their business, without getting their own land? As mentioned above, the Constitution stipulates that all the urban land was state-owned and trade of land was strictly banned. At that time, if someone needed urban land for public interest, the government would look into the demand, the appropriate some land to him, freely. Only the constitutional units (e.g., government departments, schools, hospitals, and state-owned enterprises) were endowed with this right. Private enterprises and individuals were shut out, not to mention foreigners.

This obstacle must be removed. It was interesting to see that after learning from the Russian experience for the first 30 years and finally abandoning it, China turned to another Western mentor: England, or specifically, Hong Kong. Shenzhen bordered the then English colony of Hong Kong, an ethnic Chinese but an economically Western free port. Some businessmen from Hong Kong suggested the Chinese government to lease long-term use rights to foreigners, while keeping the ultimate ownership, like the mode of Hong Kong itself.

This suggestion was taken and in 1987, Shenzhen sold the 50-year use rights of 3 pieces of urban land to foreign and private buyers in the auction. The government got 23,368,800 RMB Yuan, which almost equalled to the sum of land-renting income in the previous two years (Zhou, 2013).

This event in Shenzhen was an icebreaker of China's ossified land system, like Xiaogang village. The land ownership and use rights were separated, and state-owned land's long-term use right could be traded from then on. It was surprising that the registration formality came later than the event. In 1988, an amendment was made to the Constitution, stipulating that land could be transferred according to the law. Then in 1990, the central government promulgated "Interim regulations on the appropriating and transfer of the urban state-owned land use rights" (State Council of PRC, 1990), which is a specific law about the urban land transfer.

Hong Kong's land managing mode helped Shenzhen and China to overcome the land ownership dilemma, but it had its own glitches and left a serious trouble. This mode was essentially the English Crown Land mode. Crown Land was owned by the English Royal Family, taking only a small piece of the British Islands. This mode applied similarly to state-owned land in Chinese cities, while the much bigger collective land was ignored. Still, there was no law for transferring collective land until 2003, which caused the widely concerned matter of rural land expropriation.

2.3.4.2 The logic of land expropriation

The 1990 Interim Regulation gave explicit instruction on how the urban land can be transferred. It stipulated that the length of lease-period would be different due to the use type of the land. That was 70 years for housing, 50 years for industry, education or other public infrastructure, and 40 years for commercial and entertaining use. All the companies and individuals in China, no matter native or foreign, could take part in the land lease transactions. The way of leasing out land can be auctions, negotiations, or bidding. From then on, a market of urban land came into being and developed year by year.

This regulation also delegated the authority of handling urban land to the local governments, which was the opening of a new era of Land Expropriation in China. As it was seen, Chinese local governments were so enthusiastic in land market transactions in the late 1990s and 21st century, due to several obvious reasons:

(1) Urban land lease is a fast, convenient, and exorbitant way of getting government revenue, which is a key indicator to asset the local official's work. The land price grew

extremely fast in contemporary China, as the real-estate bubble emerged after 2000;

(2) The divisional taxation system in China since 1994 made local governments care more about land-lease payments than the tax. Collecting tax costs much higher than just leasing out a piece of land, and the central government would take the bigger part of the tax, while land money was totally enjoyed by local governments;

(3) In order to increase GDP, promote economic development, and keep the employment rate, the local governments tend to attract investors from outside by offering favourable terms, such as a tax cut and infrastructure facilities. But the most attractive bargaining chip in governments' hand is the land. By getting the land with a preferential price from the governments, investors could expect to benefit from land appreciation even more than the industry itself.

Therefore, the local governments held the most valuable resource, land, and made use of it to create maximum revenue, like doing some business. Many local governments exceedingly relied on land payments, instead of a local tax. This phenomenon was well-known in China as "Land Public Finance".

But there was an intractable trouble: the amount of disposable urban land was rather limited, especially when the established area of cities was still very small at the beginning of rapid urbanisation. The government could not keep leasing out old urban land for good. The desperate land desire for expanding cities made people turn to suburb rural lands, which was not state-owned but collective-owned.

In 1990, in Beijing, there were large fields of rape right to the south of the Second Ring Road, where stands a lot of skyscrapers now. These fields were collective-owned, agricultural land, which was unfortunately left out of the land market as discussed above. How could the land be taken by the city, without the permission to transfer collective-owned land?

The only answer was Land Expropriation. The Constitution said the state can expropriate land with compensation for the public interest. Thus, the government, on behalf of the state, could expropriate collective-owned rural land, to make it become state-owned. This was the only way to transform the land property from collective-owned (agricultural land) to state-owned (construction land), and only the governments could do this. With this legal means, local governments could expropriate some rural land each year, according to the Comprehensive Land Use Plan (CLUP) from the central government. The land amount per year was still limited, but the most urgent land demand was greatly satisfied.

There were many disputes about the land expropriation system. The most concerned one is the compensation standard. According to Land Management Law, the compensation of one

mu (15 mu = 1 hectare) of farmland is no higher than 30 times of the average agricultural product value of previous 3~6 years. Due to the low grain price in China, this standard was rather low. But after the government got it and lease it out, its price could be 10 to 100 times higher. This made those farmers who lost the land feel quite unfair. They could not sell the land directly to the company which finally got it, but to see the government get the huge margin.

To amplify, the government did not take the land from a specific farmer household. It took it from the collective to whom the land belonged. The compensation was given to the collective and each member shared it. The household losing its contracted land kept its membership. The collective separated pieces of farmland from other households to the losing one, which worsened the problem of land segmentation. And the trouble in re-allocating farmland within the collective was really a headache.

Another dispute is that according to the Chinese Constitution, land could be expropriated only for public interest. But this statement did not define clearly the meaning of “public interest”. Scholars argued that leasing land to commercial companies was not intuitively for the public interest, but more like a business (Xie & Lu, 2001). The power of expropriation was too excessive, causing corruption and social unrest (A. L. Jiang, 2003).

A third dispute is quite alarming that years of cultivated land encroaching would endanger China’s food security, which will be discussed in the next section.

2.3.5 Cultivated land protection

2.3.5.1 The basic Farmland Protection Regulation

China is a big country with 9,600,000 km², but the cultivated land takes roughly only one tenth of it. The Chinese government believes that the 1.4 billion people of China should feed themselves with their own land. The international grain market is fluctuant. Relying on food trade is too risky for such a big country. However, the urbanisation and industrialisation progress made Chinese economy to develop in an amazingly high speed. A lot of previously cultivated land, especially suburb land, was expropriated and became construction land, losing its agricultural product. This stirred concern about China’s food security.

In 1998, “Basic Farmland Protection Regulation” was published (State Council of PRC [SCPRC], 1998). This regulation states that all the cultivated land should be strictly protected, to make sure the cultivated land would not lose quantity and quality. It is worth mentioning that the regulation stipulated that if some cultivated land was taken for other uses legally,

newly cultivated land of no less amount and quality must be developed, which is called “Occupying-Replenishing Balance”.

2.3.5.2 The red line of 1.8 billion mu

According to the survey of land change (started in 2005 conducted by the Ministry of Land and Resources), the total amount of cultivated land in China was 1,827,000,000 mu in October of 2006. Just ten years before, in 1996, the amount was 1,951,000,000 mu. More than 100,000,000 mu had been lost in 10 years, and the land per capita decreased from 1.59 mu to 1.39 mu.

In September of 2006, the central government vetoed the Comprehensive Land Use Plan for 2006-2010, because the file did not put enough effort to farmland protecting, which expressed a determination of Chinese leaders to hold the line of food security. The central government demanded that the number of 1.8 billion mu was a red line that should be defended by any means. This attitude was a brake to many local governments’ overheated advancement of city expanding, and it became even harder to take any farmland for construction use. Land use control was not loosened, but really strengthened a lot.

In Section 2.2, the development of China’s land managing system was briefly reviewed. It is found that the Urban-Rural Dual Structure, Land Use Control, as well as urbanisation (with the effort of local governments), shaped the current controversial land system in China. The cities grew so fast and claimed more and more space, while the rural area remained still (except those expropriated suburb land). A fair, reasonable, and efficient rural land transfer system and market are called for since 1978. This market had been weaving its way for decades through many difficulties. Next section will provide an overview of Chinese rural land transfer system.

2.4 The farmland Transfer System

2.4.1 The laws and policies about rural land transfer

Since HCRS was formally acknowledged in 1983, the Chinese government had been exploring a reasonable and orderly way to confirm and release farmland transfer rights. In 1993, other than the 30 years’ extension of land contracts, it was mandated that rural land within the contract period could be voluntarily transferred with compensation. In 1998, it was reiterated that the farmland transfer must be voluntary and compensated. No one can force the farmers to transfer land. Then, in 2001, the central government required that farmland transfer

should be between members of the same collective in most cases. To stabilise the rural social structure, large-scale and long-term rent by companies were discouraged.

The Rural Land Contract Law in 2003 first legally confirmed the transfer rights of rural land for agricultural use. In 2008, the central committee of the party published “Resolution on promoting the rural area’s reform and development” (Central Committee of Communist Party of China [CCCCPC], 2008a), which was a milestone of the rural land transfer market in China. It required that a market for rural land contract rights transfer must be set up and improved. The farmers were allowed to transfer contracted land rights in multiple patterns like renting and subcontracting. Meanwhile, the collective-ownership and agricultural use must remain unchanged. The scale of urban and rural construction land was put under stranded control, to protect cultivated land from being encroached. Thus, farmland transfer’s upper and bottom bound were set clear.

2.4.2 The patterns of rural land transfer

According to the resolution in 2008, there were multiple ways to transfer the farmland, the main five ways are:

(1) Subcontracting. The contracting farmer can subcontract the land to some other member within the same collective, for a certain time interval within the whole contracting period. This usually happens when a farmer goes to cities to work and then leave the land to family relatives, which is rather common in current China.

(2) Transfer of contracted management right. A contracted farmer can ultimately give up his contracted management right and transfer to someone within or outside the collective. This often happens when an original farmer seriously decided to move to the city. His membership of the collective will also be abolished. This kind of transfer and the land taker must be under the permission of the collective.

(3) Renting. The contracted land of a farmer can be rented to other ones for agricultural production, without touching the original contracted management right. The farmer gets paid.

(4) Swapping the contracted management rights. This happens when two members of the collective wanted to adjust and integrate the land they plant, for convenience reasons.

(5) Pooling of land. A farmer’s contracted management right can be quantified as some share, then lands of many farmers can be put together to work with. The original pooling was only among collective members, but some companies also took part in it. This will be good for the integration and mechanisation of modern agriculture. There are some other local and

more complicated patterns of farmland transfer. As it is seen, the meaning and means of farmland transfer are diversified.

2.4.3 Farmland transfer in practice

As a matter of fact, non-governmental farmland transfer started much earlier than the pace of policy and legislation. It was a simultaneous tradition in Ancient China, especially in those coastal and mountainous areas, where land was not fertile enough and people tended to go out to earn a living. After HCRS was implemented, helped by the government's encouragement, the farmland transfer rate had been increasing. At the end of 2007, according to statistical data from Ministry of Agriculture, the total amount of transferred farmland was 63,723 mu, taking 5.2% of the gross contracted farmland. One year later, in 2008, the ratio became 8.7%, and the number was over 1 million mu (X. H. Wang, 2010; L. F. Jin & Ran, 2011).

But due to the complicated managing system and history related issues, there exist several serious problems that are hampering the market:

(1) The rural collective-ownership was vague and flawed. Although the Three-Level-Commune had been reformed into township-village-group governmental structure, with the direct authority of production team (group), the two upper-level authorities may intervene the land issues driven by huge profit expectation. And in a certain collective, the ownership was committed to the head; benefit appeal of the members was often twisted.

(2) The farmers lack the necessary legal and literature skills to make contracts and keep its terms. The people-to-people land transfer often took place with no written contract, just by oral promise, which easily leads to disputes.

(3) A modern market with enough information support has not been built. The farmers short of commercial sensitivity and market experience can suffer a lot from information asymmetry.

(4) The rural social security system is not well organised. Many farmers take land not as a production material, but simply the lifeblood. They feel that it is hard to survive if the land is gone. Many ones going to the cities kept the contracted land in the hometown, in case one day they cannot find a way of living in cities. If the bottom survival line is not guaranteed, farmers would be rather sceptical about transferring their own land.

2.4.4 The necessity of farmland transfer marketisation

Although there are many problems, the rural land transfer market must be well built. The

marketisation is the inevitable outcome of China's urbanisation and rural-urban immigration. It may greatly complement the social market economy principle set up by the reform and opening policy. It is a necessary means to allocate the land resources in the rural area, to cope with the fast development of cities. And it helps eliminate the stubborn defects in traditional HCRS.

Still, the transfer market must tackle its own problems. The most fundamental one is the ambiguity of the collective-ownership, thus of the contracted management rights. To solve this, the government launched a national project of rural land rights confirmation.

2.4.5 Rural land rights confirmation

In 2010, China's administration started a nation-wide task of Rural Land-use Rights Confirmation. The confirmation of land-use rights, including rights of farmland, homestead, and collective construction land, has provided a foundation for rural land's transfer.

Since the Property Law was promulgated in 2007 (NPCC, 2007), China has entered a new era of implementing of a modern property rights system. The Central No. 1 Document of 2008 required to "strengthen the standardised management of rural land contracts and speed up the establishment of the registration system of land contract management right" (CCCPC, 2008b). In 2010, it was further required that "the contracted plot, area, contract and certificates should be fully implemented for each farmer household" (CCCPC, 2010).

Based on the preliminary pilot work (including Chengdu's reform experience to be discussed in Section 2.7), at the end of 2011, four ministries of the central government jointly issued "Several opinions on the rights confirmation and certification of rural collective land" (Ministry of Land Resources of China, 2011), which marked the launching of nation-wide rural land rights confirmation project. The Central No. 1 Document in 2013 had set a clear target to fully complete this great project in 5 years (CCCPC, 2013b).

In addition, in 2013, the Communist Party also made it clear to "safeguard farmers' land contractual management rights according to the law". The farmers have the legal rights of possession, use, income, and transfer of contracted land (CCCPC, 2013b). This statement affirmed and supported farmland transfer activities from the perspective of the law.

Rights confirmation is the foundation and land transfer is the core target (Zhou, 2013). Therefore, after the Chinese farmers got their land certificates by the rights confirmation project, the future of a prosperous farmland transfer market looked quite promising.

Then, in 2014, the government launched another great work called the Unified Real Estate Registration. A unified registration establishment will be set up, managing all the real estate assets including not only rural land but also urban land, houses, woodland, grass, lakes, and the sea. Meanwhile, a huge land registration information system will be built, boosting the development of the land market. All the data will be merged into a unified database within the system. Chinese Property Law of 2007 states that the nation should register all the real estate under a unified principle and rule. In August 2014, the “Interim Regulations of Unified Real Estate Registration” was published by the central government (SCPRC, 2014). Under this guidance, the unified registration project was to be done in the whole country in 5 years, which demonstrated the determination of Chinese central government to deepen the reform of land administration system and the confidence in fully opening up rural property rights market, bringing new opportunities to farmland transfer market in a larger framework. Analysis pointed out that rural assets and urban real estate assets would be treated equally in the near future, and financial support for rural assets would be greatly strengthened (A. G. Wang, 2016). This could make the market more active and affect the price of farmland.

2.5 The views of Deng Xiaoping and Xi Jinping

As the top leader of China in different periods, Mr. Deng Xiaoping and Mr. Xi Jinping had published many important views and discussions about agriculture. Their views reflect the central government’s deep concern for agriculture, rural areas and farmers. Interpreting their views helps understand the government’s basic judgement of the historic process, and the starting point of the reform and policies. This section makes a brief review of the thought of these two leaders.

2.5.1 Deng Xiaoping’s basic view on agriculture

Mr. Deng Xiaoping is called the general designer of China’s Reform and Opening Gate policy, and the main promoter of Four Modernisations Construction including Agricultural modernisation, Deng made great impact on modern China and the whole world, and changed the fate of almost every Chinese citizen. Early in 1978, as the main leader Deng supported the HCRS embryo that emerged in Anhui Province (mentioned in Section 2.3.3) and other places, thus became the ice-breaker in rural China’s reform. Deng made many important discussions about agriculture and rural China throughout his political career. These discussions were usually vivid and practical, as well as his other comments.

Deng pointed out that agriculture is the foundation of the development of national economy. Industry would be hopeless and other livelihood supply like food, clothes and everyday commodity would be in trouble if agriculture is in defect (Deng 1994). Whether China can develop depends first on whether the countryside can develop. These words gave a general hint of rethinking over China's economic strategy since 1949. In the early 30 years, China underwent a forceful industrialisation process, which resonates the industrialisation movement in Soviet Union in the 1920s. The farmers made great sacrifices to subsidise industry and urban citizens, which was described as Price Scissors. The culmination of forceful industrialisation was the "Great Leap Forward" movement in 1959-1961, which caused great damage to the country and people. Deng realised that the farmers' freewill must be respected. Their right of development and prosper should be paid full attention, as well as workers and urban citizens. And the key to productivity development in the country, is to raise the production enthusiasm of the farmers.

2.5.2 Two leaps

In 1990, Mr Deng made the famous statement of "two leaps", which is an overall and penetrating summary of his thinking on agriculture and rural land (Deng, 1994b).

The first "leap", was the abolition of People's Commune and the establishment of Household Contract Responsibility System. The farmers in China got anatomy of using their own land, making rural economy advance towards a more commercialised, specialised, and socialised way. Actually, the prominent successful reform in rural areas boosted Chinese government's confidence in the big picture of reforming the whole country, including industrial sector and urban areas. The rural reform since 1978 has been a version of "separation of two rights". A pure public ownership of land before was amended with a contract right to each farmer household. With this separation, the mechanism of agricultural production and managing was changed into a more efficient and flexible way. The farmers became self-responsible for profits and losses, which was a market economy feature rather than the highly centralised planned economy. This separation had great impact on the lives of nearly one billion Chinese rural populations and made astonishing economic and social improvements.

However, Deng saw things from the perspective of development, as always. He regarded the HCRS as a means to liberate the rural productivity, under certain historical situations. HCRS is a huge advancement in the early years of China's reform, but its disadvantages

became more and more obvious in some regions. With a big farming population and relatively few farmlands, each household gets only a small piece of land to cultivate. Thus, China has a tradition of intensive and meticulous planting. While rural economy restored and developed, the labour price rose, but the potential room for performance increase by the traditional farming way was quite limited. Decentralisation and fragmentation of land use rights caused many troubles to modernised agriculture.

Therefore, individual household farming under HCRS, like the family workshops, should not be eternal. Deng's second "leap" was socialised planting with modern science and technology, and appropriately scaled management of land. Agricultural modernisation cannot be achieved by bare hands work and decentralised small land units. The inevitable way towards modern highly efficient agriculture is intensification and mechanisation. As it is seen, Deng broke premature People's Commune as an unsuccessful experiment of collective production, but he still foresaw that the collectively intensification of agriculture was an irresistible trend.

Deng's Two Leaps view stemmed from his deep understanding and foresight of China's rural problems. The pragmatism within it complies with his famous judgement of "Science and technology as the primary productivity" and "Seeking truth from the facts". The market mechanism, optimisation of allocating rural productivity factors, and regulation improvement for rural land, were pursued by all the government leaders since Deng Xiaoping.

2.5.3 Xi Jinping's view

Mr Xi Jinping became chief secretary of Chinese Communist Party, and President of China in 2012. Xi's thinking on national governance is systematically organised in "New Era Thought of Socialism with Chinese Characters". Xi attached great importance on rural work, and made many theoretical developments.

In 2014, President Xi published keynote speech about farmland management. He required the government to encourage proper and orderly rural land transfer. Appropriately scaled and intensified agricultural production should be promoted with great effort. He made affirmative statements about rural land rights transfer. On the premise of strictly adherence to public ownership principle, farmland rights should be further separated into contract right and managing right. This marked the official recognition of a new land rights arrangement: Separation of Three Rights. The collectives have ultimate ownership. Farmers keep their contract land right, but can be free to rent them out, in the form of managing right transfer.

The political and legal basis of farmland transfer was strongly consolidated (CCCPC, 2014).

Xi further stated that farmers' willingness should be strictly respected, and transfer actions must be voluntary, legal, and paid. The government cannot force or suppress farmers into transactions, or make blind commands without field research and argumentation. To ensure security of food, the government need to further mobilise the enthusiasm of farmers, promote properly intensification, and increase the ratio of scaled crop production (CCCPC, 2014). Meanwhile, Xi emphasised on protecting cultivated land quota, by eliminating the illegal transition of farmland use type change (especially change to non-agricultural use). There were three bottom lines never to be compromised in rural reform: public ownership must remain, 1.8 billion mu red line must be kept, and the interest of farmers must not be damaged (W. Zhang, 2014). The background context was discussed in previous sections.

Xi's view has features relating to the national economic status in the new era. He states that agriculture should be fed-back by industry, and cities should promote the development of rural areas. The mutual-beneficial coping of agriculture and industry will provide the foundation of Urban-Rural Integration. Meanwhile, diversified patterns of industrial management of agriculture, like cooperative management and big-farmer management, are encouraged in rural area (Xi, 2015).

Following President Xi's multiple instructions, the ministry of agriculture promoted a new round of rural land right confirmation project in 2015.

2.6 Scholars' discussions about land policy

Zhou (2009) analysed and praised Chengdu's Urban-Rural Integrated Development Experiments, including "occupying-replenishing balance" and "increase and decrease hook", which were discussed in the previous chapter. Then, Zhou's view of land policy and way of development was summarised (Zhou, 2013). He believed the current land managing system (e.g., ownership, use control, land expropriation) should be broken, and the farmers should get complete dealing right over their own land. The rural land should be transferred freely. The farmers should decide what they can do about their land, and thus acquire the fair share of economic development through land trading. His view was accepted by many scholars and government officials.

However, there are some conservative arguments about land policy. X. B. He (2013) argued that public ownership, land use control are the good features of China's system. They made Chinese development fast and unhindered. If these main features are gone, huge risks

might emerge: 1) Land privatisation causes annexation and social riot; 2) Land fragmentation may hinder the construction of public infrastructure and city expanding; 3) Farmers may lose their land, go into cities and form asylums.

Both sides are for the good of Chinese development, and have their own theoretical and practical background. This thesis is inclined to believe that Zhou's free-market view could prove effective and feasible. Meanwhile, the worries from conservatives should not be ignored. Land annexation is a natural process to approach modern intensified agriculture. Most of the farmers are inevitably going to cities to live, whether in the asylums or not. And the problem of land fragmentation could be solved by free land trading.

2.7 Chengdu's rural land system reform

2.7.1 The Urban-rural integration exploration

Chengdu city lies in southwest China, as the capital of Sichuan province. In ancient times, Chengdu was famous for its great irrigation projects, and the rich plains that made the city rather plentiful in the agricultural eras. In the 21st century, Chengdu played a most important role in China, to be the leading city to explore the way of Urban-Rural Integration.

The term of Urban-Rural Integration was first proposed in 2003, in the communist party's central meeting (CCCPC, 2003). The essence of urban-rural integration is to coordinate various resource elements between urban and rural areas, thereby eliminating the gap between them, and spread urban public services and transportation facilities to rural areas. This is an important way to improve the mode of development and the inevitable way to solve the "three agricultural problems".

In 2007, Chengdu was formally set by the central government to be the national experimental zone for comprehensive reform of Urban-Rural Integration. Chengdu faced the historic subject of China, to break the urban-rural dual structure, and coordinate the development of both.

The main direction of Chengdu's Urban-Rural Integration can be summarised as "three concentrations", which referred to (1) concentration of industries to specialised industrial zones, (2) concentration of farmers to cities and towns, and (3) concentration of lands to scale managing entities (Yan & Wang, 2011). With these concentration plans, the fast process of industrialisation, urbanisation and modernisation of agriculture could promote each other, and urban and rural residents could enjoy the outcome of economic growth more equally.

Land allocation and utilisation was the key problem in the integration, while the desire for marketisation was the main driving force. Chengdu government was determined to solve the bottle-neck of land that constrained economic development. They set up an official establishment to revitalise rural assets, especially land, and launched a rural land system reform in the whole prefecture.

2.7.2 The Chengdu Agriculture Equity Exchange

In October 2008, in order to cope with the pace of Urban-Rural Integration, promote the efficient flow of rural assets, and develop a reliable transfer market, Chengdu government established the first rural property exchange in China. Its main business was publishing information about rural property rights transfer, and organising the transfer deal process. While doing transaction services under the guidance of Chengdu government, the Exchange also tried to find creative and market-oriented ways to help rural development. Through years of efforts, the Exchange had developed into a professional rural property rights transaction platform. Its total transaction volume ranked first in the same kind of transaction institutions in China.

The change of ownership structure of the Exchange is worth mentioning because it reveals the evolving idea of its nature. At the time of its establishment, the Exchange was a small government-affiliated institution. In 2010, it was registered as a separate legal entity, to become a limited liability company with modern enterprise systems. Four departments of the Chengdu government, namely department of land resources, real estate, forestry, and agriculture, were its shareholders. These departments were also administrations of the trade objects through the Exchange (like rural land and houses). Then, in 2014, it made another change of equity. Two big investment SOEs became its new shareholders, as the former four departments quit. This was a big step to further improve the managing structure of the Exchange, towards a modern enterprise system.

The equity changes released strong signals towards marketisation and modern management, which was in line with the whole context of rural property system reform. With the deepening of the reform, Chengdu Agriculture Equity Exchange would bring more market function into play and gradually weaken its identity as an administration.

2.7.3 The great changes of four villages

As the case of Xiaogang village expressed (see Section 2.3.3), great changes usually started

from small places. This section takes four most representative villages as the milestones, to make a brief review of Chengdu's rural land system reform.

2.7.3.1 Heming village's exploration on land rights confirmation

At the beginning of 2008, a small village called Heming, in Dujiangyan County of Chengdu prefecture, was selected by Chengdu government to be the pilot area of rural property system reform. This village was thereby known as the "first village of rural property reform" in China. It was selected for three reasons: (1) Dujiangyan County was the earliest pilot area for HCRS in Sichuan Province, which experienced the benefit of reform, where the people had a relatively positive view of being the pioneer of new social experiment. In the process of urban-rural integration, Dujiangyan County had done well in infrastructure construction and social development, thus made itself prepared for a further administrative exploration; (2) Heming is a pure agricultural village with a weak economic foundation, which had no industry projects or scaled farming. Therefore, it is suitable for exploring new policies and gathering common experience; (3) the local government had a pragmatic work style, and kept a good relationship with the simple and honest rural masses, which made it feasible to carry out a system reform and overcome the difficulties.

The first key object of Heming village's reform was land rights confirmation. A surveying and mapping company was hired to measure the land of each household, and the local government organised hundreds of meetings and negotiations, to settle the disputes over land boundaries. The villagers actively participated in this movement too. In the end of April, 2008, the pilot task was successfully accomplished. All the 650 households in the village, were issued land rights certificates (Zhong & Liu, 2008). These certificates formally recorded the land location, area and "four boundaries" of the farmer houses, with a typed map.

Then, with the basis of confirmed land rights, Heming village made consequential explorations including farmland transfer, farmland mortgage loan, and making transfer deals on governmental platforms. The rural economic vitality was greatly released. After 5 years of reform, the annual income per capita of the village, had increased from under 2,000 Yuan to nearly 10,000 Yuan. New types of modern agriculture, such as nursery planting and ecological breeding, are prospering in Heming. Many people from throughout China were attracted here to learn the experience of this small village.

2.7.3.2 The "Long-term no adjustment" policy in Wayao village

The Heming experience opened the door to farmland transfer and scale managing, but there

still existed institutional barriers. The most prominent hampering problem was the habit of land adjustment within rural collectives. Since the HCRS was in place in the late 1970s, the slogan “no matter more or less people, lands don’t change” had been mentioned all the time. However, in reality, farmland adjustments kept going on in the village collectives. Traditionally, what the farmers pursued was absolute land equivalence for each person, not each household (J. Z. Chen, 2010). Therefore, the land was re-divided every time when the population of a household changed. Births, deaths, and immigrations caused such minor land adjustments.

In old times, because of the conservative view of the farmers, and the rather low income in farmland cultivating, these minor adjustments might not lead to fierce conflicts of interests. But, as the reform went on, the negative effects of frequent land adjustments became obvious, which became a major threat to farmland transfer deals. A previous research indicates that the farmland transfer price was inversely proportional to both the scale and frequency of collective land adjustments (Deng, 2009). That was where another small village, Wayao, came into the historic stage of rural land system reform.

Wayao village is in Shuangliu County of Chengdu prefecture. It was the first pilot village in Chengdu and China, to implement a strict “long-term no adjustment” policy. The biggest challenge in this reform was the local people’s traditional views. Some people saw it unfair for households who got new members, and had concerns about the basic food security. Some local cadre took the adjustments as a source of power, while others thought this could bring problems to land expropriation tasks. The local government organised many meetings and discussions, like in Heming village, to promote the necessity and benefit of the new policy. Several effective discreet actions were made to alleviate the people’s sentiment, including demutualisation of collective assets. Finally, in June, 2009, the reform task was successfully done. More than 700 farmer households in Wayao got their land certificates stating clearly their long-term fixed land boundaries and rights. The village leader described the later scene as “The economy grew, as the villagers can work contentedly and the enterprises can make long-term invest with confidence” (G. Li, 2013).

2.7.3.3 Quanshui village’s deal by electronic bidding

Quanshui village in Pid County, marked the first farmland transfer deal that was made by electronic bidding. In December, 2008, in the bidding hall of Chengdu Agriculture Equity Exchange, a farmland of 570 mu in Quanshui, was transferred to a Chengdu-based agricultural enterprise. The reserve price was set by the involving villagers to be 400 kgs of

rice (/mu/year), and the hammer price was 500 kgs, which could be converted to RMB 1400 Yuan. There was a 25% premium, but both sides of the transaction were content to close the deal. The villagers were more than happy to get the price far beyond their expectations (T. Wen, 2008).

This deal also reflected the effort of the Exchange to cultivate a big and prosperous farmland transfer market. Besides its basic functions as a platform, the Exchange also used commercial means to help the market participants to find deal partners and strike deals through negotiations or biddings. In later years, this kind of intermediated transactions became more and more popular. As in 2016-2018, intermediated deals done by the Exchange took about 15% of the total number of deals. Within them about four fifth were by non-public negotiations, where the Exchange helped in deal match-making like a real estate agency, while the one fifth left were by public bidding. The details and effects are to be discussed in Section 4.7.

2.7.3.4 Taoba's case on contract breaching

The land rights had been confirmed and certified, and many farmland transfer deals had been made. New managing entities started cultivation work in the fields. But the problems in farmland transfer market were not dealt with once and for all. With the increase of transactions, the phenomenon of breaching contracts became more and more common. The residents in Taoba village, Qionglai County, had experienced such trouble.

The typical case happened in Taoba village in Qionglai like this. When many young people went out to the cities, to work and live there, the villagers left were mostly elders and children (Cao & Li, 2017). Each household retains its small piece of farmland contracted from the collective, but could not well cultivate it due to lack of strong labour and poor return. This caused two problems:

(1) The farmlands were cropland with good farming conditions (though relatively segmented due to the total number of farmer households). They are within the “1.8 billion mu red line” and obliged to produce food each year. But then the farmland abandonment problem is quite threatening;

(2) The villagers, especially elders, might lose their basic agricultural annual income, which may cause livelihood issues.

To solve these two problems, the village cadre introduced an enterprise from the city, to contract the farmland and fulfil the cultivating task. The company signed contracts with the renting-out farmers in 2013, with a price of 800 Yuan/mu/year. In the next year, this company

met problems in cultivating and business. Its capital chain was broken, thereby forcing it to abandon the cultivation work, and breached the contract with farmers, who did not get the annual rent.

After that, the village cadre invited a local big grain grower, to take over the involved farmland. The villagers suffered losses and were quite suspicious of the new deal. They turned down the deal unless the new contractor pays 30% of the annual rent beforehand as guarantee. In this way, the grower had to pay nearly 1 million Yuan even before getting started (Xian, 2017). When the financial pressure was too harsh making the deal stalled, Qionglai government intervened by bringing in insurance companies, to provide performance bond insurance for farmland transfer deals. The premium is 3% of the annual land rent, of which 80% is paid by the transferee and 20 by the transferors. In case of default, the insurance company would pay the damaged party (usually the farmers) in full. In order to encourage the participation in the performance bond insurance, the government would pay half of the premium for the insured, as a subsidy or reward (Gu, 2017).

With this insurance policy, the grower who took over the land, would instead pay only about 30,000 Yuan insurance premia to get things started, which is one thirtieth of the previous guarantee. The great financial obstacle was removed. Meanwhile, the villagers welcomed this policy too, which greatly alleviated their worry about future income. Then, the new contract was carried out smoothly.

2.7.3.5 The roots and impacts of the breach of contracts

The Taoba village case reflected the problems and solutions in performance period of farmland transfer contracts. The breach of contracts, in certain period of the reform process, especially the early explorative years, could be a usual phenomenon. Objectively speaking, these defaults had some common roots as follows:

(1) Since 2013, the central government formally encourage urban industrial and commercial capital to invest in rural areas. This was good for modern scale agriculture, and caused a investment boom in rural China. But some enterprises rushed into the countryside, and made blind and speculative invests. They were strong in acquiring land, but weak in cultivating, without fully understanding the complexity and long-term risk in agriculture production. When met with practical difficulties, these fast investments could not continue to operate, then failed and quit as soon as possible (J. W. He et al., 2013);

(2) The fluctuation of crop price is a direct cause of breach of transfer contracts. The urban capital might have entered farmland transfer market when crop price was high and the

earning expectations were promising. As the price fell, the profit-seeking nature made this capital to give up and abandon the land to avoid further losses;

(3) The absence of post-supervision and service made the breach problem more serious. Many village collectives were active in introducing capital from outside, and signing transfer contracts as an administrative achievement. But after that, there were not efficient monitoring and service in the long course of contract implementation (H. Q. Huang, 2015);

(4) The farmland transfer contracts were not standardised, with many legal flaws, which made it even harder to hold the defaulting party responsible for breaching the contract.

The breach of contracts had its roots and it seemed inevitable that some of such cases might happen. But breaching itself caused damages and dangers that are not to be overlooked:

(1) It seriously damages the social credit system and the emerging farmland transfer market. This led to a higher hidden transaction cost for both sides of transfer deals. The transferors worried the future income risk and usually asked a huge performance bond as in the Taoba case. Otherwise, they would rather keep the land to themselves. The transferee had to raise and pay a big amount of money before production. The financial pressure was too heavy for many growers and companies. Therefore, a lot of potential deals that could lead to better resource allocation were stalled.

(2) Breach of contracts also threatened China's national food security. The central government persistently attached great importance on agriculture, and kept imposing the 1.8 billion mu red line, just in order that "the Chinese people can hold the rice bowls in their own hands". Encouraging urban capital to invest in agriculture also meant to raise food production. But if the breaching cases were uncontrollable, the strategy could backfire.

(3) Breach of contracts directly harmed the interest of the farmers, who were usually the weak party in land deals. Meanwhile, the urban capital's enthusiasm on long-term agriculture invest were harmed too. Thus, the capital lost money, while the farmers lost standard of livelihood. The lose-lose deal might cause other economic and social consequences in rural areas.

2.7.3.6 The introduction of performance bond insurance

Since the breaching problem has its obvious negative effects, it must be dealt with by the government and the market. In general, there are three ways to tackle this problem, from different perspectives. The first way is to strengthen the function of contract law. The modern market economy is based on the spirit of contract. The power and authority of contract law must be fully respected. Once the contract is signed, both sides are obliged to fulfil the clauses,

as long as the date is not expired. By legal means, the interest of each party could be ultimately protected. The second way is to impose effective post-supervision as discussed. The local government need to identify and exclude that impulsive and speculative capital before the signing of contracts, and make more effort to ensure the performance after that.

The third way is to cater to modern financial tools, to set up an insurance mechanism for the transfer deals, which the Qionglai government started to implement in 2015.

Farmland transfer is basically a market activity. Thus, it is natural to make use of economic and financial means to decrease the defaulting risk and ensure contract performance. Performance bond is one of the main functions of modern insurance business, which reflects the characteristics and competitiveness of insurance industry. This function is to make compensation for economic losses caused by breach of contract in commercial activities.

The performance bond can make full use of modern insurance system's risk dispersion mechanism, and is able to generate huge risk protection effects with relatively very small investment, like leverage. It not only protects the legal rights and interest of the farmers, but also reduces the financial pressures of transferees. As the Taoba case disclosed, the performance bond greatly mobilised the enthusiasm of both sides in farmland transfer contracts.

Qionglai was the first county that explores such a way, to introduce insurance companies to take part in the protection of contract performance. The five involving elements: farmers, lands, local governments, managing entities, and insurers are organised together to set up an effective risk prevention mechanism. In April, 2007, an insurance company made full compensation of 350,000 Yuan to the farmers who suffered a contract breach, in Taoba village of Qionglai. This was the first claim case of such type in China (Y. Chen & Li, 2017).

Actually, Qionglai served as the pilot county to implement performance bond insurance. Later in May, 2017, Chengdu government issued a formal regulation, to promote farmland transfer performance bond insurance in the whole prefecture, including 16 counties. The encouraging policy was like that in Qionglai, where the government pays half of the insurance premium, for scale farmland transfer deals of over 50 mu area. The target of the policy was to cover 90% of such deals in three years (Chengdu Government, 2017). This had brought new impetus to the rapid and healthy development of farmland market.

2.7.4 A longitudinal overview

The four villages discussed above, were the epitome of the whole process of Chengdu's rural

land system reform. These breakthrough experiences had very important meanings and profound impacts.

The Heming village experience revealed that clear property right is the premise for the realisation of all property rights, and the basis for the market mechanism to play its role. It was also seen that the essence of the reform was the reconstruction of rural microeconomic foundation. The main driving forces of the reform were farmers themselves. Their choice, enthusiasm and creation were to be respected and guided.

Wayao village made further and head-on explorations on how to realise and protect the stable land property rights after rights were certificated. The great meaning of the strict “No Adjustment Policy” was no less than that of Heming. The relation of these two was like the first amendment to the constitution of land.

Table 2.1 Milestones in Chengdu rural property system reform

Time	Location	Event and meaning
2007	Chengdu	Began urban-rural integration exploration. Proposed the reform of rural property system.
April, 2008	Heming Village in Dujiangyan County	The first village to complete land rights confirmation.
October, 2008	Chengdu	Chengdu Agriculture Equity Exchange was established. It was the first specialised Exchange in China.
December, 2008	Quanshui Village in Pidu County	The first farmland transfer deal made by electronic bidding in the Exchange.
June, 2009	Wayao Village in Shuangliu County	The first village to fully implement the “Long-term No Adjustment” policy
December, 2010	Chengdu	The rural land rights confirmation project in the whole prefecture was basically finished (G. Chen, 2011).
2015	Qionglai County	As the pilot area, started to implement performance bond insurance for farmland transfer contracts
April, 2017	Taoba Village in Qionglai County	The first claim case of performance bond insurance. An insurance company made full compensation for farmers who got a breach of farmland transfer contract.
May, 2017	Chengdu	Chengdu started to promote performance bond insurance for farmland transfer contracts in the whole prefecture. The government paid half of the premium as an encouraging policy.

Quanshui village contributed the first farmland transfer case by electronic bidding, on the

platform of Chengdu Agriculture Equity Exchange. With this kind of transaction, a higher level of information symmetry was achieved in a larger scope, so that the farmers could get better return. They could have full participation and autonomy in the dealing process, while the awareness of market economy and rules was also enhanced. What is more, both parties' rights and interests were better protected with clear rules and openness.

The case in Taoba village expressed that the performance bond insurance was good for further revitalising rural assets, standardising farmland rights and transfer process, thereby effectively preventing the risks in land deals and protecting the legitimate rights and interests of the contract participants. By this means, farmland transfer deals could enjoy a healthier business environment, and the modernisation of agriculture could be greatly promoted too.

Table 2.1 is a brief list of the milestones in Chengdu's rural land system reform discussed in this section.

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Chapter 3: Literature Review

3.1 Introduction

The farmland transfer price in China comes from China's unique land administration system and the process of rural land reform. Therefore, this chapter first reviews the research on China's land system, and then reviews the driving factors and social impacts of China's farmland transfer market. On this basis, the next section analyses the mechanism of farmland price dynamics, and reviews the research on the factors affecting the price, including those basic aspects of determinants, as well as the impacts of market and policy on prices. Next, some important theories related to farmland price dynamics would be reviewed, including property theory, contract theory, two-sided market theory, land rent theory, concentric zone theory, and so forth. Finally, as a reference, a brief introduction to the farmland system and price in some developed countries is provided, in order to make comparison with the situation in China and give inspirational thoughts.

3.1.1 Research about China's land system and reform

China's unique land management system and the ongoing land reform are important backgrounds for analysing the land price dynamics. Many scholars reviewed and discussed this reform in different perspectives. Yao (2000) discussed the relationship between farmland system and economic performance, and emphasised the role of a trade-off between efficiency, equity and social stability in improving the farmland system. Y. L. Wang (2013) discussed China's land system from an urban economic view. It was clearly stated that China's inevitable choice was to promote a new round of urbanisation, in which "people, land, and money" were the three main issues. R. S. Chen et al. (2014) focused on the relationship between people and land, and specifically discussed the impact of rural out-migration on farmland. It was revealed that the rapid rural out-migration had transformed China into an urban and industrial society. China had taken multiple policies to address the involving problems, such as restricting urban sprawl by clear land zoning, subsidising agriculture production, and improving rural infrastructure and farmer's living conditions. These experiences could benefit other developing countries in the world. Xiao and Liang (2016) discussed the connotation of "three separated rights" of China's farmland, and pointed out the basic direction of reform is to "implement collective ownership, stabilise farmers' contracting

rights, and release land management rights”. Among them, the former two were prerequisite and foundation, while the third was the core.

In the past 40 years, there were great social, economic, and administrative changes that modernised China’s rural areas. As B. L. Luo (2018) summarised, the first reform was turning from the ownership-focused system to the rights-focused system; the second was turning from the “welfare assurance” land endowments system to “property right” system; the third was involving the household management into the economy of work division.

3.1.2 China’s farmland transfer

Farmland transfer transactions are the source of farmland prices. There are several studies on the circulation of agricultural land itself. There are many researches on farmland transfer market and activities, which can be mainly divided into three categories: administrative issues, driving forces of farmland transfer, and social and economic influence of farmland transfer.

3.1.2.1 The administrative issues

The first category is the research on political, legal, or social issues of farmland transfer. Y. S. Jin (1997) discussed the conflicts between farmland protection and land transfer, and suggested introducing a market competition mechanism, improving the land price appraisal system, and promoting the integral development of urban and rural areas.

You and Wu (2010) studied the relationship between farmland transfer and labour transfer, as well as farmers’ land endowment dependence. It was emphasised that the economic development disparities between different regions should be fully considered when formulating transfer policies. S. M. Zhang (2014) conducted research from the perspective of supervision, and reminded to clarify the subject of supervision, and establish a supervisory compensation mechanism.

3.1.2.2 The driving forces of farmland transfer

The second part is the studies on farmland transfer’s driving forces. The substantial development of China’s farmland transfer market is the foundation of a scientific land price system. There are mainly two driving forces that were decisive for the marketisation of rural assets in China. One is the rural property rights system reform and the land rights confirmation project. The other is the increasing willingness of the farmers to take part in the market.

In 2005, before the confirmation project, Deininger and Jin (2005) expressed that a

complete set of land rights could result in better land market engagement rate. In Hunan, Yunnan and Guizhou Provinces, complete set of land rights made land market engagement rate 1.7% higher, and the average area of rented land 6.4% higher. A later research emphasised the impact of China's new version of rural land contract law published in 2003 (Deininger & Jin, 2009). Although the situation was complex and many factors might interfere, the evidence from 800 farmer households across China showed positive results because the definition of farmer's land rights were further stated and protected. After the new round of rural land confirmation project began in 2011, Cheng et al. (2016) used data in 28 provinces of China, to discuss its impact on land market. The result is quite positive that by the help of land rights confirmation, farmers' engagement in land transactions was increased by 4.9%. Average area of each transaction was increased by 0.37 mu, almost 2 times of before. The land price went up steeply by 43.3%. J. T. Fu et al. (2016) also revealed in Jiangsu Province, East China, that land rights confirmation could increase farmer's transferring-out actions by 5%. Similar results were also found in other parts of China (H. Wang et al., 2015; Y. H. Wang et al., 2018). It was seen in these results that the volume of deals and farmers' participation rate in farmland transfer market grew a lot following the land titling project, which might cause influence on the price of farmland indirectly.

Other than the rights confirmation policy, the farmers' willingness to take part in the transfer market was studied by many scholars.

The Chinese farmers hold the contractual and managing rights of farmland, distributed by their collectives since 1978. It is them who made decisions about whether to put their land into the market. X. L. Ma et al. (2015) explained the magnitudes of land tenure security in farmers' decisions and farmland transfer market. The security is elaborately subdivided into legal security, actual security, and perceived security. When the land rights reform and confirmation project was being carried on, the legal security was significantly improved. An interesting comparison between the two cases in Jiangxi Province and Gansu Province suggested that, when farmers have a larger share of off-farm income, with the characteristic and impact of local industrial and urban economy, they would not necessarily feel more secured on land tenure. And Gansu farmers had better conceived security because there was not much income resource other than land, and they invested on the lands to continuously improve it, thus the primacy of agriculture helped them to be more confident. Therefore, the tendency of the farmers to invest on the land and grow crops could affect their decision to rent out farmland. In another study in 17 provinces of China, L. Feng et al. (2013) revealed that increase of GDP per capita and bigger cultivated land area per capita could help relieve the

farmers from overly relying on social security; thus, be free to welcome the policy changes and market activities.

In addition, W. X. Du and Huang (2005) studied the farmers' willingness to transfer farmland in Yangtze River delta in East China. The results expressed that, besides land policies and local economy, there were several other important factors that affect the farmers' decisions, including non-farm employment rate, education level of the host, unit area profit of agriculture, transportation distance of the grain, and the Engel Coefficient of each family. These factors could also make impacts on the transaction volume and participation of local farmland market, and further on the price.

In the same area, L. Zhang et al. (2014) studied the regional disparities in farmland transfer. It was suggested that regional economic development and non-agricultural employment benefited farmland transfer, and related land policies promoted the transfer market. Meanwhile, the scarcity of farmland and agricultural subsidy policies would hinder the transfer of farmland.

3.1.2.3 The social and Economic influence of farmland transfer

Farmland transfer had been allowed and carried out in China for many years. As a type of economic activity, the transferring itself is not the end, but a means to make developments. Its social and economic effects had been studied too.

X. Chang and Liu (2018) found there was a fast process of differentiation of farmer households with the advancement of farmland transfer, based on the situation in a small town in developed Eastern China. It was shown that at the beginning the small-scale farmer households were the dominant demographic and the main agriculture producer, but they radically decreased and cultivated the smallest area of farmland in the end. On the contrary the large-scale farmer households developed rapidly and became the main producer. Finally, the majority of original farmer households quit farming and went for urban employing and life. Hence farmland transfer actions could bring productivity gain by land use intensification and specialised production. The big farmers who still engaged in agriculture were often experienced and professionalised producers. The results exhibited profound changes in the population and farmers' employment structure in rural areas, which will also bring an impact on the volume and price of farmland transactions.

Other researches had revealed farmland transfer's conspicuous impacts on rural land intensification, crop type, crop yield, and natural environment (Y. T. Huang, 2012; Y. Liu et al., 2018; X. L. Ma et al., 2019). These studies inferred that farmland transfer is a rather

comprehensive and complex issue to be observed.

3.2 Farmland price

3.2.1 The basic determinants of farmland price

Regarding the influencing factors of farmland prices, scholars across the world conducted a lot of studies. The most traditional and intuitive view is that farmland value depends on its agricultural conditions and return of cultivation. Then, Shi et al. (1997) expanded the classic view and divided the influencing factors into agricultural and non-agricultural categories. Drescher et al. (2001) then listed the location factor as a separate category other than the former two, because it was important and involved with both agriculture and non-agriculture conditions. H. X. Huang et al. (2006) estimated farmland value in Illinois, US, using both farm characteristics and non-farm factors. The important influencing factors were found to be the soil productivity, parcel size, population density, personal income, and distances to the state capital and other big cities. The author noticed that the non-farm income factors were exerting great influences. In addition, the number of swine farms nearby, as a environmental and location factor, was found to have considerable impact on the farmland value in the research area.

Dunford et al. (1985) identified factors in many aspects, including factors influencing cultivation return, external economic and government influence, expectations of future income, characteristics of the buyer and seller, and the land itself. Borchers et al. (2014) inspected those factors comprehensively on land data from US, and confirmed that the agricultural return only partially explained the farmland value. Several non-agricultural factors, especially locational characteristics and urban influence interpreted as development potential, also contributed to the land value. It was further implied that there is a divergence between a farmland's agricultural use value and its market value.

As for the farmland transfer market in China, though scholars focused more on issues like farmers' willingness to participate, social influence, or property system, there are some proceeding studies discussing the price theoretically or empirically.

Z. J. Wu et al. (2011) did a survey in several small villages of Anhui Province to 417 farmer households, and found the main factors affecting farmland prices were land quality, the period of contract, and the farmers' characteristics such as age and literacy. T. Du et al. (2016) analysed the situation in the total Henan province, using county level statistics, and

discovered several economic factors were also important, in addition to the land quality. These factors were the local county GDP, proportion of primary industry, rate of urbanisation, and farmers' income. Y. Shen et al. (2012) analysed the data from 786 farmer households in three provinces of east China, and tested five categories of factors that could influence farmland transfer price. These categories include land features, farmer's characteristics, transfer methods, local economic level, and transfer policies. It was found that the land quality and undulation, farmer's willingness to cultivate, residents' income and social price level were main factors that made positive impacts. It was suggested that the authority build intermediary platforms for farmland transfer deals and help the farmers to negotiate. This could be experimented in a pilot zone and then spread to other regions.

Lin et al. (2017) conducted an analysis of the farmland transfer market in Heilongjiang province in the northeast, which is a key grain-producing region of China. It was revealed that the most significant single influencing factor of farmland price was the grain production per unit area. Local village economy, transportation accessibility, and county GDP were also made significant impacts. It was suggested that the price of farmland was more influenced by its production and regional economy than by the farmer's individual features. It was also seen that in the traditional grain-producing area the agricultural potential of a parcel is the key factor to determine its value. The authority needed to know well about these main factors to improve their land appraisal methods.

Du and Zhu (2018) made a further macro-level study on the provincial data of farmland transfer across the whole China. The main factors identified were land quality, relief degree of land surface, local GDP, local GDP per capita, proportion of sown area of cash crops, etc. It was meaningful to find that at the early stage of China's farmland transfer market in 2009, both natural endowments and location were key factors that make impacts on the price. But later in 2017, the impact of natural endowments decreased, while the location factor played a stronger role. What is more, with the continuous strengthening of cultivated land protection policies, the impact of land resource per capita became more significant.

Indicators commonly used in these researches about China were soil condition, terrain, crop type, distance to urban area, transportation situation, local economic level, farmer households' personal attributes, and so forth. The specific discussion of these indicators' selection and operationalisation would be made in Section 5.2.

3.2.2 The impact of intermediary organisations and market power

3.2.2.1 The intermediary organisations

This research used the transaction records from Chengdu Agricultural Equity Exchange, and studies its important role in the farmland market as an intermediary organisation. From a bigger perspective, in the whole real estate business, transaction mechanisms (with or without intermediary agents, negotiated deal or price bidding) played a vital role which is not to be overlooked. In the more mature urban market, there are researches focusing on the intermediary effect of realtors and agencies on the asset price. For instance, B. Q. Huang and Rutherford (2007) found that the realtors with certification of the National Realtor Association and better experiences could achieve a higher selling price of a house. Jauregui and Hiteb (2010) discovered that the real estate agencies could manage to offset a part of the negative impact of nearby landfills on housing prices. In China, the disputes over the way of governments' urban construction land leasing method had continued for a long time. Some studies believed the "*Zhao-pai-gua*" (bidding-auction-listing) way of land leasing since 2004 caused excessive competition on rural residential land, thereby pushing up apartment prices, which also provides momentum for local governments to deliberately reserve land and rely on land money rather than normal taxation income (Yu, 2009; Y. Zhao, 2012). Other scholars argued that the competitive way of land leasing was not the reason for high prices. The true causes were scarcity of urban land and the high demand of apartments in the fast urbanisation process (X. W. Zhang et al., 2005; Kuang & Li, 2012).

For farmland transactions, Hüttel et al. (2016) studied the records from two big intermediary organisations, LGSA and BVVG, in German farmland market. After German Unification, these two agencies were responsible for selling previously state-owned farmland in East Germany to social buyers. They made public auctions to sell those lands, though the specific process of bidding and offering could be slightly different. The results expressed that the farmland deals through both agencies had significant higher prices, than those made through traditional private negotiations. The agencies were able to better reflect the market value of the lands. However, one of the agencies (LGSA) had comparatively lower price than the other. It was suggested that LGSA had some additional targets when selling the farmlands, for example, to keep the agriculture land quota in East Germany. Therefore, it made some conditions that could benefit the real farmer buyers but block the speculators, which could lead to a lower price.

As for the farmland transfer market in China, the academia had been calling for a

well-designed system of intermediary service organisations (Y. Y. Wang et al., 2011; Y. L. Chen et al., 2013), since many studies found that the farmland transfer market would be very inefficient without market institutions or “channels” of transfer.

Deng (2007) showed that due to the lack of farmland transfer information platforms or intermediary organisations in some areas in Henan Province, the negotiation costs for the transfer participants were quite high, which resulted in the difficulty of making transfer deals or very low prices. It was inferred that the lack of transfer channels hindered the transfer of farmland with its real market value, and the establishment of a transfer service platform could fundamentally solve the problem. D. Q. Luo et al. (2009) found that the average expected income of farmers from land transfer was around 540 yuan/(mu*year), but most of them were freely given to relatives and friends for cultivating. The main reason was that there was no direct transfer channel and the transaction cost was too high. Guo et al. (2016) used the income reduction method to find that the price of farmland in some areas deviated from the actual value. It was suggested that the market mechanism of farmland transfer was not working properly. Many farmers went to other places to work and could not cultivate their own land. In order to avoid land abandonment and subsequent problems, they had to transfer out the lands at a lower price or even free of charge.

These studies above revealed that, the kinship and “acquaintance society” could only explain a small part of the defects of farmland price, and the more important issue was the absence of effective transfer channels.

Meanwhile, as the local governments across China had been setting up rural property exchange institutions following Chengdu, Chinese scholars also have done a lot of research about the rural intermediary organisations, especially those local agriculture equity exchange platforms.

J. Lu and Peng (2010) made an empirical study of two leading agriculture equity exchanges in Chengdu and Wuhan. It was suggested that these organisations should clarify the legal position, standardise the subjects and procedures for defining rural property rights, expand the scope of transactions, and make some innovation on the farmland transfer system. Y. Y. Wang et al. (2011) hired a dynamic game model to simulate the transactional behaviour in farmland transfer deals. A comparison was made between the situations with or without the participation of intermediary organisations. It was stated that those intermediaries would play a key role to promote the farmland market and make deals. Tao et al. (2018) analysed the operational condition of the rural property exchange platform of Yongjia County in Jiangsu Province of east China, and found its positive effects in awakening those “sleeping” rural

assets. A more advanced trade platform was suggested to be built with the cutting-edge technologies such as big data and cloud computing.

J. Y. Tian (2019) analysed the operation mechanism of the rural property transaction platforms in Zhejiang Province, and demonstrated the operation mode and characteristics of these organisations. Two main advantages of the platforms were clearly stated. First, the intermediary platforms could make fast market information exchanges by modern communication networks and hierarchical data centres. Second, the dynamic offering or bidding system could help increase deal transparency and protect the market order.

As reviewed above, the studies about Chinese rural platforms were mainly conceptual or qualitative. But there is scant literature about the intermediary agency's effects on practical deal attributes, especially the price, which is one of the focuses of this research.

3.2.2.2 The market power

Other than the intermediary organisations, there are still some studies observing the impact of those market characteristics on the price. Cotteleer et al. (2008) used a hedonic model estimation to find that in the rural areas, land prices were more influenced by local market power (e.g. the number of buyers and sellers within a certain distance from the parcel). There were no perfect competitions in the vast rural regions. But in the more urban areas, the dominant determining force of farmland prices was land speculations. Temesgen and Dupraz (2014) studied the farmland market in Bretagne Region, which is a leading agriculture area of France. It was found that the participants' willing to pay or accept, the number of competing agents, distribution of offered or reservation price in the local market mattered a lot to the farmland transaction price. It was also seen that most of the transactions were conducted by participants in the same area, and the farmer and non-farmer participants performed quite differently in price bargaining. These studies expressed that the "market power" itself could be an important factor that affected the price of farmland.

3.2.3 The impact of policies

Scholars from China and abroad had conducted much study on farmland and agriculture policies. Those policies affecting farmland transfer and its price can be divided into the following three categories:

(1) Property policies. This category is especially critical in China because of the ongoing rural land system reform. Two prime practical policies are the confirmation of rural land rights (Deininger & Jin, 2009; H. C. Feng & Liu, 2018), and the extension of farmland

contract rights for the farmers under HCRS (Ding & Li, 1999). For instance, Cheng et al. (2016) conducted comparative study between several villages with clear farmland property certificates, and several without that. It was unsurprising to find that farmland price in the former was about 50% higher than in the latter, suggesting a good property boundary system could help build a more effective land market.

(2) Farmland reservation and land use control. To ensure food security and prevent the overexpansion of cities, land reservation policies are widely imposed across the world. Examples abroad include the Zoning plan in Netherland and Germany (Tan et al., 2009) and the Agricultural Land Reserve in North America (Nickerson & Lynch, 2001; Eagle et al., 2015). In China, the famous 1.8 billion mu red line and land use control is being stringently imposed, as mentioned in Chapter 2.

(3) Subsidies and financial support. There are typical researches about European Union's Common Agricultural Policy (CAP or BPS after 2015), usually implemented in Western European countries like Belgium (Duvivier et al., 2005), and Single Area Payment Scheme (SAPS), operated in Central-Eastern European countries like Poland (Czyzewski et al., 2018). In China, the government was exploring the use of innovative financial methods to support farmland transfer, farmland mortgage loan, and agricultural operating loan. Studies found these methods had some positive effects, but the support was far from enough (Y. Song & Chen, 2014; Z. X. Huang & Lai, 2017). Han (2017) studied the effects of agricultural subsidies, such as farmland transfer subsidy and sown area subsidy in some parts of China, and suggested that the specific way of subsidy need to be chosen carefully, or the transfer price would rise unreasonably and hamper the development of modern scale agriculture production. In the long term, the government need to support agriculture by improving public infrastructure, promoting technology, and nurturing new farm managing entities.

While the first category tried to make some “deregulation” effects on farmland, the second category was attempting to keep and tighten control. Their relationship is like the one between a throttle and a brake. If so, the third category is like the engine oil, to promote the stable operation of agriculture by economic and financial means.

3.3 Farmland appraisal and Hedonic Model

3.3.1 Farmland appraisal methods

To see how the farmland transfer price is derived in different theoretic approaches helps to

further discover involving factors. There are mainly three approaches to be mentioned for China's farmland transfer appraisal. These approaches are from common real estate appraisal methods in essence.

3.3.1.1 The income capitalisation approach

The income approach is to value multiple years' net operating income of a farmland, by a Discounted Cash Flow (DCF) analysis model. Then, the price is found. It is also an implementation of K. Marx's land rent theory. The kernel argument here is that the price is based on the expected benefit in the future, not on the past. It is the theoretically most fundamental approach for farmland appraisal in China (P. Liu & Fu, 2007).

The key to income approach is to find a reasonable set of future income expectation, interest rate and total cost. As it was mentioned in Chapter 2, in farmland expropriation activities, the government used to make compensations to land-lost farmers, according to the sum of expected agricultural income of the land in several decades. This looks right if the farmland will still be farmland to cultivate crops. But when the use type is switched into construction, making the future commercial income soar for a hundred times, the way how the compensation is calculated is obviously unreasonable, which caused troubles (Zhou, 2013).

Nonetheless, those factors to be discussed in this research, which have impacts on farmland price, play the roles logically by way of income approach.

3.3.1.2 The appraisal by sales comparison

By this approach, the deal records in similar markets and of similar products are set as references. A comparison is made between the valuation target farmland and the references, to see their differences on each attribute, and then set an expected price in current term. In regions with a lot of transaction cases, especially recent cases, this approach works more effectively and persuasively (Jatileksono & Otsuka, 1993; G. L. Yang et al., 2014). But in those areas that lack the market environment and transaction data, it must be very careful and risky to use the sales comparison approach. Therefore, two preconditions are needed: a well-developed farmland transfer market, and sufficient record data of transfer deals, better with some statistical analysis. It is taken-for-granted that the law of market economy and substitution principle should be followed, when this approach is more intuitive, and more easily to be understood and accepted by most of the market participants.

However, under current situations of China, sales comparison approach is not feasible in many areas without a developed market and deal data. The political particularity and social

sensitivity of farmland in this long-term agricultural country, is an opposing influence too. What is more, since farmland transfer involves a lot of complex factors and consequences, there should be a well-designed indicators system for appraisal, which is still in progress with difficulties. Thus, at present, sales comparison approach is not the mainstream method in the whole Chinese farmland market (Shan & You, 2002).

3.3.1.3 The appraisal by benchmark price amendments

This approach is also based on the substitution principle. But the reference is provided by administrative organisations as benchmark land price, which represents the recent average price level of a certain region. Target farmland is compared with the benchmark conditions, then the correction coefficient is calculated accordingly, and the specified price expectation is found. As long as the benchmark price is regularly measured and published by the government, and easy to be seen, it is good for the market to be more scientific and standardised. Compared to the previous two, this approach is fast, convenient, and accurate. It is being taken in vast areas of China, not only for farmland, but also for urban construction land and others (F. Chen & Peng, 2000; W. J. Yang & Meng, 2009).

There are still some other methods of land appraisal, including the cost approach, and in practical deals, a combination of these techniques is the normality (Y. P. Wu & Xue, 2009). For example, in a county that a benchmark price is quite lagged, a sales comparison approach should be introduced as the amendment to benchmark evaluation.

3.3.2 The Hedonic price model

It is good to know how the price is theoretically formed. But, for a certain dealing participant, it cannot even name the specific approach it is using for the appraisal. It just takes in account many factors that affect the price, and that is where the Hedonic Model came in. This model is a basic approach to deal with the problems with multiple potential factors.

Lancaster (1966) proposed a new approach of consumer theory and pointed out that the goods gave rise to multiple characteristics in fixed proportions. It was these characteristics, not the goods themselves, on which the consumer's preferences are exercised. This research focused on the choice of consumers. Rosen (1974) further analysed both producers and buyers' choices of the characteristics vector, to achieve market equilibrium. Goods could be treated as tied packages of characteristics; observed market prices were also comparable on those terms. Hence the theory of Hedonic Price Model was formally proposed. The underlying idea of Hedonic Model was to break down the goods into its constituent characteristics, and obtain

estimates the contributory value of each characteristic.

From Rosen's theory it was inferred that two important assumptions with Hedonic Model were the heterogeneity of products, and the implicit market. The implicitness meant the total price of a product could be directly observed, but the contribution of each characteristic to the price was hidden in the whole (Epple, 1987). The total price was a composite of constituent prices for the different characteristics.

3.4 Related theories

3.4.1 Coase's theorem and property theory

The property theory (Coase, 1960) is based on his deep insights about the relation between property allocation, transaction costs, and resource allocation, and suggests that: (1) when transaction costs=0, there is Pareto Improvement; (2) when transaction costs>0, different original rights bring different resource allocation results.

Thus, when transactions exist in the real world, the initial allocation of property is quite important. The core value of this theorem is that different allocation of property would lead to different transaction costs, then different results of resource allocation. It is beneficial to establish, or switch to, a transaction-friendly allocation of property structure, to reduce social and private cost. The logic of Coase's theorem suggests that clear property, free right of transfer and well-established law and regulation, can help increase the predictability of transactions, lower transaction costs, dispel speculative motives and actions; thus, bringing a higher economic efficiency. Other authors presented related conforming conclusions on Coase's theorem's effects on land market (Chalamwong & Feder, 1988). Feder (1988) studied the land managing policy in Thailand's agriculture and land market and found that land right confirmation can stimulate the transactions of farmland. Binswanger and Deininger (1995) suggested that land market, labour status and product market can cause the low efficiency of agriculture and land use. Therefore, an appropriate amount of transferred land ownership and use rights can be good to improve the efficiency. Macours et al. (2010) found in Dominican Republic that improving land tenure security would increase the land rental transactions by 21% and the area rented to the poor by 63%. The results signalled that a mature land rental market is good not only to the asset-owners, but also to those they might interact in the market.

Property theory focuses on the rights connected to certain objects. In rural China, as it was reviewed in Chapter 2, there are "three separated rights" of a farmland. These are

ownership, contracting right and managing right. As the former two are almost non-transferable, the transfer price is only the price of managing rights. It can be also seen as the compensation of lost managing rights and land outcome, to the farmer households.

From the history of planned economy era and reformation era, it is widely admitted that the “innovation” of rural property is necessary for economy growth. A stable expectation, market liquidity, and completeness of usufruct are key supportive factors. A study on China’s land rental market had found that the gains in allocative efficiency and productivity of land use that can be realised through rental markets in a growing economy could be large. The productivity increase can be even 60%. But if concerns about tenure security prompt households to refrain from participating in land rental or to limit rental transactions to relatives, the productivity and equity benefits from land rental will be reduced or entirely forgone (S. Jin & Deininger, 2009).

A clear property system lowers the transaction cost, thereby making a more effective trade market. The prefecture of Chengdu had finished the land rights confirmation project in early 2010s, thus it has good foundations, which is a prerequisite for real market-oriented farmland transfer in China, as well as a basis for studying farmland price dynamics.

3.4.2 The contract theory

Since the Chinese HCRS system is basically a contractual system, it is worthwhile to take contract theory into consideration. This theory of complete and incomplete contract was proposed by Hart and Moore (1990). They argued that at the time of contracting, it is impossible to specify any contingencies in the future; sometimes the contingencies can be even indescribable. Thus, most of the real-world contracts are incomplete contracts. No matter how careful and detailed the contract is written, an unspecified contingency may happen in the future. And, when it happens, there can be distortions. An immediate consequence of this defect contract is called hold-up problem, which means due to the uncertainty, each party may be conservative and overcautious in the execution of contracts, lowering the economic efficiency. Or worse, the hold-up problem in sight can prevent the contract to be signed from the beginning.

Hart and Moore (1990) pointed out that, the hold-up problem, the defect of incomplete contracts, can be mitigated by choosing a suitable ownership structure *ex ante*. There is often a low-cost alternative to contracts that allocate all specific rights of control. Particularly, when it is too costly for one party to specify a long list of the specific rights it desires over another

party's assets, then it may be optimal for the first party to purchase all rights except those specifically mentioned in the contract. These "unmentioned" rights are called residual rights, the key concept to the solution of incomplete contract problems. A comparison is made between when the residual rights belonged to the first party and when they belonged to the other. It leads to better economic yield (surplus), when these residual rights are held by the party that is most concerned.

The "contracts" in Chinese HCRS can be a typical, practical, and complex application case of contract theory discussed above. Obviously, these contracts are in the category of incomplete contracts. The most important meaning of the improving contract system is, the residual rights were progressively transferred, from the collective authorities, into the hands of farmers. Each individual farmer cares more about his own land than the leaders, beyond all doubt. Thus, for the logic of Hart and Moore, the residual rights went to the right party.

Empirically, J. P. Ye et al. (2010) researched the data of land property from 17 provinces in China. The result showed that areas with clearer land property, facilitated by formal land contracts (for collectives and their members) and land right certificate, tend to have a more standardised farmland transfer market where written contracts were more signed. When the median price of informal transfer was 181 yuan/mu, that of formal written contracts was 300 yuan/mu instead, a 65.7% higher. From the perspective of incomplete contract, the transferees accepted higher prices with written contracts, just in order to claim the residual rights of the farmland, because they would be the most concerned party during the time expanse of the contracts. Q. Z. Zhao and Tang (2008) conducted a random sample survey of farmers in Sichuan Province, and found that the volume of farmland transferred to farmers' relatives or close friends was decreasing. With the assistance of the local government, the farmers signed contracts for farmland transactions, thereby greatly reducing transfer risks and transaction costs, which also helped a lot in increasing the price of transferred farmland.

Further still, one of the main tasks of intermediary organisations, such as Chengdu Agriculture Equity Exchange, is to help the dealing parties in farmland transactions to sign standardised contracts, and make official registrations of that. This was beneficial to promote the healthy development of the market, and exploit the farmland's market value.

3.4.3 Marxism view of land right and land transfer

Karl Marx and Friedrich Engels systematically analysed the land problem early and created their theories on land property and land rent (Marx, 1867). They were the revolutionary

teachers of the world-wide proletarian and communist movement; thus, their theory made a great influence on land policies of Soviet Union, and the first 30 years of People's Republic of China. It still provides a ground colour, or a bottom line, for the basic thought of China's land managing system.

3.4.3.1 Marx's land property theory

On the basis of reviewing and examining previous land economic studies, Marx (1867) developed his land property theory. Land is seen as a special production factor. With labour, land can provide eternal products and service, which brings land rent and land price. If a land is bought, the actual thing purchased is the total land rent in the future (or at least, for a very long term). Therefore, to implement the land property, one needs to own the land first. Marx further defined the land property as a combination of occupying right, use right, transfer right, rent right, income right, disposal right, and ultimate ownership. The core part of land property is ultimate ownership. The concrete connotation of land property may vary and improve under different ideologies and historical periods, in which the main impetus behind is the development of productivity.

On the topic of land transfer, Marx pointed out that as a key production factor, land could not be freely moved, but its economic rights and value could be transferred. Through market transactions, land can be rented, transferred, or purchased; thus, its economic value flows from one party to another. Marx argued that unlike other common commodities like grain, the price of land depends more on social factors and property regulations, less on supply and demand.

Marxism view and the classic communist theory was the main theoretical guidance to China's farmland managing system. The significant idea within is public ownership and anti-privatisation. After 1978, the bottom line of public ultimate ownership is still working. The collectives now hold the ownership of rural land, though more and more symbolically and virtually. The spirit behind Marxism theory of protecting the poor and balancing social benefit distribution is regarded with esteem. Nevertheless, as the public ownership is unshakable, Marx's view left openings for flexible land right arrangements, involving use right and managing right. The Chinese top leaders in the new era made great improvement and innovation about the land policy, which lead to the current vigorous situation of rural China.

3.4.3.2 Marx's land rent theory

Marx (1867) saw the essence of land rent as a type of capitalist surplus value. Land rent is the excess profit above social average profit, while average profit reflects the mean profit under normal conditions. In a capitalist society, land rent is subdivided into three categories, which are absolute rent, differential rent, and monopoly rent.

Absolute rent always exists, when there is private ownership of land. It is the fee the real land user pays for its use as a means of production. Monopoly rent is rarer, because it came from land with some unique ability to generate value.

Differential rent comes out of the differences of land conditions. For agriculture or other purposes, each land has its own value, due to the conditions of climate, fertility, water supply, terrain, physical position, transportation infrastructure, yield of certain crop, etc. Therefore, for two pieces of land with the same area, a flat and fertile land is obviously more valuable than a barren and rugged land. If land A can provide 1000 kgs of wheat each year, while land B 500 kgs of the same crop, A is quantitatively superior. If Land A and B provide both 1000 kgs of wheat, but the price of wheat from A is 50% higher than that from B, due to the flavour and texture, A is qualitatively superior. Different lands provide products with different quantity or quality; thus, land users pay more for better land, i.e., the differential rent.

Differential rent was stated in two layers by Marx. Differential rent I was due to the different soil fertility and location of the parcels. With the same amount of capital and labour investment, farmland with better soil conditions could generate more crop yield as surplus value. And if the parcel is close to the market, production and transportation cost could be reduced and the profit would increase too. Differential rent II referred to the actual amount of capital invested per acre. If the farmer made continuous investment on the same farmland to improve its productivity, the value of this land would undoubtedly rise. While differential rent II focused on the endogenous differences of farmland from the start, differential rent I focused on the effect of land-improving investments. These statements provided a good enlightenment for studying the price dynamics of farmland transfer in current China.

Further, it is revealing to see that two core concepts from Marxism Economic theory and Hart's incomplete contract theory, surplus value and residual rights, share some similarities in thought. Firstly, both concepts refer to something that is LEFT. The surplus value is the income left after deduction of labour and material cost, while residual rights are those "left" rights not mentioned in the written contract. Secondly, both of them are the important hidden factors to be fought for by different parties, and to be allocated to the most concerned party.

The proper allocation of surplus value and residual rights can make economic actions more justified and efficient. For the same reason, it would be meaningful to discover the acting factors in farmland transfer, which might be left, hidden but important.

3.4.4 Concentric zone theory

German economist and agriculturalist von Thünen (1826) proposed the famous theory on layout of agriculture and industry centred on the cities, when Prussia was reforming from manor economy to the modern free economy. Von Thünen described the economic layout in a hypothetical isolated state. The state's whole territory was a rich plain without natural barriers like mountains and rivers. The only capital city was in the centre of the plain, and surrounded by rural areas. The country provides agricultural products for the city, and the city fed back with processed products. Under this circumstance, von Thünen proposed the distribution ranges of various industries, or their location. In this picture, from the near to far, the city had five circular industrial belts outside downtown, known as the Thünen rings: (1) the innermost ring produced vegetables, fruits and milk, because these products needed to be fresh and quickly consumed; (2) the second ring is a forestry belt providing timber for the furniture industry and everyday life in the city; (3) the third ring was the normal agricultural area for grain production; (4) the fourth ring was big ranches for animal husbandry; (5) the outmost ring was wastelands that were not used.

Von Thünen's theory was interpreted as the concentric zone theory (Clark, 1967). It assumes that the city downtown is the leading force in regional economy, and the leading effect of the centre to certain area, is inversely proportional to the spatial distance (Burgess, 2008). His insights about the spatial layout of industries highlighted the role of location and transportation cost factors in economic life, which was also inspiring for analysing farmland price in this research. However, von Thünen assumed that the city's range and population were fixed, and the layout was to some extent static. Thus, this theory had to be considered together with other factors to observe modern agricultural situations.

3.4.5 Two-sided market

The two-sided market theory had been mature in the first decade of this century, which reveals the mechanism of a market with two countering participant groups and an intermediary trading platform. This theory is especially useful in the era of e-commerce. Rochet and Tirole (2003) declared that a market is two-sided if the platform can affect the

volume of transactions by charging more to one side of the market and reducing the price paid by the other side by an equal amount. The price structure matters and platforms must design it so as to bring both sides on board. Otherwise, if the total volume of transactions remains the same when price structure is changed, this is a one-sided market. This definition involves the transaction cost as “price”. Armstrong (2006) takes cross-group externality into consideration, and further defines that if a platform serving two groups in the market makes charging strategies to both sides, where benefit from one group totally relies on the participants’ number of the other group, then, it is a two-sided market. Rysman (2009) summarised that there are two preconditions for a two-sided market: 1) the two groups make deals on the same platform; 2) the decision made by one group makes impact on the one of the other group.

There are two important characteristics of a two-sided market: (1) there is cross-side network externality. The concept of network externality was first proposed in 1985, which means the utility of a product the customer derived from purchasing it, firmly relies on the number of other customers buying the same thing. For instance, a telephone’s utility depends on how many other people had bought a telephone and joined the telecommunication network (Katz & Shapiro, 1985). In a two-sided market, this effect is cross-sides, which emphasises that the number of customers and transaction volume on one side, makes key impact on those of the other side; (2) two sides or groups (e.g. farmland transferors and transferees) in the market, are charged with a price structure that is unbalanced. The platform provides transaction services and has a total income target. It distributes the unequal “charge quota” between two sides, not like the marginal cost pricing way in one-sided markets. A typical example is the big e-commerce platforms like Taobao.com. It charges the product sellers while taking no fee from the buyers. Some platforms may even set “negative-charges” to increase the number of normal clients, by giving subsidies when a transaction is made there, which does not happen in one-sided markets.

Therefore, two-sided market theory is inspirational and important to this research. Because it hints that a trading platform and its charging structure matter a lot in the modern businesses with online technologies. As for the Chinese farmland market, it went through a long history towards marketisation. Before the formal market is there, farmland transfer deals were conducted privately with a negotiated price (see Chapter 2). That was a one-sided market way. The supply-demand relation was unbalanced and flow of information was jammed. After a formal market is established, trading through the platform can enjoy a wider range of choices, solve the problem of information asymmetry, and lower transaction costs. Chengdu Agriculture Equity Exchange was set up by this thought, and it worked as a

regulatory agency with benefits to the farmland market. Its role will be observed in this research.

3.5 The land systems in developed countries

Although China has its own characteristics on agriculture and rural situation, it is beneficial to keep an open mind and learn from other countries, especially the more advanced countries with practical experiences. This section would take a review on two countries which have the best reference value for contemporary China. These two are the United States of America, which sets an example of powerful modernised big-scale agriculture, and Japan, which has more similar culture and land resource situations with China.

3.5.1 The land system and land transfer in the US

As a highly developed country and the only super power in the world, United States is superior in all aspects including agriculture. The most modernised and advanced scaled agriculture feeds not only the Americans, but also many parts of the world. From 1776 to the 20th century, United States government entitled most of its farmland to individuals by auctions and rewards for western pioneers, thus nurtured a large number of farmer households, each with big areas of land to cultivate. One of the most influential measures by American authority was the Homestead Act in 1862. President Lincoln signed and published this act to give each American citizen the claim right of 160 acres of western land, with only a small charge of 10 dollars for registration. The citizen could have ultimate ownership after 5 years of continual cultivation, which strongly encouraged western immigration and boosted the victory of Civil War.

At present the American farming households are mainly of three types. The first type is households cultivating their own land and additional land rented in from others. This type of households is the most common, who usually cultivate a large area of land, and serves as the main agricultural producer. The second type is yeoman farmers who cultivate their own land but do not rent in other lands. The third type is farming “operators” who rent in land from the “pure” landlords, who have the land ownership but do not sow. The number of each type decline from the first to the third (J. Huang & Wang, 2014).

United States has a huge farmland transfer scale. According to study by US Ministry of Agriculture, 39% percent of the 911 million acres in the contiguous 48 states is rented (Bigelow et al., 2016). Within them half of the cropland is rented while only a quarter of

pasture land is rented. It is seen that renting happens more if it is for planting grain, like wheat, rice and corn, because these crops are best suited for mechanised operations. Smaller farmer households tend to be full owner of the land, while big-scale farmers are renting in lands with a large share, often from pure non-operator landlords, who have 80% of the area of rented lands. On relations between rent-in and rent-out parties, it is found that non-operator landlords often input into long-term management decisions of the land, while short-term decisions are more self-determined by operators. The contract terms are often very long, so the possibility of access to new land through renting is limited. Meanwhile, the tenants often rent in lands from multiple landlords to spread risk. Landlords seldom sell the land; most of the time just rent it out. It was predicted that in 2015-2019 only 10% of the farmland would be transferred by ownership, most of them are through gifts, trusts or wills (Bigelow et al., 2016).

There are two significant enlightenment of US farmland system to China. First, clear land boundaries and property rights, guaranteed by law, government, and contracts, could strongly help build a large land market. The ones taking part in the huge amount of land transactions would not worry about land loss or long-term stability. Although China has a public-ownership principle, unlike the American private ownership system, the same economic logic can apply to both. Second, a properly centralised big-scale production is the right way to agriculture modernisation and social efficiency. As Livanis et al. (2006) and Borchers et al. (2014) pointed out, the market value of farmland is quite beyond its agriculture use in the US. The agriculture use value was calculated as a stream of discounted future returns (by Present Valuation Model). Other factors making influences were population, urban sprawl, recreational and natural amenities, location characteristics, and taxations. The non-farm factors would play a more and more important role on farm finances. As China is promoting financial support on farmland transfer, the American experiences could be of good reference.

3.5.2 The experience of Japan's land managing

Japan lies to the east of China and shares a more similar culture with China than the Western countries. As an archipelago country with only 377,792 square kilometres, Japan's has a population of 127 million to feed. After WWII, Japan's economy restored and soared with astonishing speed, and its traditional agriculture underwent a series of reforms. These reforms could be divided into two phases.

The first phase was 1945-1960. To change the traditional social structure of Japan and

alleviate social contradictions, the post war government forcefully bought or expropriated lands from big landlords and gave them to peasants with few or no land. Then, small farmer households became the main stream, making 88% of the total production and cultivate over 90% of farmland. The area of each household was restricted under 3 hectares, and the average area of over six million households, was only 0.8 hectare. These yeoman farmers lived an independent but poor life (J. Huang & Wang, 2014).

The second phase began in 1961. The government saw the shortcomings of too fragmented agriculture production and then liberalised the right of land ownership transfer. Small and middle-sized farmer households were educated, guided, and subsidised to transfer their land to bigger scaled farmers. The number of farmer households was decreased to half of before. Then in 1970, Japanese government made optimised adjustment about rural land policy, the familiar (but actually earlier than China) separation of two rights was implemented. The farmers could rent out land use rights while keeping the ownerships. This revision brought about a conceivable wave of intensification and modernisation of Japanese agriculture. Under the context of urbanisation and industrialisation, most of the original farmers became urban citizens (J. Huang & Wang, 2014).

One important feature in Japan's land reform, was the key role played by farmers' associations and intermediaries (Y. Gao, 2010). Farmers' associations are the union-like autonomous organisations of farmers. They helped organise and guarantee the scaled production. Higher-level of cooperatives were established to be brokers and sponsors. For example, cooperatives served as land banks, which rent in land from owners, put them together then allocate to farming producers. The Japanese government not only made direct efforts. They wisely mobilised and utilised the power of social and commercial organisations to make things work.

In post-war era, the rent of farmland had been restricted by the government for a long term, in order to boost food production. The farmers' association also made efforts to lower the rent and protect the interests of tenants. Thus, studies argued that the Present Valuation Model, which was widely used in Europe and North America, did not apply to Japan's farmland market (Shigeto et al., 2008). After the government slightly relieved its restrictions on land rent, the rental rate rose, and fluctuated with the rise and fall of agricultural returns. Recent studies found that, rice price, wages, geographical locations, as well as public land-improving projects, had great influence on farmland's rental rate (Kunimitsu, 2005; 2006). Therefore, despite being strictly controlled, the farmland rent rate in Japan is still the

result of a combination of many factors, including agricultural profit, location, speculation of land conversion, land policies and even the interference of social organisations.

The trilogy of Annexation-Distribution-Intensification in Japan's land reform process is amazingly similar to China's. This process might happen in many other countries in the world. The most enlightening point here is that it matters not only what the destination is, but also which phase you are in. Different phases require different measures. The transition from People's Commune to HCRS in China was great because it restored farmers' enthusiasm and produced more food. The current trend in China towards more intensified agriculture utilised by farmland transfer market, also coped with the requirements of the new phase.

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Chapter 4: Theoretical Framework

4.1 The Hedonic model

This research employs the Hedonic Price Model as the basic model to analyse the determinants of farmland transfer price. Hedonic Models were widely used in Economics, where the relations between different characteristics of a heterogeneous product and its price were to be observed. Hedonic Models were commonly used in real estate appraisal researches, because the situation in real estate markets well matched those two assumptions (M. Zhang & Chen, 2008): 1) There are so many factors that could influence the price of a house, such as its area, age, number of rooms, neighbourhood, and environment; 2) Due to the complexity and uncertainty, it is hard to get the appraisal done by pure theoretical deductions. The Hedonic approach is to build a multiple model with those factors, and make regression analysis on that to find the effective determinants.

4.2 The natural endowments

Farmland's natural endowment is the first important aspect of factors that affects the production rate. Thus, the farmland transfer price is deeply influenced by its natural conditions, much more than industrial and urban land are (Drescher et al., 2001). These conditions are various, including soil fertility, terrain, climate, hydrography, vegetation, environment, and others (H. J. Bao et al., 2012).

Farmlands' soil fertility means the water, nutrient and heat contained in the soil, which is the most basic resource for plants' growth. The soil's agrotype, thickness, texture and structure are direct determinants of the land's products.

The terrain conditions mainly consist of the slope degree, slope direction, landscape, and altitude of a farmland. Different terrains lead to various land quality character, which affects the land's development cost and managing mode, thus the price.

Climate characteristics refer to the sunlight, temperature, precipitation, wind, and other climatic conditions of an area. Climates vary greatly across the big territory of China, thus causing a greatly diversified layout of corn types, and harvest times per year (from one to

three). This greatly affects the revenue of agriculture, then the land price.

Hydrography condition in agriculture usually refers to the condition of surface water, which makes an impact on the production of plants, by making impacts on the soil, especially in arid or marsh areas, or on salinised lands. Therefore, irrigation and draining capacity are seriously considered in farmland transfer deals.

Vegetation makes an important impact on the land. It works by regulating the climate, conserving moisture and soil, enriching soil nutrients, fixing sand while blocking the wind, and by purifying the atmosphere. It provides a good biological system for the development of farmlands.

As the economy grows, the environmental issues are becoming more and more prominent, which also influences the farmlands. Soil or water pollutions can decrease the production rate, contaminate farming products, and even harm the people's health (L. Z. Zhu, 2014). Thus, it is obvious that bad environment leads to lower farmland prices.

There are still many other natural factors that make impacts. One of them worth mentioning is the natural disasters (R. Y. Zhu, 2001). The disasters can be of several types: earthquakes, mudslides, forest fire, tsunamis, plague of locusts and even acid rains. Many of them are regional-diversified, periodical, but sudden. Disasters reduce the production and revenue, thus decrease the land price. Furthermore, they also damage big chunks of farmland and destroy farming infrastructures, which reduces stability and lowers the production expectation, causing land price to fall deeper.

Thus, our first hypothesis is that:

H1: Farmland's natural endowments positively affect its transfer price.

4.3 The location factors

The location of the farmland plot affects the cost and benefit of agricultural production; thus, it affects the farmland's price as external factors. Location factors mainly include two indicators as below:

(1) The distance to the city/town centre (Drescher & McNamara, 1999; Lehn & Bahrs, 2018). Farmland in near suburb areas and outer suburb areas, differ from many aspects such as scale, use type and way of cultivating. These differences would make impact on the average profit per unit area, thus affect the land price.

(2) Traffic conditions (Ke et al., 2015). Better traffic conditions of the plot would decrease the cost of transportation of agricultural products, and shorten the transport time. For

those fresh products, which are difficult to preserve, the good traffic condition can help make quick deliveries and, thus, generate better profits. The other managing costs, such as cost of fertilisers and machinery, are also decreased. Therefore, the farmland with better traffic conditions will theoretically have a higher price. Thus, our second hypothesis is:

H2: The location condition of farmland positively affects its transfer price.

4.4 The factors of economy and society

The developed degree of the area influences the land price too (Livanis et al., 2006). In theory, rural residents in those more developed regions tend to have a higher standard of living and consumption level. They tend to make more investment to improve land conditions and agricultural infrastructures. Thus, the efficiency of land use is thus better, making the land price higher compared to that of less developed regions.

Referring to a study of the whole farmland transfer market of China from 2009 to 2017, the most concentrated regions of lower-price farmland were North-eastern China, North-western China, and Tibet Plateau provinces. Meanwhile, the higher-price and sub-higher-price regions were Yangtze river delta, Pearl river delta and Beijing-Tianjin district. The overall price decreases from east to west (T. Du & Zhu, 2018). The overall layout of farmland price of the big country of China, matches the layout of economic and social development very well.

In addition, X. B. Wu and Wang (2015) studied the farmland transfer situation in Hubei Province, and found that the transfer prices in economically developed and underdeveloped areas both deviated from the actual values of farmland. In those comparatively developed areas, transfer price was generally higher than the actual value of farmland. This was because the economic level not only directly affected price expectations, but also reflected the maturity of local market and the activity of land traders. On the contrary, in those underdeveloped areas, the expected price was lower, and there were fewer new type of farm managing entities willing to transfer in land, thus the price was mostly lower than the actual value of land.

Still, it is necessary to mention that the development of a modern farmland transfer market, would weaken the effect of farmland's natural endowment on the price, which further strengthens the impacts of social and economic conditions. Therefore, our third hypothesis states that:

H3: Regional economic development positively affects farmland transfer price.

4.5 The transactional Factors

There are mainly two transaction attributes that affects farmland transfer price: the period and acreage of a contract (Z. J. Wu et al., 2011; X. B. Wu et al., 2016).

The period length reflects the farmer's willingness of cultivating and managing. It also affects the distribution of a farming entity's labour invest (C. H. Li et al., 2015). For the transferee, the longer the term is, the smaller the risk is, then the more they invest on the land, and thus a better unit and total profit causing a higher land price in theory. For the farmer transferors, it is well known that a longer term is more helpful to agricultural production; thus, a higher land price could be probably expectable. The acreage makes impacts on the price in the similar way the period does. A large acreage transfer reflects the big demand of farmland, and it usually involves a whole contiguous and flattened field, with less land fragmentation problems, which is rather beneficial for agricultural production. Thus, a higher price is expectable too.

In summary, on the period and area of a farmland transaction, our fourth hypothesis is:

H4: Contract period and area positively affect farmland transfer price.

4.6 The policy factors

Administrative policies make conspicuous impacts on the price of transferred farmland in China, due to the following reasons:

(1) The land property system is the basis of farmland transfer actions. The land rights confirmation projects carried out in recent years, as it was mentioned before, provided the precondition of a farmland transaction market.

(2) The increasing policy intensity would accelerate the formation and development of an effective market (Hu, 2007). If there is a clear policy orientation to support farmland transfer, farmer households would also be more active on land transactions. On the contrary, lack of policy or even opposing policies would make farmers more inactive. As it could be seen, the statistical scale of farmland transfer market is growing year by year, as the policies are being more and more supportive.

Therefore, a more active and formalised market, would deeply influence the farmland transferring price. In previous private transactions, two sides of the deals were usually close relatives or fellow-townsmen, who lived in the same small community and knew each other quite well (Deng, 2009; Yuan & Zhu, 2014). Thus, affected by the "acquaintance society", this

kind of transactions was not completely market-oriented. The price could be very unstable, and some of the deals were even free. However, a more marketised transferring system could eliminate the negative social factors, and give out prices of comparability, openness, and transparency. Both sides could enjoy a fair and justified transaction environment, to protect their interests.

(3) Moreover, the agricultural policy subsidies could influence the farmer households' willingness to make deals, as well as the price. There is a study showing that subsidies make negative impacts on the farmland transfer market (Y. Y. Wang et al., 2017). Because when the farmers have an expectation of obtaining governmental subsidy by keeping land to themselves, they tend to leave the market, or raise the price, which hampers the development of a healthy market.

Thus, our fifth hypothesis states that:

H5: Land policies affect farmland transfer price.

4.7 The factor of transaction mode

In Section 3.3, several theoretical methods of farmland appraisal were reviewed. In practice, there are four kinds of pricing process to be taken in account as below. These modes provide a view of the effect of transaction modes, since a reasonable price system is the foundation of a healthy farmland market.

(1) Pricing through negotiations. Both dealing parties make direct contact and have price bargaining, until an agreeable price is fixed. Each party acts on its own interest, and accept the deal and price voluntarily (Deng, 2007). This traditional mode is often limited by space and information, making the price arbitrary and unstable, due to lack of comparable information and statistical data. There are certain defects in this unsystematic mode to reflect the actual value of the farmland.

(2) Pricing through bidding. More than one potential transferees make biddings to target land, then the one with the highest price offer gets the land deal (see Section 2.7). A formal contract is signed to secure both parties' interest. The dealing price is transparent and regulated.

For this mode to work, an administrative organisation, such as Chengdu Agriculture Equity Exchange, plays a key role to provide official guidance and technical support.

There are also some less used pricing methods, such as pricing through government direction (Y. Lu & Zhu, 2006) or through appraisal by intermediaries (Chinese Ministry of

Agriculture, 2016). Currently in China, these pricing modes exist parallel in different regions and under different circumstances. Chengdu is one of the most leading cities, to set up an official establishment to promote rural property transactions. The trend towards marketisation and transparency is inevitable. Therefore, as an indispensable part of a real-world market, the role of intermediary agencies needs to be well inspected. While doing the authentication and supervision job assigned by the government, the exchange is a *de facto* commercial broker too. At present a small part of the transactions are done by the exchange's matchmaking service, within which about one fourth is even through public bidding, while a larger part of the transactions was directly made without acquiring intermediate services. These different modes of transactions represent a diversification of commercial thoughts and operations, and might have deep impact on the farmland price and others. Thus, our sixth hypothesis is:

H6: Transaction mode affects the price of farmland transfer, i.e., deals made with the help of intermediary organisations have higher prices.

4.8 The factor of the type of managing entities

The type, or nature, of the farming managing entities is also a transactional attribute. Though it is separately listed because it has a special significance in these years. The central government had been emphasising on “new types of farming managing entities” in the recent decade, because to promote farming at a moderate scale, while guiding the healthy development of farmland transfer market, is the inevitable course of developing modern agriculture.

The central and provincial government had issued opinions on cultivating “various new types of agricultural managing entities” in 2013 (CCCPC, 2013a). In order to implement this thought, Chengdu government had set up a goal in 2016, to cultivate 100 leading enterprises with strong driving force and good market prospect, 1,000 farmers' cooperatives well operated under good managing mechanism, and 10,000 specialised family farms or large grain growers, run by optimum scale management (Chengdu Government, 2016).

These new types of farmland managing entities are the main promoter of China's farming professionalisation and moderate intensification. They are different from traditional small-scale farmer households and each has its own characteristics. The three types of entities are emerging quickly and replacing backward agricultural production capacity. Among them, the changes brought about by those enterprises, which are sometimes referred to as industrial and commercial capitals, and usually come from the cities, caused many concerns.

Compared with traditional agricultural producers, the incoming enterprises had the following three advantages:

(1) Industrial and commercial capital could bring advanced technology, capital, and business ideas to agriculture, improve the form of farming organisations, and increase the efficiency of agricultural production (Q. L. Ye & He, 2015);

(2) Agriculture operated by large capitals had scale advantages. By reducing the cost of production materials and increasing the level of field management, industrial and commercial enterprises could increase grain output while reducing production costs per unit area, thereby achieving economies of scale (G. C. Li et al., 2009). Recently in China, the rising price of farming materials, such as pesticides, fertilisers, seeds, and other materials, is one of the most important causes of high cost of food production (Wei & Wen, 2014). However, the scale of capital-run grain production is generally bigger, with a bigger amount of farming materials used. Therefore, for the enterprises there is a certain bargaining power in the procurement of those farming materials, which helped reduce the price, thereby greatly reducing the cost of food production. Moreover, because those enterprises from the cities had more timely and comprehensive access to market and technical information, it is also more convenient for them to purchase higher-quality materials to further improve the efficiency of agricultural production.

(3) Industrial and commercial capital can help extend the agricultural product industry chain. L. Yang and Hao (2014) conducted a survey in Nantong Prefecture, Jiangsu Province, and the results expressed that after urban enterprises participate in agricultural production and management, many of them would engage not only in the simple planting work, but also in the processing of those agricultural products obtained from planting, which extended the industrial chain to the downstream, and created profit far greater than pure cultivating.

Therefore, those capitals going to the countryside for agricultural operation had some impact on the rural economy and society. First, they brought funds, technology, and management experience to rural areas, as well as the orders of agricultural products, which helped in promoting the development of the rural economy and increasing the income of farmers. Secondly, the capitals' input in rural areas, lead to a process of price discovering of farmland and other properties. Traditional rural areas were extremely lack of money and financing channels, and the currency brought about by urban capital could greatly alleviate that shortage, and become a great driving force for the increase of farmland price. Third, those enterprises, which were capable of operating large-scale, mechanised, and modernised agriculture, could definitely get high profits. Thus, looking back, they were more inclined to

accept a deal from the perspective of return on investment, and their views on those various price factors would be different from those of traditional agricultural producers.

Thus, our seventh hypothesis states that:

H7: Enterprise and non-enterprise managing entities are affected differently by different price factors.

4.9 Summary

In this section, seven influencing factors on farmland transfer price were analysed, though there are still some more such as the characteristics of farmer households. In some researches, the status and inclination of individual farmer households, often being the transferors, are discussed too (Deininger & Jin, 2005). Though for this research, the focus is more scaled transactions rather than small-piece private deals. The scaled farmland transfer deals can weaken the impact of individual farmer households' heterogeneity on transfer price. The heterogeneity includes different age, health status, marriage and family status, cultural degree, migrant working, and so on. And a collective transfer deal, on the basis of participation by many farmer households, can make the differences offset each other.

Therefore, these seven covered the aspects mentioned in Section 3.2, from agricultural condition, to non-agriculture characteristics like location and economy, and then the market itself and related policy. Based on the actual situation of the research area, and data accessibility, the seven factors discussed in this chapter were chosen to represent those important sources in the real world that affect farmland price.

Chapter 5: Research Methods

5.1 Introduction

This research adopts a quantitative method to empirically test the hypotheses regarding those factors making impacts on the price. First, we discuss the operationalisation of concepts by indicators. Then, we discuss the data sources and data management. Then, a regression model is specified to study the compositive effects of independent variables.

5.2 Indicators selection and measurements

In Chapter 4, many factors that affect the farmland price were discussed and hypotheses set forward. In this section, 13 independent indicators are selected to represent those factors. Together with the dependent variable, their measurements are also described.

5.2.1 The indicator of dependent variable

This research focuses on the variation of farmland transfer price; thus, the price per unit area per year, often referred to as land rental rate, is of the most concern:

Y: Farmland rental rate

Prices are defined as rental rate of a certain land using concrete numerical price records (yuan/[μ *year]).

5.2.2 The measurement of natural endowments

As discussed in Chapter 3, the natural endowments contained many natural factors that could influence the agricultural productivity. Chinese and foreign scholars used a variety of specific indicators to measure that. Typical indicators include soil fertility, terrain, slope degree, organic matter, irrigation, share of arable land, production of a certain crop, and so forth (Livanis et al., 2006; Duvivier et al., 2005; Sklenicka et al., 2013; Lehn & Bahrs, 2018). In fact, there are too many natural factors that could affect the status of farmland, which makes it difficult to enumerate most of them. Meanwhile, it is also too cumbersome to include these many natural indicators in a research that adopts both agricultural and non-agricultural attributes. Therefore, an alternative and effective way is to use a comprehensive single figure. Drescher and McNamara (1999) introduced the EMZ figure to represent the productivity of

farmland. The calculation of EMZ value is based on the official soil productivity estimations established in Germany, 1935, which measures the lands by soil and climatic conditions. Drescher et al. (2001) also introduced the average crop equivalent rating index named CER, from the University of Minnesota, to analyse the farmland value in that state, US.

In China, a governmental surveying index of the farmland, named Agriculture Land Quality Grade, is being widely used in agricultural researches (Z. J. Wu et al., 2011; Lin et al., 2017; T. Du & Zhu, 2018). To express the complexed natural effects, this nation-facilitated index is introduced, to measure the intrinsic quality of farmlands. It is surveyed and compiled according to Chinese Nation Standard “Regulation for gradation on agriculture land quality”. The central, province and county-level governments built hierarchical databases of this index, and make updates every one or two years.

The agriculture land quality grade index is technically computed in three steps. The first step outcome is the physical grade of farmland, which is a weighted sum of many natural endowment attributes, which include the status of soil, terrain, climate, irrigation, drainage, vegetation, etc. As just for soil, there are six sub-indicators used to calculate the grade, which are effective soil thickness, surface soil texture, profile configuration, PH value, organic matter content, and degree of rock outcrop.

After getting the physical grade of farmland, it is then adjusted by land utilisation coefficients. These coefficients are comprehensively assessed across the nation, to reflect the utilisation status of farmland in the standard production system (e.g. times of harvest each year, normal production of each harvest). The whole territory of China is divided into many regions by drawing contours. Each region is assigned a coefficient. For instance, the city of Chengdu lies in the “Western Sichuan Plains” region, and has an utilisation coefficient of 0.78.

The outcome of the second step is agricultural land utilisation grade; it is then further adjusted by local social and economic coefficients, which is also assigned to the region, to get the final gradation result. Though adjusted two times, the index is mainly an evaluation of the natural endowment of the farmland, because those coefficients are qualitative and highly consistent within the same region.

The agriculture land quality index has 15 grades, of which grade one is the best and grade 15 is the worst. In a rough division, grade one to four is tagged “excellent”, grade five to eight “good”, grade nine to twelve “medium”, and grade thirteen to fifteen “poor”. The index is being used in many governmental and social works, such as rural area planning, soil improving projects, farmland protection surveying and many related research activities (Z. X.

Bian et al., 2011; J. H. Ma, 2016).

5.2.3 The measurement of location factor

The characterisation of the location advantage of a certain area is quite complicated too. But there exists no single index like the agriculture land quality index. Consequently, scholars used various indicators to reflect the location features, including distances and the traffic situation.

The distance from a farmland plot to the nearby urban area could reflect the degree of influence of urban sprawl. This distance is commonly used in the researches concerning urban influence on the farmland price (Lin et al., 2017; Lehn & Bahrs, 2018; Czyzewski et al., 2018). Some scholars used more than one distance to express the spatially overlapped impacts on a plot. For example, in the study about farmland in Illinois State, US, H. X. Huang et al. (2006) take the distance to Chicago and the distance to local county centre into account simultaneously. To study the farmland value distribution pattern in Chile, Donoso et al. (2013) employed both the distance to the regional capital and the distance to Santiago (country capital). A periodical comparison of farmland value determinants was made between 1978-1998 and 1999-2008, revealing a more and more important role of the location indicators. A study about farmland price in Czech Republic adopted even three different levels of distances, which are the distance to the district town, to the regional capital and to the national capital of Prague (Sklenicka et al., 2013). Since land is a two-dimension entity and the administrative division is hierarchical, a combined use of two or more distance figures tend to reflect the layout more precisely.

Shi et al. (1997) made use of the distance factor in a more complex way. A Distance Index was calculated as the increase in urban population divided by the distance squared between the urban area and the relevant county. If there are several urban areas within the distance threshold for a farmland, the total of their impacts is then used. This is supposed to be a better simulation of the pressure of urban sprawl in northeast area of United States. Another relatively unique case is the study about Agricultural Land Reserve (ALR) in British Columbia, Canada. Eagle et al. (2015) used two distances in the research. One is the distance from the farmland plot to Victoria, the provincial capital. The other one is not to some urban area, but to the ALR, suggesting that the ALR could exert a positive impact on farmland value nearby, due to environmental and subsidiary reasons. Besides, Borchers et al. (2014) adopted some more specific distances to describe the micro layout and social infrastructures around

the farmland, such as distances to the park, hospital, and school.

In this research, two distances are introduced to measure the urban-rural attribute of the farmland. Each distance is from navigation software service. These distances are measured by the driving route, instead of straight lines. Thus, they more truthfully indicate the practical plot accessibility. Chengdu is a mammoth city in charge of 22 county-level administrative regions. The downtown area is the most developed and urbanised kernel, which is economically superior to other areas. Apparently, the distance from a farmland to the city centre matters, according to the theory of grading land rent (see Section 3.4.3). Meanwhile, within a county, the distance to the centre matters too, due to the principle of locality. The counties surrounding Chengdu are in a rapid developing period, because the big-city-disease is being concerned and county economy is repeatedly emphasised by the government. These satellite cities are growing into prospering subcentres of the metropolis, which also exert economic influences in the vicinity.

In addition to using the physical distances directly, Drescher et al. (2001) also introduced a simple and clear ADJACENCY indicator to measure the urban sprawl. Counties having immediate borders with metropolitan areas are assigned 1 and the rest are assigned 0. This kind of dummy variable is employed in other studies to make qualitative measurements. For example, a study about German farmland categorises East and West Germany because of the economic gap between them (Drescher & McNamara, 1999).

In this research, a binary indicator named “circle layer”, which is a traditional concept in Chengdu’s city planning, is introduced. This concept derives from von Thünen’s concentric zone theory (see Section 3.4.4). According to that, the development map is like a nest of circle layers from inside toward outside. Chengdu is a city on the plains with a radial domain, which geographically matches the theory’s assumption well. Chengdu government had divided the whole prefecture into three circle-layers in its city-planning files. The first circle-layer is the city centre. The second is six counties in the suburb (Pidu district, Wenjiang district, Qingbaijiang district, Shuangliu district, Xindu district, and Longquanyi district). The third is eight counties in outer suburbs (Chongzhou, Dayi, Qionglai, Jintang, Xinjin, Pengzhou, Pujiang, and Dujiangyan). This attribute is a rough but effective partitional indicator to represent the closeness between downtown and the counties. The circle layer is also like a greatly simplified version of the American Beale Code (United States Department of Agriculture [USDA], 2013), which will be discussed in the next section.

Apart from that, the general traffic facilities in the regions need to be considered as a supplementary factor, since China had always been committed in rural traffic construction to

In summary, to describe the degree of traffic accessibility and convenience, and location characteristics, four indicators are proposed to be taken into the study: distance to the city centre of Chengdu, distance to the local county centre, average highway mileage per area, and the “Circle layer” attribute. Figure 5.1 depicts the administrative divisions of Chengdu, the circle layers, and the distance indicators of a certain farmland plot.

Figure 5.1 Schematic diagram of location variables

5.2.4 The measurement of regional economic and social factors

To measure the overall economic situation of a region, the Gross Domestic Production (GDP) is the most intuitive and common indicator to be considered. Mela et al. (2012) found the regional GDP is positively correlated to the farmland value in all the use types when analysing the situation in Italy. Chinese scholars also used the GDP figure to describe regional economy in the studies of farmland transfer price on big scopes (Lin et al., 2017; Du & Zhu, 2018). Sometimes the overall GDP is adopted, but the most reasonable choice is GDP per capita, to offset the differences of regional population.

The GDP figure is usually counted on county or bigger level, so it is more useful when doing big scope analysis such as nationwide or provincial researches. But on the more micro level, there might be distortions in this indicator because of the variation of economic structure, and the uncertainties usually caused by secondary and tertiary industries. Thus, this figure needs to be used with other regional indicators to generate more credible outcome.

Besides, the average income status of the people is also an important indicator to reflect the economic development degree of certain area. Hypothetically a higher income would cause higher price expectations of the lands. H. X. Huang et al. (2006) discovered a positive impact of the region average income (per capita) on farmland price in Illinois, US. To the contrary, a recent study in Germany found that the income is negatively correlated with the farmland price in North-Rhine Westphalia State, though insignificant (Lehn & Bahrs, 2018). The income indicators used were the average income of all the people in the area, which could include urban residents. An implicit assumption was that the area is mainly agriculture-oriented and the income comes from farm production. However, in China, the income status of the rural people is separately counted by the agricultural departments, which provides a more specific indicator to measure the rural economy. T. Du et al. (2016) used county-level rural resident annual income per capita to analyse the farmland price in Henan Province. In a later study, the province-level rural income was taken into consideration when analysing the farmland price distribution pattern across the whole country (T. Du & Zhu, 2018).

Following this distinguishing thought, it is important to know the role of agriculture, or its proportion, in local economy when analysing farmland issues. In the studies in United States, scholars employed a governmental code system called Rural-Urban Continuum Code, to describe the degree of “ruralness” of a county (Drescher et al., 2001; H. X. Huang et al., 2006). The code is also known as the Beale Code, which is compiled and published by the

United States Department of Agriculture and updated every ten years since 1973. It assigns a one-digit code from one to nine, to each county in the states, where code one means totally urbanised area and code nine indicates the highest extent of ruralness. For non-metropolitan counties, the main factors considered in this system are the degree of urbanisation and closeness to metropolitan areas (USDA, 2013). Unfortunately, there exists no such code system in China. Instead, the proportion of the primary industry production in the whole GDP, was often used to measure how “rural” a region is, due to data availability and effectiveness (T. Du et al., 2016). Other indicators could be the proportion of non-agriculture employment in the US (Drescher et al., 2001), or the income dependence on agriculture in India (Awasthi, 2014).

Next, for the regional characteristics of the land itself, there are several indicators used in the literature, such as the total area of a region (Drescher et al., 2001), total farm area (Duvivier et al., 2005), and the average size of a farm (Drescher & McNamara, 1999). In addition, Drescher and McNamara (1999) put to use the price of land of development to provide a big picture of land use conditions. In China, scholars employed cultivated land area per capita, on province-level or village-level, to measure the scarcity of land resources in a certain region (T. Du & Zhu, 2018; H. C. Feng & Liu, 2018). This indicator is more fitted to the realistic circumstances of China because it reflects the land intensification status in the fast process of urbanisation. Less land per capita would lead to a higher price due to basic supply-demand theory.

Other than the variables discussed above, there are still some regional features frequently used by researchers, such as total population, population density, or rate of urbanisation (Duvivier et al., 2005; Sklenicka et al., 2013; Borchers et al., 2014). In this research, the following five indicators are selected to measure the social and economic development of a county in Chengdu prefecture: Gross Domestic Product (GDP) per capita, Income of rural residents per capita, Proportion of agriculture in GDP, Farmland area per capita, Proportion of primary industry employment.

GDP per capita mainly represents the urban development degree, while income of rural residents per capita measures the farmer’s living standard. These indicators combined, can make more comprehensive and unbiased explanations to farmland price under the urban-rural integration system in Chengdu.

5.2.5 The measurement of transactional factors

Farmland transfer activities are basically done through deals and contracts. Thus, the factors relating to the transactions themselves are to be paid attention to.

5.2.5.1 Transferred area and period

Transfer area and period, which shaped the transaction size, are two direct factors. Z. J. Wu et al. (2011) found a positive correlation between contract period and farmland price in Anhui and Zhejiang Provinces in China. X. B. Wu et al. (2016) held that both area and period had positive impacts on farmland price in Hubei Province. However, Eagle et al. (2015) found that a smaller size of farmland could get much higher unit price than those big ones in Canada, supporting the results of Nickerson and Lynch (2001). It was suggested that the phenomenon was because of the high demand of residential properties. Besides, on the perspective of transaction cost, Drescher et al. (2001) concluded that a larger farm tend to have lower unit price.

Therefore, the two indicators of area and period of a certain farmland transfer deal are adopted in this research to measure the transactional effects.

5.2.5.2 The transaction mode

As discussed in Section 3.2.2, intermediary organisations had been called for by many scholars, and their nature, function and advantages had been studied. But there is scant literature about the intermediary agency's effects on practical deal attributes, especially the price. However, the dataset in this research makes it possible to look into those effects. Among the transaction records from Chengdu Rural Property Exchange, there are three deal modes as below:

(1) Self-closing transactions. These deals are made by direct contact between transfer-out and transfer-in parties, which are reported to the Exchange by its branches and local authorities. The Exchange only registers and records them as an official authentication establishment. This kind of transactions takes about 85% of the total in the dataset. No fees charged.

(2) Match-making transactions. This mode is through the intermediary work of the Exchange. The typical process starts when a buyer from the city needs to find some farmland in the countries. The Exchange gets the requirements such as direction, location, area, land type, and expected price. Then certain land targets are selected through the internal land database and branch connections. These are recommended to the buyer and offline trade deals

are arranged and negotiated. This process is similar with the way urban real estate agencies make services. There is a 0.15% fee of annual rent charged on both sides if a deal is made.

(3) Transaction by bidding. The Exchange conducts a public bidding activity, and the highest bidder gets the deal. Technical implementations could be listing, one-time sealed quotation, or electronic bidding like the Quanshui case discussed in Section 2.7.3. This kind of transaction is the most commercial way and usually starts from the seller side with a relatively good land. There is a 0.5% fee of annual rent charged on both sides if successfully done. Like in the other biddings or auctions in the real world, the transferring-out party might have made preliminary contacts with one or several potential buyers. Nonetheless, the result still depends on the formal outcome of the bidding activity.

Mode (2) and (3) are considered together as deals with intermediary effects of the Exchange. They take a small part of the whole (totally 15%, 12% for mode 2 and 3% for mode 3), but the proportion would increase as the marketisation is going on. Hypothetically in a not fully developed market, the intermediating agency could help connect and inspire more participants, reduce information asymmetry, thus discover the more effective market price, which is often higher than in the local traditional way. Still, the competitive bidding mode could make the price even higher. In this research, the different impacts of these three modes above on the price of farmland transfer deals would be observed.

5.2.5.3 The nature of managing entities

With the gradual opening of the farmland market, many organisational forces had joined in agricultural production. The one caused most concern is the agricultural enterprises usually coming from the cities. There is a small amount of research about the incoming enterprises, but their main focuses were legal regulations, risk of contract breaches, and abandonment of cultivation (Q. J. Bian et al., 2011; R. Z. Chen & P. Chen, 2013; L. Wu & Zhou, 2014). Still, there is a dearth of study about these new managing entities' impact on the farmland price, especially by the enterprises. The dataset in this research contains the information of the nature of transfer-in parties, which makes it possible to analyse their heterogeneous influences.

As mentioned in Section 4.8, there are mainly three types of transferees managing entities: large grain growers, farmers' professional cooperatives, and agriculture enterprises.

(1) In the previous decades, a huge team of skilled farming experts, had been growing and prospering in rural China. They earn the living by doing commercialised agricultural production. They need to have bigger scale of cultivation, to get a profit no less than a migrant

job or some other business. Scale grain production can reduce cost and increase production, which makes the “large grain growers” to be active in the market and rent in farmland. When the land is big, they tend to grow finer grain varieties, with better fertiliser, pesticide, and machinery, which raise production efficiency.

A “family farm” is like an upgraded version of a large grain grower, except that its labour force usually includes several family members in a farmer household. This concept basically came from western countries like France and United States, and the Chinese government had been using it in many supportive files since 2013 (Q. Z. Zhu et al., 2014). This expresses a thought of developing moderately intensified agriculture while keeping the conventional rural family system of production.

(2) Farmers had been joining together to counter production risks for a long history. In contemporary China, these cooperatives are formed by more than five spontaneous farmer households, to help each other on agricultural production, sale, processing, transportation, and storage. Within a cooperative the members share skills and information to serve others’ demand (S. G. Wang, 2008). HCRS is the system foundation of farmers’ cooperatives, and members can join and quit autonomously, while keeping their own farmland contracting and managing rights securely. This type of entity is like the intermediary form between large grain farmers and agricultural corporations. It is more organised than individual farmer households, while it is less profit-making and more economically democratic compared to a modern company. In practice, members often entrust the issues to a certain convener, who does the communication, coordination, and operation.

(3) An agricultural enterprise has higher views, better managing skills and better organisation structure than normal farmers. Meanwhile, the nature of an enterprise makes it most eager for profit. Usually, it has stronger financial support, and tends to invest on the farmland to make better production rate, when it needs big contiguous land with a rather long-term contract. It also has a tendency of using machinery and new technologies, even like the most cutting-edge drones. It does the farm work more like an industry, as the central government started to encourage urban business capital to go and invest in the rural area, since 2013 (Ren & Meng, 2015).

When the red line between farmland and non-agriculture land are strictly kept, enterprises tend to do more profitable operations other than growing grain. These operating activities can include planting vegetables and fruits, planting cash crop like tea, tobacco, flowers, and herbs, breeding seedlings, and farming animals. In the suburb area near big cities, many enterprises are getting net avenues from “sight-seeing agriculture” or “leisure agriculture”, in place of

agricultural products. It is counter-intuitive to regard these kinds of business as “agriculture” in the conventional thought. But they do act under the prescribed limit of farmland managing rules. Such phenomenon occurs quite seriously around Chengdu, which also caused concerns.

As discussed in the previous chapter, among these new types of managing entities, the behaviour of enterprises could be more unique and commercial. Thus, for comparison, the grain growers (including family farms) and farmers’ cooperatives are merged as one “non-enterprise” group, and the other group is the enterprises. Their different elasticities to those price determinants could be tested thereby.

5.2.6 The measurement of policy factor

As discussed in Section 2.7, Chengdu government started to implement the performance bond insurance subsidy for farmland transfer contracts in May, 2017. This was the most significant policy within the time span of this research (2016-2018), and the start time was right in the middle, thereby providing a good time window to observe its effects. Hence, this policy is selected to represent the impact of government intervention on the market.

5.2.7 Summary

In this Section, 14 independent indicators in five categories, which might affect farmland transfer price, are selected and their measurements are discussed. These variables are summarised in Table 5.1.

Table 5.1 Independent variables that affect farmland transfer price

Category	Variable	Type
Natural Factors	X1: Agriculture land quality index	Continuous
	X2: Distance to the city centre of Chengdu	Continuous
Location Factors	X3: Distance to the local county centre	Continuous
	X4: “Circle layer” attribute	Categorical
	X5: Average highway mileage per area	Continuous
	X6: Gross Domestic Product (GDP) per capita	Continuous
	X7: Income of rural residents per capita	Continuous
Social and Economic Factors	X8: Proportion of agriculture in GDP	Continuous
	X9: Farm area per capita	Continuous
	X10: Proportion of primary industry employment	Continuous
	X11: Transfer area	Continuous
Transactional Factors	X12: Transfer period	Continuous
	X13: Transaction mode	Categorical
Policy Factors	X14: Type of the managing entity	Categorical
	X15: Affected by performance bond insurance	Categorical

5.3 An overview of the study area

5.3.1 The general situation

Chengdu is a prefecture level city in Sichuan Province. It is the capital of Sichuan, and one of the nine National Central Cities formally approved by the central government (S. H. Du & Ge, 2018). It is also a national high-tech industrial centre, a trade and comprehensive transportation hub. The city is international renowned for its vast plains, great ancient irrigation projects, and the panda base.

Chengdu is the leader of economic development in Western China, with a fast-growing population and sprawling urban area. In 2018, the total population of permanent residents in Chengdu prefecture is 16.33 million, within which the urban population is 11.94 million. Thus, the urbanisation rate is 73.12%. Meanwhile, the prefecture's natural population growth rate is 3.4‰. The prefecture's area is 14,335 square kilometres, while built up area is 931.58 square kilometres. The total Gross Domestic Product (GDP) is 1,534 billion RMB Yuan, of which the primary industry product is 52.2 billion, taking 3.40%. The secondary and tertiary industries' product are 651.62 billion Yuan and 830.40 billion Yuan, taking 42.48% and 54.12% accordingly. The total highway mileage is 27,731 kilometres, and the highway density is calculated 193.45 kilometres/100 km² (Chengdu Government, 2018).

Currently, Chengdu Prefecture consists of 21 county-level administrative regions. The metropolitan regions, including five urban districts, locate in the centre of the whole domain. Other county-level regions are distributed around the main urban area, presenting two “circle layers”. These 16 regions contain 8 county-level districts, 5 county-level cities and 3 counties, which are referred to as counties collectively in this research.

5.3.2 The natural conditions

Chengdu city lies between 102 ° 54' and 104°53', east longitude, and between 30°05' and 31° 26', north latitude. Figure 5.2 depicts the overall topography of Chengdu prefecture. As it is seen, the urban area is built on the vast and rich Chengdu Plains, which is on the northwest edge of Sichuan Basin. The terrain of the whole prefecture inclines from northwest to southeast. The highest peak exists in the remote western part with altitude of 5,364 meters, on the edge of Sichuan Basin and Hengduan Mountains. The average altitude of hinterland Chengdu is about 750 meters, and the east most river valley area has the lowest altitude below 400 meters. Due to the huge elevation differences, Chengdu has formed a unique geomorphic

pattern of one third plain, one third hill and one third mountain (Chengdu Government, 2018).



Figure 5.2 Topographic map of Chengdu

Source: Chengdu municipal bureau of planning and natural resources

Chengdu has a subtropical monsoon climate. The annual average temperature is 16 °C and the annual rainfall is about 1000 mm. Two remarkable features of Chengdu's climate are the cloudy day and high air humidity. Therefore, sunshine is short and cherished. Though the temperature is not high in summer (usually under 35 °C), it is rather muggy. In the winter, the average temperature is above 5 °C, but the human perception is a little colder because of humid air. The rain in Chengdu is concentrated in July and August, and it is dry in winter and spring. Ice and snow are rare on densely populated plains (Chengdu Government, 2018).

The land types in Chengdu are quite diversified. According to the soil types can be divided into 11 types such as paddy soil, fluvo-aquic soil, and the typical purple soil of Sichuan Basin. The plain area amounts to 4971.4 km², accounting for 40.1% of the city's total land area, which is far higher than the level of 12% in China and 2.54% in Sichuan Province. The land is fertile with a high reclamation index, and the soil layer is very deep. Together with

the mild climate, and convenient irrigation, the utilised land area could reach 94.2% of the total. The average land reclamation index (proportion of arable land) of the whole prefecture is 38.22%, of which the plain area is more than 60%, also far higher than the national level and Sichuan level (Chengdu Government, 2018).

5.3.3 An overview of agriculture and rural area

At the end of 2016, there were 9648 farmers' cooperatives registered in the industrial and commercial departments, and 3808 farmers' cooperatives registered in the agricultural census mainly focused on agricultural production and operation or services. There are 1.657 million farmer households, including 275,000 scale-managing households. The total labour in agriculture production was 2.2264 million, of which 108,100 work in scale managing entities as managers or employees (Chengdu Statistics Bureau, 2018).

The total area of cultivated land in the prefecture is 529,391 ha, of which 273,680 ha is irrigated. The grain yield per hectare is 6.012 ton for rice, 2.461 ton for rape seeds, and 34.2 ton for vegetables. The per capita income of rural residents is 22,135 Yuan, compared to 42,127 Yuan of urban residents (Chengdu Statistics Bureau, 2018).

5.4 Dataset

5.4.1 The main data source

The main data source is the farmland transfer records from Chengdu Rural Property Exchange. This research takes the farmland records from 2016 to 2018, within Chengdu Prefecture, to be the main data. The data is structured, each containing 8 main fields: (1) Location of the plot; (2) Name and type of the transferor; (3) Name and type of the transferee; (4) Transferred area; (5) Transferred period in contract; (6) Amount contracted; (7) Type of transaction; and (8) Conversion rate. The key dependent variable, the value of farmland transfer price (land rent rate), is calculated by division. In some cases, the price is set in kind; thus, the conversion rate is used to get a price in currency. A conversion rate refers to the price of a specific corn type in that year and locality, which might have small fluctuations over time. The typical price for rice is 5.2 yuan/kilogram, and 3.3 yuan/kilogram for yellow millet.

5.4.2 Other data sources

The main dataset is supplemented by the three parts of data as follows:

(1) The second part is the farmland quality indexes for each sample unit. These are acquired from the database in Department of Natural Resources Chengdu. The database has the patch-level outcome of farmland quality surveying each year. This is a very professional and useful index to measure farmland natural status and productivity.

(2) The third part is the distances to city centre and to county centre, for each record. These were obtained by using online navigation service of Baidu.com, which is the most widely used navigation platform in China. The navigational distance is adopted rather than straight line distance, because the former reflects the actual urban access more accurately. The city centre is set to be Tianfu Square in Chengdu, and each local centre is set to be the county government.

(3) The fourth part is the economic statistical data for each county, including GDP per capita, highway density, proportion of agriculture, and farm area per capita. These are from statistical yearbook of Chengdu 2018.

5.4.3 The nested data structure

Each record in the dataset contains the plot address of the farmland; thus, it is convenient to know which county it belongs to. As previously discussed, the variables (columns in the database) can be divided into two level categories: the ones expressing the farmland's own features, and the ones reflecting the general situation of the county. The categorisation is listed in Table 5.2. Farmlands in the same county share identical county-level indicators. The whole dataset contains 1805 sample units, and can be clustered by the county name as a cluster-id. There are totally 16 clusters.

Table 5.2 Variables on individual level and county level

Individual Level	County Level
Unit Price (UPR)	
Agriculture land quality index (LGR)	“Circle layer” attribute (CIRL)
Distance to the city centre of Chengdu (DTC)	Average highway mileage per area (HDEN)
Distance to the district centre (DTDC)	GDP per capita (PERGDP)
Transfer area (AREA)	Income of rural residents per capita (PERIN)
Transfer period (PERIOD)	Primary industry share (PPR)
Transaction mode (TRM)	Farm area per capita (PERF)
Type of the Managing Entity (TME)	Farm employment share (PPEM)
Affected by performance bond insurance (PBI)	

5.5 Model specification

To analyse the comprehensive effects of different factors, a hedonic multivariate model is to

be specified. There are several conventional approaches to ascertain the factors that affect land price, such as multiple linear regression, logistic multiple regression, and ridge regression. However, as discussed in Section 5.4, the independent indicators in this research are distributed on two levels. One is the individual level related to the farmland plot itself, and the other is the regional statistical figures on the county level. The dataset is, thus, hierarchically structured, which needs to be analysed in a more suitable way. This section first makes a brief introduction of the Hierarchical Linear Model, then discusses model formulation and the research process.

5.5.1 Introduction to HLM approach

In the hierarchical dataset, the sample units within the same group, like the students in the same class, tend to have higher correlations because they share some common group-level features, just like the students in one class share the same teachers and classroom. Sample units from different groups are more diversified due to the differences of both individual-level and group-level effects. To apply the traditional regression model such as ordinary least squares (OLS) to this kind of dataset means to treat all the samples equally as independent observations. But, the hierarchical structure of the data violates the very assumption of OLS analysis, which is the independence of the observations. This can lead to biased outcome, where the variances are usually underestimated. In another word, the clustered sample units are “deconcentrated”, and the group effects are ignored and resolved in the linear residual, which caused error-prone results that contradicts the real-world mechanism.

To estimate the effects of high-level variables, another simple approach is to treat the groups as individual samples and do a regression on these combined entities. Within each group, the individual-level variables are “concentrated” and represented, usually by their arithmetic mean or median. Then, these values are assigned to the groups as control variables, and the consequent regression could be still one-levelled. This approach is not reasonable for two reasons: (1) The valuable and diversified individual information within the groups is discarded and wasted, thereby damaging the accuracy of their corresponding coefficients; (2) The original groups usually differ in their populations, so the actual weight of each group was very different. To combine within-group samples means to eliminate the impact of original weights, which leads to biased estimated results too.

Therefore, neither the “concentration” approach nor the “de-concentration” approach is the right way to handle the nested data structure. The effects of two or more levels must be

analysed simultaneously to generate unbiased estimate results. That is where the HLM comes in.

Hierarchical Linear Model (HLM) is also named Linear Mixed Model, Random Effects Model, or Variance Components Model. Its basic idea is to separate the variance into within-group and between-group components, and comprehensively deal with the effects on each level. The concept of HLM was firstly proposed in 1972 (Lindley & Smith, 1972). Then, Dempster et al. (1981) realised the model by applying expectations-maximisation (EM) algorithm. Goldstein (1986) improved the implementation of HLM by using iteratively reweighted generalised least squares (IRGLS). Longford (1987) also improved it by introducing Fisher scoring algorithm. These algorithmic improvements, together with the development of statistical software, have made HLM a mature technique commonly used in social sciences.

5.5.2 The applications of HLM

Since HLM was mainly designed to manipulate hierarchical datasets, it is often used in the aspects where nested data structure exists, such as schools (V. E. Lee, 2000; J. P. Shen et al., 2014), higher education (W. Bao & Liu, 2011), organisational psychology (Davison et al., 2002; J. H. Chang & Teng, 2017), and politics (Ikeda et al., 2008). The typical research objects could be the math score of students in different classes, or performance of employees within different enterprises.

As Tobler's First Law of Geography expressed, everything is related to everything else, but near things are more related to each other (Tobler, 1970). The things in a certain range of space are spatially autocorrelated and have clustering effects. This brings another common application scene for HLM: to deal with cross-regional mass observation data, because the samples are automatically nested within regions. The research topics include such as employment and wage of the people in different cities (Berry & Caplan, 2010).

Moreover, almost all the real estate assets, including lands, buildings, and houses, have location features inevitably. They are always nested in blocks, neighbourhoods, districts, cities and even prefectures or provinces. This innate hierarchical spatial structure makes HLM an excellent choice to analyse the impacts of different levels. In recent years, there are more and more researches about real estate asset mass appraisal using the multilevel model, especially in urban areas (Uyar & Brown, 2007; Arribas et al., 2016; S. Lee & Choi, 2017).

The farmland transfer price problem in this thesis is a real estate problem too, but

concerning the rural assets instead. Currently there are a few studies that applied HLM to farmland price and some other agricultural topics. Czyzewski et al. (2018) employed HLM to analyse the determinants of farmland prices in Poland. Under Chinese rural context, this model was used to observe the regional impacts of agricultural subsidies (Y. Y. Wang et al., 2017), and the farmers' willingness to quit the contracted land rights (J. Gao et al., 2017). To the author's knowledge, there are very few researches on China's farmland transfer price using the HLM approach.

5.5.3 Model formulati

The basic hedonic formulation can be expressed as:

$$Y_{ij} = \beta_0 + \sum_p \beta_p X_{ijp} + \sum_q \beta_q G_{jq} + \varepsilon_{ij} \quad (5-1)$$

where Y_{ij} is the dependent variable farmland transfer price, for the i -th sample in group j , and X_{ijp} is the value of the p -th first-level independent variable for that sample, with its coefficient β_p . G is the vector of group-level independent variables, and G_{jq} indicates the q -th variable for the whole group j , with its coefficient β_q . β_0 and ε_{ij} are the constant intercept and the error term, respectively.

The error term ε_{ij} is different from that in one-level regression models (OLS), because it consists of two components: the individual-level residual and the group-level residual. This could be written as:

$$\varepsilon_{ij} = u_j + r_{ij} \quad (5-2)$$

It is obvious seen that variance within a group is smaller because it only involves with r_{ij} , while the between-group variance is bigger since it involves with both u_j and r_{ij} . The basic assumption about these two error terms is that they are both normally distributed and independent from each other:

$$u_j \sim N(0, \sigma_u^2) \quad (5-3)$$

$$r_{ij} \sim N(0, \sigma_r^2) \quad (5-4)$$

$$\text{Cov}(u_j, r_{ij}) = 0 \quad (5-5)$$

Therefore, it can be deduced that the total variance of ε_{ij} is the sum of these two variances:

$$\text{Var}(\varepsilon_{ij}) = \text{Var}(u_j + r_{ij}) = \text{Var}(u_j) + \text{Var}(r_{ij}) + 2 * \text{Cov}(u_j, r_{ij}) \quad (5-6)$$

$$\text{Var}(\varepsilon_{ij}) = \text{Var}(u_j) + \text{Var}(r_{ij}) \quad (5-7)$$

Formula (5-7) expresses the advantage of HLM that the total variance is broken into individual-level and group-level variances, thereby providing the valuable information on how much each level contributed to the whole. A typical parameter to measure the proportion of impacts is called Intraclass Coefficient (ICC):

$$ICC = \frac{\sigma_u^2}{\sigma_u^2 + \sigma_r^2} \quad (5-8)$$

where σ_u^2 and σ_r^2 denote the variances of u_j and r_{ij} . A higher ICC value means the homogeneity within groups (intra class) is stronger, the samples in the same group are closer to each other. This measure is also called Variance Partition Coefficient (VPC), which denotes the proportion the between-group variance σ_u^2 takes in the total. A higher VPC value indicates that the between-class variance has a larger weight.

With the decomposition of ε_{ij} , formula (5-1) is expressed as:

$$Y_{ij} = \beta_0 + \sum_p \beta_p X_{ijp} + \sum_q \beta_q G_{jq} + u_j + r_{ij} \quad (5-9)$$

To specify the group-level effects, a combined variable is defined as:

$$\beta_{0j} = \beta_0 + u_j \quad (5-10)$$

where β_{0j} refers to the *random intercept* for group j , which is a key concept for HLM analysis. Since $u_j \sim N(0, \sigma_u^2)$, u_j can be positive or negative in different groups. Hence the variety of β_{0j} demonstrates the different initial conditions of these groups. This variety exists there even before the introduction of fixed effects into the model. A Zero Model, which only considers the group effects without the independent variables, could help to see the initial differences.

With the definition of β_{0j} , formula (5-10) is further expressed as:

$$Y_{ij} = \beta_{0j} + \sum_p \beta_p X_{ijp} + \sum_q \beta_q G_{jq} + r_{ij} \quad (5-11)$$

Finally, in this research, continuous and categorical independent variables exist on both levels. Therefore, to get stable results and reduce heteroscedasticity, the logarithms of continuous variables are calculated. Thus, the practical formula used in this thesis is:

$$\ln Y_{ij} = \beta_{0j} + \sum_p \beta_p X_{ijp} + \sum_{p'} \beta_{p'} \ln X_{ijp'} + \sum_q \beta_q G_{jq} + \sum_{q'} \beta_{q'} \ln G_{jq'} + r_{ij} \quad (5-12)$$

where X_{ijp} refers to categorical variables and $X_{ijp'}$ refers to continuous variables on the first level. G_{jq} and $G_{jq'}$ do the same way for group-level variables.

5.5.4 Research process

As the model formulation is set, the regression is to be carried out in the following steps:

(1) A Zero Model is firstly tested to see the initial differences of the county groups. No

independent variable introduced;

(2) The individual level independent variables (LGR, DTC, DTDC, AREA, PERIOD) are added to the model and tested;

(3) The county-level independent variables (CIRL, HDEN, PERGDP, PERIN, PAG, PERF) are then added and tested.

So far, a basic model of common determinants of farmland transfer price is constructed. An OLS analysis of all the indicators above is also done, to be compared with the HLM model about their effectiveness. Pseudo- R^2 and several other indicators (MAE, MAPE, and RSME) are employed to facilitate the comparisons.

Afterwards, with the basic model of common determinants, the variables of transaction mode and performance bond insurance policy is added to the model in turn, to see the impact of intermediary agents and the policy. The type of managing entities is further used to see the heterogeneous effects. Details are to be given in Chapter 6.

Chapter 6: Results

6.1 Introduction

This chapter shows the main results in this thesis. First, a descriptive analysis of the sample is provided. Then, a correlation analysis is also performed on the indicators. After that, the hypotheses in this thesis are tested using the multilevel model, and the estimated results are presented with a brief summary.

6.2 Descriptive statistics

6.2.1 The general statistics

The descriptive statistics are adopted first to summarise the distribution status of each indicator, before the model testing. Statistical indicators including mean value, maximum value, minimum value, median value and the standard deviation were used to see the overall numerical features of the variables. The results are given in Table 6.1

Table 6.1 General descriptive statistics

	Mean	Std. Dev.	Min	Max	Median	Coef. var.
UPRICE	1197.096	669.58	100	4498.413	1020.018	0.559
AREA	161.188	299.697	0.1	4477.49	73.4	1.859
PERIOD	13.67	8.585	2	70	11	0.628
DTC	52.891	19.586	16.1	129.6	51.1	0.370
DTDC	18.337	11.706	2	78	15.1	0.638
LGR	7.132	0.863	5	10	7	0.121
PERGDP	80489.225	26778.368	38692	150037	88681	0.333
PERIN	25408.062	2775.834	18009	30405	25004	0.109
HDEN	228.106	77.766	99.548	376.212	243.622	0.341
PPR	0.074	0.05	0.019	0.144	0.042	0.676
PPEM	0.22	0.068	0.102	0.398	0.222	0.309
PERF	0.716	0.238	0.166	1.337	0.671	0.332
CIRL	0.493	0.5	0	1	0	1.014
TRM	0.151	0.359	0	1	0	2.389
TRM1	0.113	0.316	0	1	0	2.829
TRM2	0.038	0.191	0	1	0	5.053
PBI	0.404	0.491	0	1	0	1.215

As it is seen in Table 6.1, the average price of farmland is 1197.096 Yuan/(mu*year). The price is found to be right-skewed since the median (1020.018) is smaller than the mean. Its

kernel density estimate is shown in Figure 6.1 An approach to partially solve the skewness problem is to use the logged form in this research. Other continuous variables are logged too.

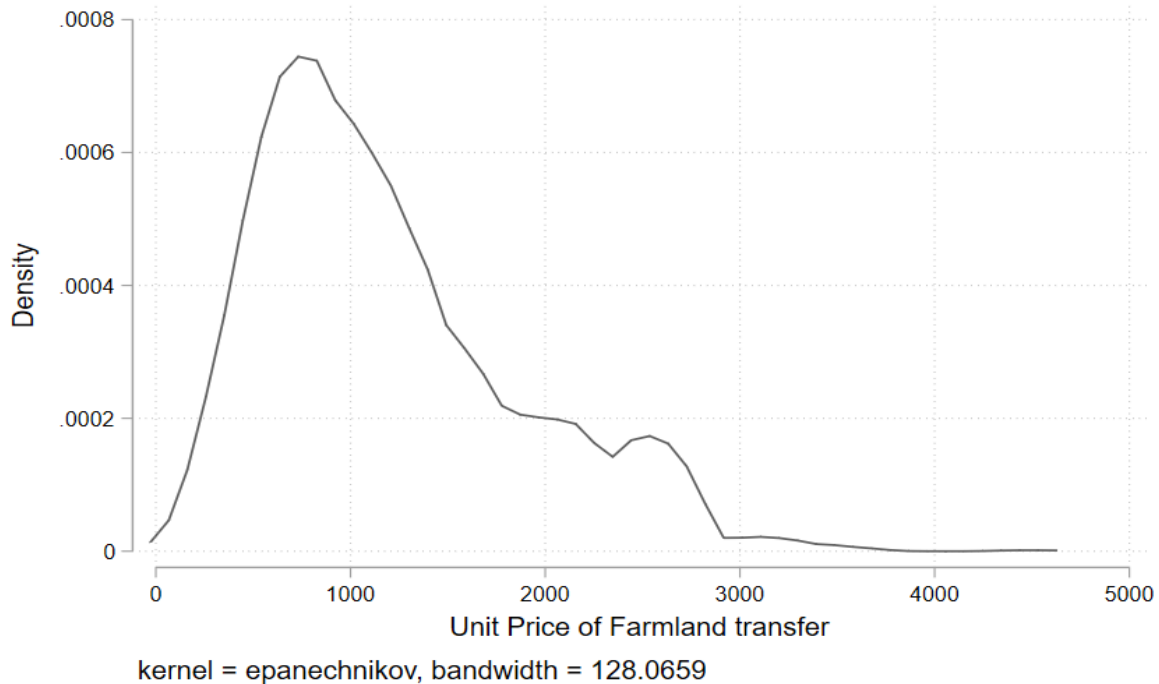


Figure 6.1 Kernel density estimates of price

On the individual farmland level, the average area per transaction is 161.188 mu. Average period is 13.67 years. The mean distance to city centre of Chengdu is 52.891 km, and to the local county centre is 18.337 km, which are roughly consistent with the geographical distribution of Chengdu prefecture. It could be inferred that most of the traded farmland is in the middle ground between the city and the counties. Those further than the outer counties take a small proportion.

On the county level, for the 16 counties involved in this study, the weighted mean of GDP per capita is 80489 Yuan, while average rural residents' annual income is 25408 Yuan, which reflects that the income of villagers is far behind the total economic growth. The average high way density is 228.106 km/100 km². The mean of proportion of primary industry, and proportion of primary industry employment is 7.4% and 22%, accordingly. Finally, the mean of farm area per capita is 0.716 mu, which is much less than that of Sichuan province (1.209 mu) and the whole nation (1.456 mu), showing that the scarcity of cultivated land in Chengdu is relatively high.

Besides, according to the medians, a typical farmland parcel traded was of area of 73.4 mu and land grade seven. The distance to Chengdu city centre is 51.1 km and that to the local

county centre is 15.1 km. The price is 1020 Yuan/(mu*year) while the contract period is 11 years.

A typical county is of the following characteristics: GDP per capita is 88681 Yuan and rural resident's income is 25004 Yuan. Highway density is 243.622 km/100 km². Primary industry product proportion is 4.2% and that of its employment is 22.2%. Farm area per capita is calculated 0.67 mu.

6.2.2 The statistics of concrete and categorical variables

The value distribution statistics of those categorical variables are given in Table 6.2. As it shows, the value range of agricultural land quality index is from 5 to 10. There is no farmland of very high quality (grade 1-4) or very low quality (grade 11-15). This index is of approximately normally distribution, with the median grade 7 taking half of all the observations, and the proportion of other grades decreasing from middle to both sides.

From the perspective of circle layer, it is seen that numbers of observations from the second and the third circle layer counties are almost equal. For transaction modes, the intermediated deals take about 15% of the whole, in which the bidding mode takes only 3.8%. For the policy variable, about 60% of the whole were not affected by the performance bond insurance subsidy policy (which are transactions before June of 2017, and not in Qionglai county), and the rest 40% were affected by the policy.

Table 6.2 Frequency distribution of the variables

Variable	Value	Number	Proportion	Remarks
LGR	5	4	0.22%	Lower grade digit indicates better land quality
	6	404	22.38%	
	7	897	49.70%	
	8	350	19.39%	
	9	149	8.25%	
	10	1	0.06%	
CIRL	0	915	50.69%	0: Suburb
	1	890	49.31%	1: Remote suburb
TRM	0	1533	85.10%	0: No intermediary
	1	272	14.90%	1: Intermediated
TRM1	0	1602	88.75%	0: Others
	1	203	11.25%	1: Intermediated negotiation
TRM2	0	1736	96.18%	0: Others
	1	69	3.82%	1: Bidding
PBI	0	1075	59.56%	0: Not affected by PBI
	1	730	40.44%	1: Affected

6.3 The correlation of the factors

The correlation test results of the variables are provided in Table 6.3. From the content of this table, it is seen that the farmland transfer price is correlated to most of the independent variables. County GDP per capita, rural residents' income and highway density have significant positive correlations with the price, while distance to city centre, distance to county centre, agricultural land quality grade, county proportion of primary industry in GDP, farm area per capita, proportion of primary industry employment, and the circle layer have significant negative correlations. Two contractual indicators, the area and period, were found not significantly correlated to the price. The comprehensive impacts of these indicators would be further examined in the regression tests later. In addition, some of the correlation coefficients are relatively high, but all are lower than 0.8, indicating that the multicollinearity between these variables is quite limited.

Table 6.3 Correlation matrix

	lnUPRICE	lnAREA	lnPERIOD	lnDTC	lnDTDC	LGR	lnPERGDP	lnPERIN	lnHDEN	lnPPR	lnPERF	lnPPEM	CIRL
lnUPRICE	1.000												
lnAREA	-0.037	1.000											
lnPERIOD	0.002	0.046	1.000										
lnDTC	-0.4193*	0.1343*	0.3483*	1.000									
lnDTDC	-0.2839*	0.015	0.077	0.3454*	1.000								
LGR	-0.2898*	-0.076	0.2597*	0.2391*	0.3064*	1.000							
lnPERGDP	0.2676*	-0.1793*	-0.1424*	-0.6207*	-0.1583*	-0.044	1.000						
lnPERIN	0.4632*	-0.1372*	-0.1936*	-0.7351*	-0.2478*	-0.3426*	0.7101*	1.000					
lnHDEN	0.1115*	-0.1693*	0.1792*	-0.3410*	0.1036*	0.5557*	0.5781*	0.3054*	1.000				
lnPPR	-0.4051*	0.1577*	0.1198*	0.5705*	0.1512*	0.042	-0.6913*	-0.6067*	-0.5555*	1.000			
lnPERF	-0.4066*	0.1630*	0.3018*	0.6592*	0.1967*	0.2454*	-0.6375*	-0.5367*	-0.3497*	0.5795*	1.000		
lnPPEM	-0.3349*	0.1171*	0.2992*	0.6914*	0.3670*	0.4453*	-0.4507*	-0.6545*	-0.059	0.6059*	0.6592*	1.000	
CIRL	-0.3868*	0.1059*	0.2613*	0.6287*	0.1759*	0.2019*	-0.5722*	-0.6115*	-0.4650*	0.7094*	0.5987*	0.5608*	1.000

6.4 The estimated results of basic determinants

6.4.1 Model test process

The first part of the analysis aimed to explore the basic determinants that affect farmland transfer price in China. The indicators were listed in Section 5.2 and divided on the individual level and on the county (group) level. To apply the HLM approach, the 16 counties were used as grouping proxies. In order to analyse the different impacts of the levels, three specific HLM models were tested in sequence. Model (1) was the “Zero Model”, in which none of the independent variables were introduced and only the group effects were tested. Then, model (2) was to test the impacts on the individual level. Five individual indicators, including area, period, distance to the city centre, distance to the county centre, and land grade, were involved. After that, the county level characteristics were added in model (3), to test the effects of both levels simultaneously. Those group indicators were GDP per capita, rural residents’ income per capita, highway density, proportion of primary industry in GDP, proportion of primary industry employment, farm area per capita, and circle layer.

Besides, to compare with the traditional single-level regression approach, an ordinary least square (OLS) model of all the indicators was also tested as model (4). The variances and R^2 or Pseudo- R^2 were calculated for each model, as well as the group variances of the HLM models. Three error indicators were introduced to measure the fitness of each model: mean squared error (MAE), mean absolute percentage error (MAPE), and root mean squared error (RMSE). The intra-class coefficient (ICC or VPC) was calculated for the hierarchical models too, to measure the ratio of random effects caused by the two levels.

Table 6.4 Estimated results of basic determinants

	(1) HLM Zero Model	(2) HLM Level 1	(3) HLM Level 1&2	(4) OLS Model
Explained: lnUPRICE				
lnAREA		0.006 (0.782)		-0.005 (-0.556)
lnPERIOD		0.016 (0.654)		0.071** (2.204)
lnDTC		-0.345*** (-5.272)	-0.335*** (-5.040)	-0.303*** (-4.668)
lnDTDC		-0.114*** (-5.137)	-0.118*** (-5.286)	-0.196*** (-9.317)
LGR		-0.437*** (-18.074)	-0.442*** (-18.193)	-0.334*** (-13.403)
lnPERGDP			-1.270*** (-3.383)	-1.102*** (-10.599)
lnPERIN			-0.055 (-0.048)	0.480* (1.757)
lnHDEN			0.611** (2.311)	0.413*** (7.548)
lnPERF			-0.797* (-1.944)	-0.087 (-0.523)
lnPPR			-0.726*** (-2.699)	-0.700*** (-9.394)
lnPPEM			0.963** (2.525)	0.719*** (7.124)
CIRL			0.508 (1.565)	0.230*** (2.844)
2017.year		0.103*** (3.918)	0.104*** (3.975)	0.100*** (3.659)
2018.year		-0.025 (-0.804)	-0.024 (-0.782)	-0.089*** (-3.210)
Intercept	6.979*** (64.627)	11.726*** (39.100)	22.106** (2.010)	15.146*** (5.159)
Random effects				
Total variance	0.390	0.319	0.234	0.213
Between group variance	0.180	0.152	0.067	-
Within group variance	0.210	0.167	0.167	-
ICC or VPC	0.460	0.476	0.287	-
R ²	-	0.169	0.352	0.387
MAE	0.473	0.469	0.362	0.344
MAPE	0.705	0.070	0.054	0.051
RMSE	0.347	0.344	0.226	0.211
N	1805	1805	1805	1805
Number of groups	16	16	16	-

t statistics in parentheses: $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

6.4.2 The basic results

The basic estimated results are shown in Table 6.4. In the preliminary test of the five individual level indicators (model 2), the results of the two distances and land grade are very significant (at 1% level). It means that 1% increase of the distance to the city centre, would

cause the price to fall 0.35%, and that of the distance to local county centre would cause a 0.11% decrease of price. These results are in line with expectations. The impact of nearby county centre is smaller than that of the metropolis (about one third), but it is still conspicuous. The agricultural land quality index, representing the natural endowments of a parcel, also plays a very significant role. It is revealed that an “upgrade” of one level (for instance, from grade seven to grade six) would cause the price to increase 43.7%. The results of contract area and period are insignificant, meaning there were no correlations detected; thus, these two indicators were removed from the model.

Then, model (3) gives the results of indicators on both levels. As the results suggest, GDP per capita is significantly but negatively correlated with the farmland transfer price. An increase of 1% in GDP per capita leads to a decrease of 1.27% in the price. The correlation is as expected but the minus sign is somewhat counterintuitive. Significant correlations were also found between other four county level indicators and the price. Highway density has a positive correlation ($p < 0.01$), with an elasticity of 0.611, meaning a 1% rise in the transportation infrastructure would lead to a 0.61% rise in the price. The proportion of primary industry product in total GDP was found negatively correlated (elasticity = -0.726) with the price ($p < 0.01$), indicating that farmland in a more agriculture-oriented county tend to have a lower price. On the other hand, the proportion of primary industry employment, which reflected the labour force ratio in agriculture, was found to be positively correlated with the price ($p < 0.05$), with elasticity of 0.963). This result suggests that more intense labour force in agriculture would generate a higher price. Farm area per capita is found to be negatively correlated ($p < 0.1$). A 1% increase in it would cause the price to decrease 0.80%, suggesting the scarcity of farmland in a region matters to its price. No significant correlations were found between the rest two regional indicators and the price, which are the rural residents' income and circle layer.

To sum up, three of the five individual level indicators were found to be significantly correlated to farmland transfer price. These are DTC, DTDC and LGR, whose impacts were very conspicuous. From the results in Model (2) and Model (3), it is seen that their coefficients had very little changes after the county level indicators were introduced. Then, on the county level, five (PERGDP, HDEN, PERF, PPR, PPEM) of the seven indicators were found to be significantly correlated. Most of these significant indicators had the expected impact direction. The only exception is the GDP per capita with a negative correlation with the farmland price.

6.4.3 Model comparison

As results of the four tested models from Table 6.4 expresses, the total variance of random effects obviously decreased when more indicators were added in the HLM models, which expresses the part of the variance that is explained by the independent variables.

In model (2), where only the individual level indicators were estimated, the within-group variance was 0.167, much smaller than that of the zero model (0.210). The VPC (0.476) was a little bigger than that of Model (1) because of the sharp drop in within-group variance. Afterwards, in model (3), the between-group variance was seen to decline from 0.152 in model (2) to only 0.067. The decrease was due to the introduction of county level indicators. In that way, a big proportion of the county level effects were explained by the regional indicators (as fixed effects); thus, the random effect counterpart was greatly reduced. Meanwhile, the within-group variance had almost no change, causing the VPC to decline from 0.476 to 0.287, reflecting that the county level random effects account for only 28.7% of the total.

Figure 6.2 illustrates the changes of the random effects of each specific county, from model (1) to model (3). The blue dots denote the random intercept for the corresponding county, and the black dashes represent the 95% confidence intervals. It is apparent from this figure that the magnitude of random effects shrank as new independent variables were added to the models in turn. In model (1) and model (2), five counties' intercepts (logged) had absolute values greater than 0.5. But in the most complete model (3), all the intercepts were in interval (-0.5, 0.5).

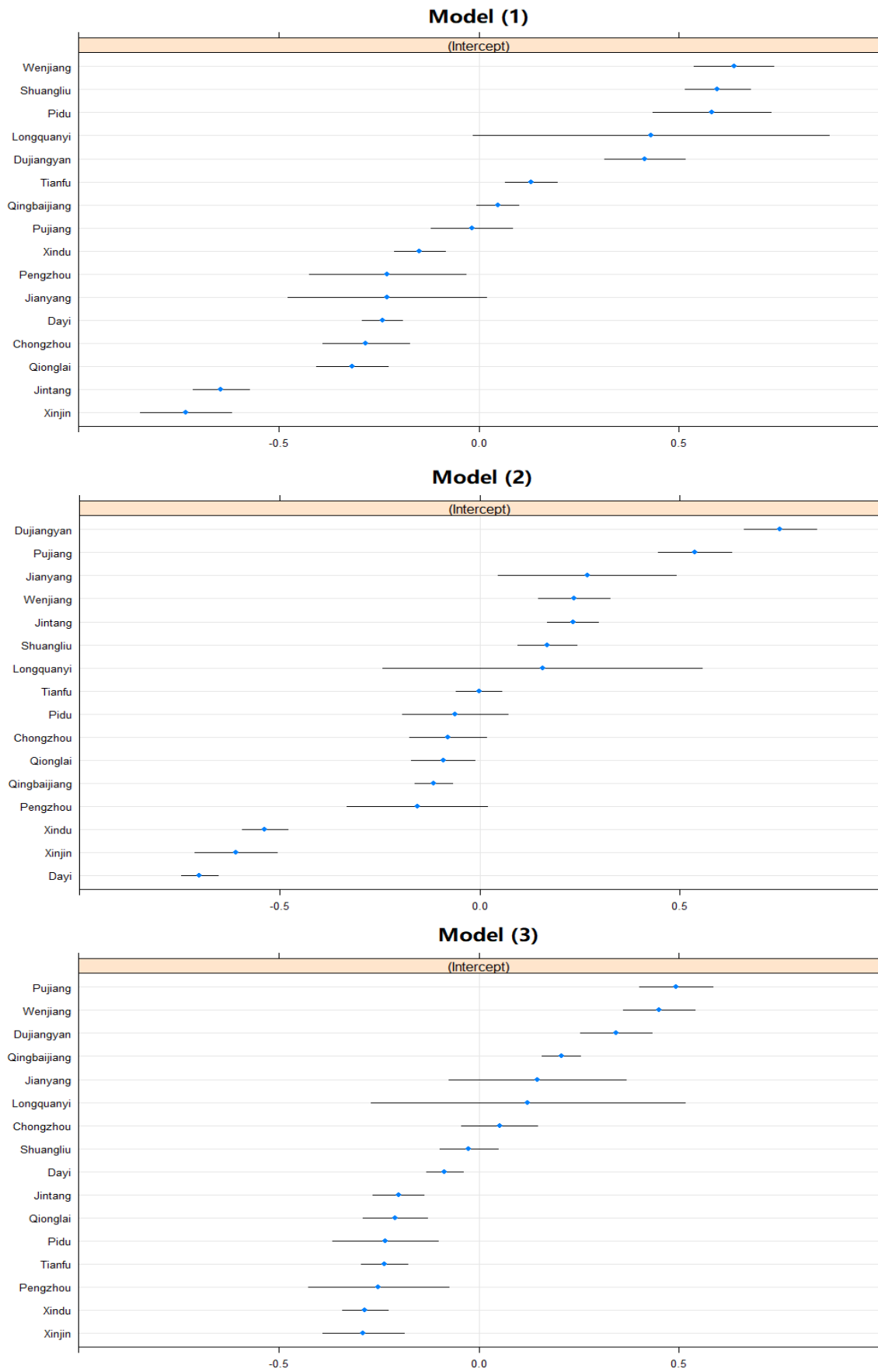


Figure 6.2 County level effects in HLM models

As for the fitness of models, the data in Table 6.4 expressed the gradual improvements of the HLM models. Model (1) was set up to be the foundation to calculate the Pseudo- R^2 , which is 0.169 in model (2) and 0.352 in model (3). R^2 of model (3) and the OLS model (0.387) are close. The significant indicators in HLM and OLS models had the same positive or negative signs. The MAE, MAPE and RSME figures in model (3) are also very close to those in the OLS model. However, as it was discussed in Section 5.5, the HLM model better reflects the mechanism of real world by catching both individual and group level effects.

6.4.4 An analysis on the heterogeneity of buyers

A further regression test was made to analyse the different impacts in two buyer groups: (1) When the transferee parties were non-enterprise managing entities such as large growers, family farm, and farmer's cooperatives; (2) When the transferee parties were enterprises. Their corresponding results are shown in Table 6.5.

There are mainly two prominent and interesting findings from the data in Table 6.5: (1) The contract period, which was found not correlated with the farmland price in the overall model, is seen to be significantly correlated in both buyer groups. Its coefficient in the non-enterprise groups is positive, while that in the enterprise group is negative, which implies the different attitudes of the buyers towards long-term contracts. (2) Distances are important factors in both groups, but their elasticities in the enterprise group are almost twice their counterparts in the non-enterprise group, clearly stating that the enterprises considered more about the distances to urban areas. These differences reflect the heterogeneity of buyers, which will be discussed in Chapter 7.

Table 6.5 Estimated results in different buyer groups

	Model (5) Non-enterprise buyer	Model (6) Enterprise buyer
Explained: lnUPRICE		
lnAREA	-0.002 (-0.142)	-0.001 (-0.111)
lnPERIOD	0.099*** (2.943)	-0.114*** (-2.954)
lnDTC	-0.233** (-2.540)	-0.487*** (-5.472)
lnDTDC	-0.079*** (-2.827)	-0.150*** (-4.563)
LGR	-0.423*** (-13.149)	-0.412*** (-12.095)
lnPERGDP	-0.944** (-2.540)	-1.404*** (-3.514)
lnPERIN	0.559 (0.438)	0.221 (0.186)

lnHDEN	0.655** (2.506)	0.681** (2.420)
lnPERF	-0.546 (-1.170)	-0.723 (-1.626)
lnPPR	-0.671** (-2.542)	-0.536* (-1.854)
lnPPEM	0.576 (1.513)	0.975** (2.389)
CIRL	0.702** (2.159)	0.287 (0.823)
2017.year	0.158*** (4.265)	-0.129*** (-3.037)
2018.year	0.009 (0.210)	-0.234*** (-4.925)
Intercept	10.659 (0.823)	22.102* (1.905)
<i>N</i>	1089	715

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

6.5 The impact of the intermediary organisation

The first part of the analysis has discovered ten indicators which had significant correlations with the farmland price. Three of them were on the individual level, and seven were on the county level. Following this, a fundamental hierarchical linear model had been set up with these basic determinants, which facilitates further research on two aspects of exogenous independent variables that have important reference values.

The second part of the analysis examines the impact of intermediary organisations and governmental policies on farmland transfer price. Independent variables representing these two impacts were added to the fundamental model in order. The transaction mode variable (TRM) denotes the participation of an intermediary organisation in a farmland transaction, which refers to Chengdu Rural Property Exchange in this research. Then this variable is subdivided into two specific modes, denoted by TRM1 and TRM2. The former refers to those transactions made by matchmaking work of the Exchange, and the latter refers to transactions through public bidding organised by the Exchange. The reference group is implicitly set to be those deals made without the Exchange's participation (only registered by it). Their estimated results are given in Table 6.6, in model (7) and (8).

Lastly, the policy indicator representing the effect of performance bond insurance subsidy (PBI), is introduced in model (9). Given that the policy was implemented by Chengdu government since May 2017, those deals made after that time are considered affected by this policy. The exception is Qionglai county as the pilot area starting to implement the subsidy

since 2015. Provided that, all the transactions in this county are considered affected by the policy. The estimated results are in model (9) of Table 6.6.

Table 6.6 Estimated results of intermediary organisation

	Model (7) Intermediary combined	Model (8) Intermediary separated	Model (9) Policy effect
Explained: lnUPRICE			
PBI			0.078* (1.810)
TRM	0.113*** (3.852)		0.108*** (3.641)
TRM1 (matchmaking)		0.079** (2.397)	
TRM2 (bidding)		0.227*** (4.038)	
lnDTC	-0.316*** (-4.755)	-0.318*** (-4.788)	-0.313*** (-4.709)
lnDTDC	-0.117*** (-5.279)	-0.116*** (-5.212)	-0.118*** (-5.315)
LGR	-0.431*** (-17.915)	-0.431*** (-17.961)	-0.430*** (-17.925)
lnPERGDP	-1.226*** (-3.063)	-1.205*** (-2.957)	-1.230*** (-3.060)
lnHDEN	0.609** (2.180)	0.588** (2.065)	0.603** (2.149)
lnPERF	-0.558 (-1.343)	-0.475 (-1.123)	-0.565 (-1.354)
lnPPR	-0.457* (-1.921)	-0.479** (-1.977)	-0.462* (-1.933)
lnPPEM	0.767** (2.027)	0.746* (1.936)	0.772** (2.033)
2017.year	0.080*** (2.989)	0.078*** (2.919)	0.029 (0.735)
2018.year	-0.035 (-1.134)	-0.038 (-1.218)	-0.106** (-2.124)
_cons	21.733*** (5.683)	21.558*** (5.537)	21.786*** (5.674)
N	1805	1805	1805

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

As the results in Table 6.6 expressed, the impact of participation of the Exchange is confirmed to be strong. A farmland transfer deal intermediated by the organisation tends to have a 11.3% higher price than the others. This positive correlation is found to be significant ($p < 0.01$) in model (7). Then, to distinguish between two specific transaction modes in which the Exchange played its role, a comparison is made through the results of model (8). It is revealed that the normal matchmaking way leads to a 7.9% ($p < 0.05$) increase in the price, but a transaction by bidding would result in an even greater increase of 22.7% ($p < 0.01$).

Turning to the impact of policy, it is found that the transactions affected by the

performance bond insurance subsidy policy have a price increase of 7.8% ($p < 0.1$). Therefore, the positive effect of this policy is also supported by the results.

6.6 Brief summary of the results

In this chapter, estimated results were provided to answer the research questions proposed in Section 1.4. The first set of analysis discovered ten basic determinants which are significantly correlated with the farmland transfer price. After that, the positive impacts of intermediary organisations and governmental policies were both confirmed by the second set of analysis. However, the impact of the performance bond insurance subsidy policy seems to be weaker than that of the participation of the Chengdu Rural Property Exchange, judging from the coefficients and significance. Further interpretations and explanations of these results would be made in the next chapter.

Finally, the hypotheses and their corresponding test results are organised in Table 6.7 that follows:

Table 6.7 Hypotheses and the test results

Hypothesis	Test result	Conclusion
H1: Farmland's natural endowments positively affects its transfer price.	Significant correlation between this indicator and farmland transfer price was found ($p < 0.01$). Coefficient = -0.437 Significant negative correlation was found between the price and distance to the city centre ($p < 0.01$). Coefficient = -0.345 Significant negative correlation was found between the price and distance to the local county centre ($p < 0.01$). Coefficient = -0.114	Supported
H2: The location condition of farmland is positively correlated with its transfer price.	The impact of average highway mileage per area passed the significance test ($p < 0.05$). Coefficient = 0.611 No significant correlation was found with the circle layer. A negative correlation between GDP per capita and price was found ($p < 0.01$). Coefficient = -1.27 No significant correlation was found with income of rural residents per capita.	Partly Supported
H3: Regional economic development is positively correlated with farmland transfer price.	Significant correlation was found between proportion of agriculture in GDP and the price ($p < 0.01$). Coefficient = -0.726 Significant correlation was found between farmland area per capita and the price ($p < 0.1$). Coefficient = -0.797 Significant correlation was found between the proportion of primary industry	Partly Supported

	employment and the price ($p < 0.05$). Coefficient = 0.963	
H4: Contract period and area positively affect farmland transfer price.	No significant correlation was found between the price and the period. Neither was the area.	Not Supported
H5: Land policies affect farmland transfer price.	The impact of performance bond insurance subsidy passed the significance test ($p < 0.1$). Coefficient = 0.078.	Supported
H6: Transaction mode affects the price of farmland transfer. Deals made with the help of intermediary organisations have higher prices.	The impact of transaction mode passed the significance test ($p < 0.01$). Deals through the Exchange has prices 11.4% higher than others.	Supported
H7: Enterprise and non-enterprise managing entities are affected differently by different price factors.	Regression results showed the heterogeneous impacts in enterprise and non-enterprise groups.	Supported

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Chapter 7: Discussion

7.1 Analysis on the basic determinants of farmland transfer price

The first part of this research focused on the identification of those basic determinants that affect farmland transfer price. Ten indicators were found to have significant correlations with the price. On the individual level, three out of five indicators passed the significant test, while on the county level five of seven indicators did that. The individual level variables appeared to make stronger impacts due to their great significance and coefficients, since they mattered to the price in a more direct way. Under the context of urban-rural integration, the differences among counties in Chengdu prefecture were not extremely large, but the county level fixed effects were still meaningful and enlightening.

The variable partition coefficient (VPC) was calculated to be 0.287, meaning the county level random effects accounted for 28.7% of the total residual variance, thus the individual level effects took 71.3%. This coefficient facilitated by the HLM regression, helped to see the insights of mechanisms on both levels in this kind of nested data. It is normal for individual factors to dominate the total effects. The impacts of each independent variable are discussed in this section as categorised in these groups below.

7.1.1 The natural determinants

It is not surprising to discover the land quality had a strong impact on its price. The negative coefficient of -0.437 implied that when other variables were controlled, a parcel of grade five (the best in this research) was worth more than five times of a parcel of grade ten (the lowest in this research). This finding is in line with other studies such as Livanis et al. (2006) and Drescher et al. (2001), as the land quality index represented the return of agricultural production, which would be capitalised into the price or rent of farmland. In the other way around, the finding also implied that the *agricultural land quality index* used in this research was an effective indicator to measure the value of a piece of farmland. Currently, this index is mainly being employed in the government work of land monitoring, zoning, and planning. Very few studies used it to make big scope analysis on farmland price (T. Du et al., 2016). Its commercial utility in farmland transactions could be further exploited.

7.1.2 The location determinants

7.1.2.1 The relationship between distances and farmland price

The coefficients of the distances in the estimated result are negative and in line with most of the other studies, especially with the one in Illinois State of the United States (H. X. Huang et al., 2006), where the distances to Chicago (state capital) and to the nearest city are both considered like in this research. There is at least one example of the opposite result in the literature, based on the analysis in North Rhine-Westphalia, Germany (Lehn & Bahrs, 2018). Since the population size of Chengdu prefecture and these two states abroad are of the same magnitude, a brief comparison of distance effects is made among these three regions.

Table 7.1 Comparison of distance effects in three regions

Region	Population (million)	Coefficient of distance to the metropolitan centre	Coefficient of distance to the local centre	Ratio of the former two
Chengdu	16.33	-0.340 (logged)	-0.115 (logged)	2.96
Illinois	12.67	-0.179 (logged)	-0.028 (logged)	6.39
NRW	17.87	33.94 (not logged, to nearest big city)		-

As it is seen in Table 7.1, in both Chengdu and Illinois, the impacts of metropolitan city and local small cities are significant, and the central megacity exerts a more powerful impact. Furthermore, Chicago's coefficient of distance is more than six times of that of local centres, while the ratio of Chengdu is less than three. This suggests a more concentrated economic influence in the former. Besides, it is implied that the farmlands lying in the middle ground between centre cities are to benefit more from the urban influence.

As for the case of NRW state, the authors believed that the positive correlation is caused by the geographical layout of this state. The state is densely populated with 40% of all the big cities in Germany. These cities are distributed along Rhine or in Ruhr metropolitan area. Though the cities are many, there exists no megacities like Chengdu, and the distribution is relatively scattered. Consequently, the longer distance to one city often meant a higher proximity to another one. Farmland prices were influenced by a combination of cities, instead of one concentrated metropolitan centre. This German pattern of urban layout is being referenced and learned by many Chinese city planners.

Therefore, it is interesting to find that from the perspective of economic influence gap between big and small cities, Chengdu is in a position between the other two. The more balanced distribution pattern is to be guided by the government in the future.

Another explanation of the divergent ratios of Chengdu prefecture and Illinois state might also be the differences in geographical distributions. The metropolis of Chengdu is in the

geometric centre of the whole prefecture, with the satellite cities surrounding it in circles, while Chicago locates in the northeast corner of Illinois. Owing to that spatial asymmetry, the small cities in Illinois might lose their own power of influence on nearby rural area more sharply, as the distance to Chicago increased. The impact of the division of administrative regions on economic activities is very intuitive.

Moreover, though the impact of distances is negative in most of the researches, the mechanism is slightly different. Eagle et al. (2015) holds that the decrease of property value with increased distances are due to the commuting cost in Canada, from a perspective of transportation effects in the agricultural production. Sklenicka et al. (2013) found the most important factor in Czech Republic is the distance to nearby settlements, which was firstly supposed to be caused by farmers' inclination to sow near their homes, and to make the land more contiguous. But a further inspection of the buyer information denied this theory and the true cause was suggested to be the speculation on land use change. In Czech Republic the conversion of farmland to other uses is restricted, but the land close to some built up area could get the permission of converting very easily, which aroused the speculative impulse. The situation in Chengdu is more like the combination of these two effects above. Commuting cost certainly matters, while the disguised "conversion" is quite common. Unlike Czech Republic, China's farmland preservation is very strict, where the only way of legal conversion is land expropriation by the government. But still, the land with a high proximity to the city is often invested and improved to develop ecological, sightseeing and leisure "pseudo-agriculture", with a better expectation of return than usual farming, thus the price could rise (H. Wang & Yang, 2018).

7.1.2.2 The relationship between circle layer and farmland price

There was no significant correlation found between the circle layer attribute and farmland transfer price. These two were discovered to be statistically uncorrelated, which is inconsistent with the results in Drescher et al. (2001). The reason for that is tentatively inferred to be the implicit features of some counties.

Taking Dujiangyan county as an example, it is seen that this county is in the "third circle layer" (remote suburban), but with conspicuously high estimation of farmland transfer price. There are two implicit reasons as below:

(1) It was the first and pilot county to explore farmland rights confirmation and transfer. Therefore, the market there is rather mature, and the rural residents had a higher degree of acceptance and a stronger willingness of participation, as was discussed in Section 2.7;

(2) Dujiangyan county is far more famous for its tourist attractions than for the role it played in rural property system reform. The great ancient irrigation dam, and the beautiful leisure mountain of Qingcheng, are the two iconic sites of this county. As a result, Dujiangyan's tourism-related industries are very prosperous, which is a rather unique advantage within the 16 counties of Chengdu. One of the impacts of tourism attractions is the increased investment on farmland, especially those close to the scenic areas, to develop agri-tourism (or sightseeing agriculture) (Y. H. Chen et al., 2018; J. Y. Wang & Liu, 2013). This shifting from normal agriculture to agribusiness would have positive influence on farmland price (Czyzewski et al., 2018), since the return of tourism is undoubtedly higher.

Another counterexample county is the Qingbaijiang county in the second circle layer, which had a relatively low mean of farmland price. This county was considered a more urbanised area because of its heavy industry found in 1960s. It is the only county in the second circle layer which is not adjacent to the metropolitan area, where Xindu county lies between them. Since the distances' impact had been found very strong, this county is much further than other second layer counties, which reduced the pressure of urban sprawl from downtown. If this county is adjusted into the third layer, the estimated result is still uncorrelated, meaning that the circle layer attribute's impact is very weak.

7.1.2.3 The relationship between highway density and farmland price

The highway density of a county was found to be positively correlated with farmland price, though the correlation is less significant than those distances. The finding is in line with the studies of Ke et al. (2015) and Lin et al. (2017).

The location indicators, including distances and highway density, were revealed to be the most important factors that affect the farmland transfer price, as it was expected. It is believed that the urban sprawl of the metropolis, the fast process of urbanisation, and urban capital invest in rural areas were the causes behind.

7.1.3 The social and economic determinants

7.1.3.1 The relationship between GDP per capita and farmland price

The results in this research expressed a significantly negative correlation between GDP per capita and farmland transfer price. This is counterintuitive and contrasts with the researches of Mela et al. (2012) and Du and Zhu (2018), but in line with Lin et al. (2017). The impact of GDP on farmland is rather complicated, and there could be three aspects of reasons to explain the negative impact as follows:

(1) There is a huge gap between GDP growth and the development of rural economy. Because the growth of GDP is mainly driven by secondary and tertiary industries, and these two are mainly driven by investment. In China, the increase in GDP in the short-term depends on large-scale infrastructure and industrial investment, which is almost irrelevant with the countryside micro economy. For example, the total GDP of Chengdu prefecture in 2018 increased 10.46% over the previous year, while the primary industry increased only by 4.36%, meaning that the agriculture production is limited by objective natural constraints, and its growth is far behind the total increase.

It takes a relatively long period for the benefits of economic development to be transmitted to agriculture and land. Only in those areas where the economy had been highly developed, the effects of GDP would be fully transmitted to agriculture and land. In the year of 2010 within the research timespan of Mela et al., (2012), the GDP growth of Italy was 1.7%. The economy was in a relatively stable status, thus regional differences in GDP are consistent with differences in farmland prices. In the developed countries, the pressure of urban sprawl is mainly caused by the natural growth of city population. But this statement is invalid in China's period of rapid urbanisation.

On the other hand, due to this gap, farmland transferring from rural households to urban residents, especially enterprises, is an effective way of transmitting the fruits of economic development to rural areas, which is also an impetus for local governments to promote the transfer market.

(2) While GDP growth could not influence the farmland price immediately, it could cause some negative effects by affecting the occupational structure of rural residents. Urban development had brought about an increase in non-agricultural employment opportunities with obviously higher wages, which led to a strong desire for the rural residents to switch from cultivation to non-agriculture jobs. There are two groups of these villagers. One is the residents who had been completely out of cultivation. They may have immigrated to cities, or serve as professional workers such as teachers or doctors in the country. The other one is the "part-time" farmers who cultivate in busy farming seasons but do other jobs in the rest of the year. The latter is the mainstream group of farmers, and these two groups are shifting to urban life while keeping the contracted land from the collective. These so called "farmers" are already out of agricultural production, or half out of that, thus their attitude towards scale farmland transfer is quite welcoming, because they do not mainly rely on the farming income. They would devote to other more professional and lucrative jobs and raise the income. The yield from farmland is regarded as a minimum guarantee of livelihood (Y. F. Feng et al.,

2010). When opportunities for higher income came, they tend to entrust the farmland to local collective cadre or an intermediary organisation such as the Exchange, just to make use of the land without a high price expectation. The transfer deals would bring them some extra income (more or less) and prevent farm abandonment. As a result, farmland supply would increase and the price could temporarily fall.

(3) The GDP is a relatively macro indicator, which is more suitable for large-scope researches like cross-province comparison in the whole country (Mela et al., 2012), or cross-county comparison in a province (T. Du & Zhu, 2018). For instance, in a typical agricultural county, Keshan, in Heilongjiang province of northeast China, the GDP per capita was 15,541 Yuan in 2018, while average farmland rent rate was 402 Yuan (G. Song & Lin, 2016). Both are much lower than the median level of Chengdu counties, which expressed a positive correlation.

Nonetheless, within a smaller scope like Chengdu prefecture, although the economies of the counties are different, the degree of difference is not very great compared to those cross-province disparities. In this case, the impact of regional overall economic status might have been overshadowed by other more prominent characteristics.

Moreover, Lin et al. (2017) also found a negative correlation in the analysis of Heilongjiang Province, and suggested that the cause was the downward fluctuation of food price. This is different from the Chengdu case. As Heilongjiang province is a main agricultural area of China, its economy is heavily dependent on agriculture. (For instance, Keshan county's proportion of primary industry is 37% in 2018, which is extremely higher than Chengdu counties.) The farmers there tend to preserve the land when facing price risks. But in Chengdu, rural residents, especially in the proximity of urban areas, tend to join the more active non-agricultural economy, thereby putting more farmland into the market in the long run.

7.1.3.2 The relationship between rural resident income and farmland price

Theoretically, the increase of rural residents' income represented the rise of rural economy and living standards, thereby pushing up farmland prices, like the apartment prices in the cities. This view is undoubtedly applicable to those agriculture-dominated areas (H. X. Huang et al., 2006; T. Du et al., 2016). However, in the areas surrounding a metropolis, the situation is different. Due to the weak nature of agriculture and the low value of agricultural products, the improvement of the rural industrial structure is the main driving factor for the increase of farmers' income (H. Y. Li et al., 2016).

The transmission of income growth effects to the farmland is also slow and difficult. At the same time, income from non-agricultural employments is precisely a stimulating factor of occupational shifting that releases more farmland into the market, where the transferors had casual expectations of the price as mentioned above.

7.1.3.3 The discussions about other regional indicators

The proportion of primary industry in GDP was found to be negatively correlated with the farmland price. On the contrary, the proportion of primary industry employment was tested to have a positive impact. In the last place, farm area per capita was confirmed to be a negative factor to the price, though the significance was relatively weak. Seeing that, it is necessary to distinguish among the impacts of the three county level indicators above.

The proportion of primary industry in total GDP reflects the degree of modernisation from the perspective of industrial structure. In other words, it bears some similarities with the Beale Code, to represent the “ruralness” of a county. A higher agriculture ratio indicates the overall economic level is less developed, thus the farmers would have lower expectations of the farmland price.

Conversely, the proportion of primary industry employment has a positive impact in this research, which is probably a consequence of rural residents’ occupational shift discussed in the previous section. In regions where this ratio is lower, there would be more alternative job opportunities for the farmers (Su et al., 2018), and the switching to non-agricultural jobs leads to more land released in the market. Meanwhile, a higher proportion implies a large agricultural population relying on cultivation as their main source of livelihood. They do not have many other job opportunities, thus tend to preserve the land. This finding also contradicts the results in other studies (e.g., Barkley et al., 1996). The latter study found a positive correlation between non-agricultural employment ratio and the price of farmland (thus a negative impact of agricultural employment ratio). The authors attributed the result to a concentration of industries in those areas with high ratio of non-agricultural employment. Such a county has relatively high concentration of manufacturing, which exerts strong attraction to new industries. The agglomeration effect would increase the demand for industrial land, which in turn increases the expectation of farmland conversion and its price. However, this case does not apply to China due to the strict farmland preservation as discussed above. Even when there is some farmland to be converted to construction land through land expropriation, the conversion quota of each year is extremely limited, and the influence is minimal. Though, when lands are hardly switched to other uses, the farmers

cultivating it could spontaneously and freely switch their jobs, as long as the income is increased and ensured. The human mobility transition is closely related to land use transition (R. S. Chen et al., 2014). Consequently, the farmland transfer price could fall.

Turning to the land itself, it is not surprising to see the farmland area per capita indicator has a negative impact on the price, due to the scarcity of land resources. This finding is in line with those studies on farmland transfer patterns in a provincial scope (H. C. Feng & Liu, 2018; T. Du & Zhu, 2018).

To generalise, the proportion of primary industry underlines the economy and its overall degree of development, the primary industry employment focuses on the rural people and their job structure, and the farmland area per capita indicator highlights the scarcity of land resources itself. Their different impacts stem from China's industrialisation and urbanisation process too.

Particularly, it is worth noting that these impacts of regional statistical indicators were observed in a dynamic context of China's fast economic and social change, rather than in a more "static" part of the world. Hence the findings would shed light on those developing areas who might encounter the similar situations like China did.

7.1.4 The transactional determinants

The contract area and period, which are on the individual level and important transactional indicators that could influence a deal, were found to have no significant correlation with the farmland price. A common cause of the non-significant results of these two might be the incompleteness of some farmland transfer contracts signed capriciously, due to lack of contract standards and formal process. Nonetheless, these two transactional indicators have their own mechanism to be discussed.

The relationship between contract area and the unit price could be complicated. As G. H. Wen and Yang (2019) revealed in the study of Jiangxia county in Hubei province, experienced farmland transferees (larger growers or enterprises) tend to adopt a resilient strategy against the joint variation of farmland area and price. If the transfer price was acceptable but not cheap, the transferees usually choose to control the area to be transferred in, and cultivate the farmland more intensively to increase the profit. On the other hand, when the price was perceived to be cheaper than expected, transferees would more likely transfer in a bigger area, then cultivate in a more extensive way (the management cost and profit per unit area was lower, but the total profit could be similar or slightly higher). This kind of market and

managing strategy could make farmland price rather “adaptive” to different areas, thus the correlation between them is very weak.

As for the contract period, the “uncorrelated” finding is probably a consequence of the heterogeneous attitudes of non-enterprise buyers and enterprise buyers towards long-term managing, as the results in Table 6.5 expressed. It was found that the impact of contract period on farmland transfer price was significantly positive in the non-enterprise group, and significantly negative in the enterprise group. This disparity needs to be considered together with the fact that the price itself was certainly higher in the enterprise group than the other. Hence, it is conceivable that the transfer deals between farmers, usually within a small locality of high trust to each other, would start with a relatively low price. When the contract period was set to be longer, the price would slightly increase out of general expectations of long-term economic growth. In contrast, if the deal was made between farmer households and an enterprise, the level of mutual trust was undoubtedly lower, thus the contract would probably fix a relatively high price. When facing a longer term, urban capital would worry about the bigger risk and attempt to bargain a cut in unit price. Therefore, the price of long period contract could suffer a minor drop. When these two groups were merged, their impacts offset each other, and the total finding was non-significant as it was seen.

7.1.5 Heterogeneity of the buyer type

In the heterogeneity analysis of the nature of the transferees, the first important finding of contract period had been mentioned above. The second key finding is the greater elasticities of farmland price to the distances in the enterprise group. This suggests that the enterprises from urban areas pay more attention to the location factors, which could result from two causes: (1) The land of higher proximity to the city is more welcomed by the managing workers from the urban area, who are more sensitive to commuting time; (2) The enterprise usually have a large pool of farmland options around the city in every direction, near and far. Therefore, they could make choices in a big range, which would make the impact of distances more highlighted.

But those farmer-farmer transfer deals often took place between nearby households, especially within the same village or town. The large growers and family farms tend to transfer in farmland which is adjacent to their own, and then sow together. It is unusual for a farmer to cultivate two farmland parcels which are very far from each other. Hence, the range of choices for farmers is much smaller, limiting the commuting cost, thus the distances’

impacts are weaker too.

7.2 The impact of intermediary organisations

In the second part of the analysis, the estimated results suggested that the Exchange could help increase the farmland transfer price by a degree of 11.3%, in which the price of those deals through bidding are even higher (+22.7% than normal). These findings are somewhat logical, and in line with other studies that focused on the farmland transaction mechanism (e.g., Hüttel et al., 2016). Theoretically, there is a continuous curve of farmland price between “how much it is now” and “how much it should be”. The initial price was very low due to the traditions of an agricultural society in China; thus, the overall trend of the curve is upward as expected.

The key role of Chengdu Rural Property Exchange is to reduce transaction cost and convert the farmland transfer market from a one-sided market into a two-sided market. Combined with modern information technology and market management thoughts, the Exchange is to greatly change farmland market’s status quo, and shape its future trends.

When the intermediary organisation is not involved in the transaction, the transaction cost is high. Meanwhile, the liquidated damages and farmland rent are too low, which will easily cause defaults in the process of cultivating, thus reduce farmers’ willingness to participate in farmland transfer deals. To offset the risk of breach, farmers tend to transfer the land to familiar relatives and friends nearby, which would further decrease the transfer price; Opposite of that, when an intermediary organisation intervened, transaction costs would decrease and default cost would increase, and the contract validity is more guaranteed. Thus, the interests of farmers were ensured, which effectively promotes the enthusiasm of farmland transfer and scale managing of agricultural production.

7.2.1 The status of the one-sided market

In a one-sided market, farmland suppliers (farmer households) need to pay certain transaction costs, including costs for finding the demand side of the land, estimation of the potential land demander, negotiation, and evaluation of the land. Similarly, land demanders (including large growers, farmer cooperatives or agricultural enterprises) had to plan the appropriate scale and general location of the farm investment, and then search for parcels that meet the requirements in certain area, then make negotiations with the involved farmers. These two searching activities took place in parallel, and the cost of one side is independent of the other.

The costs paid by both sides are not balanced. Often the cost of one or two sides are wasted if there is no match, and it should be noted that the search cost for a parcel in the vast and information-scarred rural area is much higher than to search for an apartment in the city. This is the reason for a higher transaction cost in a one-sided market.

As a matter of fact, before the exchange was set up, there were civil agents in rural China who were usually called the “middlemen” (Deng, 2007). They were able to facilitate some farmland transfer deals, but their effect was very limited due to three reasons: (1) the middlemen were amateur brokers who were not well organised; thus, their service availability and quality were quite unstable; (2) they did not have a centred technical mechanism to communicate with each other; thus, their source of information was very limited too; (3) they often introduce deals between acquaintances; thus, the prices were usually cut lower, which deviated from the fair market value further.

Owing to these shortcomings above, even when there were civil agents doing a discounted job, the market without a joined transaction platform was still a one-sided market.

7.2.2 The status of a two-sided market

Differently, in a two-sided market, farmland suppliers and demanders on the trading platform have cross-side network externality effects: If the platform had done enough publicity and mobilisation work in the villages, there would be more farmers or farmer collectives attracted to the platform to register their land information. Correspondingly, more demanders would be attracted to the platform because of the big number of suppliers and of choices of land. Then came even more suppliers. This interactive effect is in self-positive feedback. When the numbers of suppliers and demanders are big enough, the operator of the platform can choose to properly reduce the fee charged on both sides, making the system even more attractive. As the transaction cost lowers, farmers could benefit more and scale managing of farmland is further promoted.

As it is discussed, the main advantage of a two-sided market is a unified mutual platform, which can be used by both farmland suppliers and demanders. The positive impact of the platform has the following three aspects:

(1) The platform saved transaction costs and made transactions more convenient. Firstly, the establishment of a farmland transfer transaction platform means to create a huge network of farmland transfer information. This network could store and regularly update the quantity, quality, price, location, and other information of the farmland that was to be transferred or

already transferred. At the same time, the platform operator could make use of the big database, and provide value-added services such as land evaluation. The farm suppliers and demanders could get more complete market information for reference, thus reduce their cost for searching and identification. Secondly, farmer suppliers in the market only needed to entrust the platform to transfer their farmland. In this way, the efficiency and effectiveness of bilateral negotiations on the platform will be much higher than the one-on-one way in the old market. On the enterprise demanders' side, if they need a large piece of farmland, they would have to contact with many farmer households and deal with difficulties brought about by farmers' different personal tendencies. Therefore, the cost of negotiating with farmers was great in the old way. But if the intermediary platform worked, the cost for bargaining and contracting will be much lower. Thirdly, compared with the enterprises or strange individuals, farmers put more trust in the intermediary platform with governmental backgrounds. Consequently, the cost of communications could be lower, which reduced the transaction cost even further.

(2) The platform could promote the scale managing of farmland, thereby accelerating the development of the rural economy. In the two-sided market, income of both farmers and agricultural enterprises would increase, the main source of which is the decrease of transaction costs and the increase of agricultural product in scale managing. A big contribution of the platform is to “gather” and put together large area of farmland in a certain region. In this way, more stable and complete land information could be obtained to generate useful predictions. With the help of that, agricultural enterprises could make long-term planning of capital, production equipment and other materials, thereby benefiting more from scale managing. On the other hand, farmers could have more time to participate in other side-line businesses to increase their income, and increase their wealth more quickly, instead of engaging in intensive farming on their small private plots inefficiently. It could be said that the farmland transfer platform is also one of the most effective infrastructures to promote rural economic development.

(3) The intervention of the platform could give rise to better standardised management of farmland transfer market, and play a better role in supervising both dealing parties, so as to ensure the fairness, openness and impartiality of the transaction process. More than that, while the platform organised and recorded farmland transactions, it could technically facilitate the tracking and monitoring of those key issues, such as contract breach, cultivation abandonment and illegal conversion of land uses.

7.3 The impact of performance bond insurance subsidy

This research found a positive correlation between the implementation of performance bond insurance subsidy and the price of farmland. This kind of financial support could enhance the trust and confidence of both parties, and alleviate the substantial pressure of fund raising for the land operators. As a result, a reasonably higher price could be acceptable. The finding is in line with the study of CAP in Belgium, where agricultural subsidy payments had a positive impact on the price (Duvivier et al., 2005). But the mechanism there is different. The CAP subsidy increased the price of farmland by increasing the land rent expectations in the market, while in China, the term “price” usually referred to the annual rent itself. An opposite result of government subsidy’s impact was found by Czyzewski et al. (2018) in Poland. The cause was believed to be the additional requirements for subsidies. A farm operator who received the payments had to maintain the good conditions of farmland, and fulfil the environmental obligations. Such requirements increased the cost of operating and imposed a negative influence on the price, which is an inspiration for other governments to make use of additional terms when giving out subsidies, in order to achieve comprehensive effects and filter out those speculators. In the case of Chengdu, a hidden additional requirement of the performance bond insurance subsidy is for both parties to maintain a long-term cooperation despite the price’s fluctuations, which was also good for food security and the farmer’s interests.

7.4 The “visible hand” and the “invisible hand”

In this research, it had been seen that both the intermediary organisation and the subsidy policy had positive impacts on farmland price. The former impact is an outcome of Chengdu Rural Property Exchange’s effort to promote the marketisation, while the latter reflects the intervening effects of the government. The estimated results also made it possible to compare between these two impacts. Though both impacts are significant, the greater coefficient and significance level suggests the price is more responsive to the participation of the Exchange as a market agency.

A similar comparison was made by Weersink et al. (1999) when analysing the farmland value in Ontario province, Canada. It was revealed that the farmland price was more influenced by the government payments (through a smaller discount rate when capitalised) than the market return. An earlier study in another Canadian province (Saskatchewan) got the opposite result, where the expected market return prevailed government payments (Schmitz,

1995). It was suggested that the different degrees of stableness of the governments' payments program in those two provinces caused the opposite observations. From this point of view, the influences of the government and the market could rise and fall under varied conditions.

Nevertheless, the results in this research did imply a more powerful impact from the market's side, where the business and commercial mechanism played its role. This is associated with the famous long-lasting debate on the relation between the "visible hand" and the "invisible hand" in China's 40 years' process of reform and opening up (X. Zhao & Tan, 2006). The "invisible hand" stated by Adam Smith (1776) metaphors the market rules including mechanisms of supply-demand, price, and competition, while the connotation of the "visible hand", extracted from the insights of Keynes (1936), is the government intervention in economic life.

In the early era of the transition from planned economy to socialist market economy, the "visible hand" had obviously done too much, while effects of the "invisible hand" were too weak. The stagnant rural economy was a footnote of the dominating "visible hand". The main purpose of the transition was to release the potential power of the market, and the market is gradually turning into the main force in the new economy (Xu et al., 2019). As the central government emphasised, the market should play a decisive role in resources allocation (CCCPC, 2013). The findings in this research verified this general trend of marketisation. The business side of the Exchange was of great help in farmland price discovery and market development.

However, there exists no market without any regulation and supervision. The government played its role as the "visible hand" through its policies, to keep the market in order and raise trust and confidence as it was tested in this research too. It is impossible to rely on only one of the hands to make the economy work. Instead, one must "grasp with both hands" to get things done. The key point is to scientifically define the functions, responsibilities, and interface of these two hands.

In addition, farmland reform is practically a forerunner of the "Reform of three pieces of land" in rural China (CCCPC, 2018), where the three pieces refer to land expropriation, collective construction land and farmers' homestead land (which is assigned to a collective member household freely as a welfare, to build a home). These reforms involve with rural lands that are much more expensive and sensitive due to their non-agriculture use. Currently the latter two are being experimentally traded on the Exchange's platform, as well as the farmland. It is good for the overall economic efficiency, to see the "invisible hand" of the market is becoming the dominant force, instead of administrative orders.

Turning back to the urban side under the context of urban-rural integration, the tight supply of new construction land, the soaring price of apartments are being seriously concerned about. A typical problem is the “urban village” in the metropolitan areas (L. Zhang et al., 2003; L. Tian, 2008). These villages were collective-owned, but got surrounded by urban sprawl and became isolated “rural islands” in big cities, forming obstructing zones with many social risks. The collective land in the villages is desperately demanded by the city, but the old way of land expropriation with a mere price could no longer work. The platforms such as the Exchange are attempting to solve this kind of problem in the market way, learning from the experience in farmland transfer. Therefore, it is seen that the insights of studies on farmland marketisation could be applied not only to the farmland itself, but also to other rural land. Moreover, the rural experiences could further provide great theoretical and practical reference value for urban land system.

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Chapter 8: Conclusions

8.1 Research conclusions

Land is a kind of limited important resource, and it is an inevitable trend to develop the intensified and moderately large-scale agriculture in China. With the advancement of China's rural land system reform, the farmland transfer market is also experiencing a rapid development.

Related to that, a reasonable price system is the basis for building an effective market. Research on the price formation mechanism and influencing factors of farmland transfer can help policy makers to establish a reasonable price evaluation system, and improve the way of guiding and supporting the development of rural economy. It also provides business insights for those transaction participants and protects their own basic interests.

This research took the farmland transfer contract records from Chengdu Rural Property Exchange, which occurred in Chengdu prefecture from 2016 to 2018, as the basic dataset. The set was further supplemented by agricultural land quality grade surveyed results, navigational map distances, and regional economic and social statistics of the 16 counties in Chengdu. Due to the intrinsic nested structure of this dataset, the Hierarchical Linear Model approach, instead of traditional one-level regression approaches such as OLS, was employed in data analyses, to generate unbiased estimated results and differentiate the effects on individual level and county level. Regression tests were used to investigate the basic influencing determinants of farmland transfer price. After that, the study focused on the impacts of intermediary organisations and government policies on the price, and discussed the reasons behind those effects.

Through the analyses conducted in preceding chapters of this thesis, the main conclusions are summarised next.

Farmland transfer price is comprehensively affected by many basic determinants. Natural endowment, location factors, socio-economic situation, transaction attributes all have significant impacts on the price. Furthermore, these impacts are distributed at the individual level and the county level, both of which had conspicuous effects. Among them, the county level effects accounted for 27% of the total variance, as the multilevel model expressed.

On the plot level, land quality grade, distance to the city centre, distance to the county centre had significant negative impact on farmland transfer price. These three indicators all passed the significance test ($p < 0.01$), which supported that the location factors and natural endowments of a certain parcel are the prime determinants of the price. Agricultural condition and non-agricultural influence (urban sprawl) both played an important role.

On the county level, GDP per capita, proportion of primary industry, and farm area per capita were found to have significantly negative correlations to farmland transfer price. Conversely, local highway density and proportion of primary industry employment were confirmed to have significant positive impacts. The interpretation of these results indicated that the growth of overall economy, as well as fast urbanisation, led to changes in job structure of the rural residents, which in turn affected the farmland transfer market.

The elasticities of distances to the urban areas in enterprise buyer group were twice of those in the other group, revealing that enterprises are much more sensitive to location factors. The impact of contract period in non-enterprise buyer group is significantly positive, while that in the enterprise buyer group is significantly negative, which indicates the different attitudes of managing entities towards long-term operation in agriculture.

The participation of Chengdu Rural Property Exchange as an intermediary organisation was tested to have a significant positive correlation with the price. A farmland transfer deal intermediated by the organisation tends to have a 11.3% higher price. Among these deals, normal matchmaking way leads to a 7.9% increase in the price, while a transaction through bidding would result in an even greater increase of 22.7%.

The results also supported the positive impact of performance bond insurance subsidy on farmland transfer price. Transactions affected by this policy had a price increase of 7.8%. It was confirmed in this research that both the participation of intermediary organisations, (representing the role of the market) and the performance bond insurance (representing the role of government intervention) had strong positive effects on the price. The market effect was observed to be slightly more significant.

8.2 Policy implications and suggestions

8.2.1 Optimise the appraisal methods of farmland

The first policy implication of this research is to optimise the official appraisal methods of farmland, provide targeted, tiered guide prices according to the actual conditions in different

regions, and avoid those “one size fits all” orders (as the insignificant impact of circle layer attribute suggested).

Farmland transfer price is not only affected by its own natural endowments, but also by factors such as location, regional economy, transaction mode, and agricultural policies. Therefore, it is necessary to take an objective look at the difference in prices and short-term fluctuations. The factors above need to be comprehensively considered, and supplementary information such as agricultural land quality grade and economic statistics should be made full use of to formulate the appraisal system.

For a certain region, the price must not be set too low, otherwise interests of farmers would be harmed, and it must not be set too high either, which deviates from the actual value, brings about managing and financial risks, and ultimately undermines the development of the market. Both dealing parties also need to figure out a reasonable expected price based on their own demands, to eliminate blind comparisons or speculative tendencies.

8.2.2 Strengthen the coordinated development of urban and rural areas

Under the background of urban-rural integration, the government need to pay more attention to the coordinated development pattern, so that the outcome of economic growth could further benefit rural areas. As this research implied, there is still a disconnection between the overall economic development and the farmland price. On the other hand, farmland transfer itself is a main channel to transmit the fruits of economic growth across urban-rural and regional boundaries. Seeing that, appropriate supportive measures should be taken to encourage and guide farmland transfer activities in relatively remote areas.

At the same time, in the vast rural areas, the following three specific measures are suggested: (1) Improve the quality of farmland and protect high-standard farmlands. Keep promoting land scale management appropriately, so that land resources can be more concentrated in the hands of capable managing entities; (2) Continue to improve the infrastructure in rural areas, especially the facilities closely related to agricultural production such as transportation and irrigation, to further enhance the quality of farmland and production competitiveness; (3) Strengthen the social security of rural residents vigorously, so that they can eliminate worries about food, medical care, labour transfer and pension. In that way, the social security attribute that used to be implicitly tied with the farmland could be gradually diluted, thereby increasing the momentum for farmland transfer.

8.2.3 Firmly take the road of marketisation, and give better play to the role of intermediary organisations

Chengdu Rural Property Exchange is the primary intermediary organisation that promotes the marketisation of farmland transfer. It is necessary to fully affirm its key position in reducing transaction costs, facilitating deals and price discovery.

As a network platform, the platform of the Exchange does not have much contact with many grassroots farmers. Without effective publicity and training, the market would be less active as the farmers were not motivated enough, and the transfer information could not be fully communicated. The Exchange needs to take advantage of its own organisation, to set up a special publicity department to push market supply and demand information, as well as relevant policies for farmers and enterprises, thereby promoting transactions on the platform. Propaganda also expands the influence of the Exchange and strongly promotes deals of multiple kinds of rural assets. A main target is to convert the former private “over-the-counter transactions” into “in-exchange transactions”. Even for those transfer deals that have already taken place privately, it is also encouraged for the dealing parties to make supplement registration on the platform, to ensure the smooth execution of the contracts.

From the perspective of a two-sided market, the Exchange is a non-profit two-sided platform. Its charging strategy on both sides depend on their elasticities to quasi-demands, which are additionally regulated by the total social surplus (Rochet & Tirole, 2003). Therefore, it is recommendable to adopt differentiated charging methods to further lower the barriers for farmers to enter the platform and make deals. Large number of farmland suppliers could join the platform with more favourable fees charged, thus increase the coverage of the platform. After coverage of suppliers is expanded, the platform would automatically attract more demanders to sign in, thereby forming a strong positive feedback effect.

Looking into the nature of the Exchange, it is observed to have dual identities of a government branch and a commercial organisation, which is not uncommon in China’s reform and opening up process. While completing its registration and supervision job, the Exchange needs to focus more on its market function to promote the development of the entire market. Though the platform is non-profitable, it is necessary to establish an effective inner performance incentive system to mobilise the workers and increase the efficiency.

Still, the very topic lies behind is to straighten out the relationship between the “invisible hand” and “the visible hand”, and let the market play its decisive role in the economy.

Chengdu Rural Property Exchange is expected to become a typical embodiment of the organic integration pattern of government and market functions.

8.2.4 Continue to strengthen financial support for farmland transfer and revitalise rural assets

Farmland transfer helps promote the scale managing of agricultural production, but the prerequisite for land intensification use is a large amount pool of capital. However, it is rather difficult to raise funds by relying on agriculture itself in current circumstances. Farmland cultivation is a business facing both natural and market risks, and is prone to financial difficulties. Therefore, a sound supporting financial system is seriously required. In particular, the agricultural insurance system is an important means to diversify and reduce investment and managing risks.

The financial support is suggested to be implemented from top to bottom on three levels: (1) The authority needs to strengthen legislation and system construction for farmland transfer's financial support; (2) In addition to direct financial subsidies, it is efficient to guide and encourage commercial insurance organisations to explore insurance business related to farmland transfer, and provide proper premium subsidies; (3) Further premium subsidies and guarantees are to be provided for farmers, so as to increase their enthusiasm and increase the proportion of farmers participating in related insurances.

Besides, by means of financial support such as the performance bond insurance subsidy, the authority could better supervise the activities of agricultural managing entities after signing of contracts, thereby filling up the shortcomings in the previous supervision work. Additional terms are to be employed to restrict the behaviours of subsidy recipients.

8.2.5 Cultivate capable agricultural entrepreneurs

When discussing the market's decisive role in resources allocation, it must be noted that the farmland operators themselves are also a kind of important resource. Particularly, those outstanding agricultural entrepreneurs are even scarcer talent resource in China. As new types of agricultural managing entities are encouraged, in addition to providing them a good business environment, more attention should be paid to the training of agricultural operators themselves. Specific measures should be made to cultivate a group of entrepreneurial agricultural operators, so that they can give full play to their ingenuity and initiative to improve agricultural production efficiency, and drive the development of the rural economy.

Currently, there are two types of reserves for agricultural entrepreneurs, each having their own features: (1) The first class is the rural talents such as big growers, heads of family farms and farmers' cooperatives. They are more experienced with agricultural production and more affectionate towards their hometowns, and these are capable people in the countryside with innovative spirits, who are less conservative and willing to take risks. But their capabilities are weakened by low level of education and lack of market information. Furthermore, many of them seek to migrate to the city or switch to non-agricultural careers if possible. Therefore, measures need to be taken to upgrade their educational level and awareness of modern markets. (2) The second class is the managing entities and operators from rural areas, who are more familiar with modern managing system and have a better sense of business. They have stronger financial background, and some of them might be involved with cutting-edge technologies and start-up ideas. However, they are less familiar with the rural situation and practical cultivation. The authority and intermediary organisations need to help them to adapt to country conditions as soon as possible.

For both classes, it is also important to make them have a sense of gain. The society needs to change old perceptions, and realise and respect the contributions of new types of farm operators, so that these talents could persistently root in the countryside and work on intensified cultivation. A stable group of professional, regular, and long-term agricultural entrepreneurs would become the main force for rural revitalisation.

8.3 Research contributions and limitations

The first contribution of this research is the application of HLM approach to a large-scale transaction database within the representative research area. The Hierarchical Linear Model considers the effects on different levels, and its assumptions are more consistent with the actual situation. More importantly, the results obtained by this method can reveal the relationship between things more accurately and reasonably as discussed before. This research decomposed the respective random effects on the individual level and the county level, and estimated their corresponding ratios, which is innovative in the studies on China's farmland transfer price.

The selected research area and timespan are also helpful to exhibit the advantages of hierarchical models. Chengdu is a very representative area to be analysed. Its geographic, economic and population conditions made it an excellent study area for farmland transfer price. Not to mention its pilot experience in rural land reform, and the country's leading rural

property exchange. The 16 counties with a certain diversity also meant a good opportunity to study the regional effects of urban sprawl.

The timespan of this research is three years from 2016 to 2018. In this time, Chengdu had already finished the land rights confirmation project and established the Exchange. With the theory of urban-rural integration, Chengdu was undergoing a process of fast urbanisation and economic growth. These conditions provided a good time window to observe the impact factors in an era of rapid change. The results reflected the features of a dynamic environment instead of a static one. Hence, the findings are of good reference value for those developing areas and countries.

Of even greater appeal, the large database used in this research has a big coverage on Chengdu's formal farmland transfer market. These nearly 2000 records contained a lot of important market information. Its completeness and comprehensiveness made this study more practical and feasible.

The second contribution of this research is its relatively unique spatial scale. The outcome of researches on land issues strongly depends on the choice of spatial scale, or in other words, the choice of granularity. Firstly, the set of influencing factors differs with respect to the level it is on (Castella et al., 2007; Y. Q. Chen & He, 2005). For the level layers such as countries, provinces, prefectures, counties, or individual parcels, each is associated with different impacts. An independent indicator

which has a significant impact on one level does not necessarily work on another. Secondly, though the vectors of variables are different, they might interfere with each other. A change of indicators on one level may cause subsequent changes on its upper or lower level, which could further complicate the situation (Wood & Lenné, 2005). Therefore, the granularity issue of a land research is to be noticed.

Previous studies on China's farmland transfer price mainly had two scale categories: one is focused on the micro level by sampling the farmer households or villages for analysis and comparison; the second is on a macro level, such as analysing the county differences within a province, or a cross-province comparison throughout China. However, this research chose to observe with a "mesoscopic" view, which is right in the middle of the microscopic and macroscopic views mentioned above. The city prefecture of Chengdu was selected to be the research area, which is neither too big nor too small, and the specific farmland transaction records in its whole territory were taken into the analyses. The results and policy implications of this research are of important value of reference.

This research takes the price in farmland transfer deals as the research object. In contrast, the research on China's farmland transactions focused more on the system, the willingness to participate, and the social impacts. The studies on the price only accounted for a small percentage in the literature. However, price itself is the primary factor that reflects the market characteristics. It is of great significance to study the price and its causes in a certain field, which could provide the most effective reference for policy makers, transferors, transferees, and other market participants.

In addition to investigating those commonly-discussed basic determinants, this research further focused on the impact of intermediary organisations, and made a preliminary comparison with the role of policy factors, which is unique in related researches in China. Furthermore, most of the observations were large-scale transfer deals over 50 mu, which is more forward-looking for the normalised, market-oriented, and intensified farmland market in the future. The findings in this research implied the effectiveness of marketisation, which is also supportive to China's top view of "letting the market play its decisive role in the allocation of resources".

The empirical results reported in this research need to be seen in light of the following limitations: (1) Although the dataset used in this study has a relatively large volume, it recorded the situations when the contracts were signed. However, as it was suggested in Section 7.2, the supervision after the signing of contracts need to be strengthened, and it is meaningful to trace and observe the full life-cycle of farmland transfer contracts. Due to the limited data accessibility and time span, those "afterwards effects" were not included and needed to be observed within a longer period; (2) This research is performed in a selected prefecture with a strong metropolitan kernel, which may limit the generalisation of the findings. These limitations above could be addressed in further studies.

With the continuous deepening of rural land reform and the fast development of the farmland market, the role of the Exchange will also continue to improve. Longer time window and improved transaction registering and monitoring system, would make it possible to analyse the factors such as contract breach, operating profitability, grain production, and land use conversion, so as to better understand the logic of farmland transfer price formation. Furthermore, in addition to the impact of intermediary organisations, the local collective's particular role in scale farmland transfer deals is also to be analysed.

Another future aspect of work is to extend the study to more regions. Since China has a vast territory, the factors that affect farmland transfer price in different places are clearly differentiated. Even in Sichuan province, the strong geographic diversity and economic

differences are well noticed. Hence, it is necessary too, to conduct further and deeper studies in the featured regions, such as heavily agriculture-oriented zones, mountainous areas, and pasture areas. Research on the heterogeneity of influencing factors in various regions can provide more comprehensive and in-depth reference information for the policy makers and market participants.

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Bibliography

- Armstrong, M. (2006). Competition in two-sided markets. *The RAND Journal of Economics*, 37(3), 668–691.
- Arribas, I., García, F., Guijarro, F., Oliver, J., & Tamošiūnienė, R. (2016). Mass appraisal of residential real estate using multilevel modelling. *International Journal of Strategic Property Management*, 20(1), 77–87.
- Awasthi, M. K. (2014). Socioeconomic determinants of farmland value in India. *Land Use Policy*, 39(9), 78–83.
- Bao, H. J., Xu, B. G., Feng, K., & Xue, J. B. (2012). 农用地自然质量等级划分的可拓评价方法 [Geochemical background value of top soil and ecological quality evaluation in Jiashan County]. *Shanghai Land & Resources*, 32(4), 38–42.
- Bao, W., & Liu, Y. H. (2011). 我国高等教育资源配置差异 影响因素的多层线性模型分析 [An HLM analysis of disparities in the resource allocation of China's higher education]. *Research in Educational Development*, 19(3), 1–7.
- Barkley, D. L., Henry, M. S., & Bao, S. (1996). Identifying “spread” versus “backwash” effects in regional economic areas: A density functions approach. *Land Economics*, 72(3), 336–357.
- Berry, H. G., & Caplan, L. J. (2010). Employment and earnings growth among transition-age supplemental security income program participants. *Journal of Disability Policy Studies*, 21(3), 152–159.
- Bian, Q. J., Zhou, S. D., Yi, X. Y., & Wang, Y. X. (2011). 农户农地流转现状、特征及其区域差异分析: 以浙江省为例 [Analysis on status, characteristics and regional variation of farmland transfer: An example of Zhejiang Province]. *Resources Science*, 33(2), 308–314.
- Bian, Z. X., Yu, M., Wang, Q. B., & Zhang, M. Y. (2011). 城乡建设用地挂钩中补充耕地质量等别确定方法 [Method for quality evaluation of supplementary cultivated land on urban and rural construction land changes]. *Transactions of the CSAE*, 27(12), 318–323.
- Bigelow, D., Borchers, A., & Hubbs, T. (2016). *US farmland ownership, tenure, and transfer*. (No. 1476-2017-3904).
- Binswanger, H. P., Deininger, K., & Feder, G. (1995). Power, distortions, revolt, and reform in agricultural land relations. *Handbook of Development Economics*, 3(1), 2659–2772.
- Borchers, A., Ifft, J., & Kuethe, T. (2014). Linking the price of agricultural land to use values and amenities. *American Journal of Agricultural Economics*, 96(5), 1307–1320.
- Burgess, E. (2008). The growth of the city: an introduction to a research project. In Marzluff, J. M., Hulenberger, E., Endlicher W., Bradley, A. G., Ryan, C., Simon, U., & ZumBrunnen, C. (Eds), *Urban ecology* (pp. 71–78). Springer, Boston, MA.
- Cao, X. F., & Li, M. C. (2017). 我国农村土地流转失约风险及防范研究 以四川邛崃市为例 [Study on prevention and appointment breaking risk of China's rural land circulation: Based on the case of Qionglai City of Sichuan Province]. *Journal of Shanxi Agricultural Sciences*, 45(1), 124–129.
- Castella, J. C., Suan, P. K., Dang, D. Q., Verburg, P. H., & Hoanh, C. T. (2007). Combining top-down and bottom-up modelling approaches of land use/cover change to support public policies: Application to sustainable management of natural resources in northern Vietnam. *Land Use Policy*, 24(3), 531–545.
- Central Committee of Communist Party of China. (2003, October 14). *The decision of the Central Committee of the Communist Party of China on Several Issues concerning the*

- improvement of the socialist market economy system*. Xinhua News Agency. Retrieved December 31, 2019, from http://www.gov.cn/gongbao/content/2003/content_62494.htm
- Central Committee of Communist Party of China. (2008a, January 30). *Opinions of the CPC Central Committee and the State Council on earnestly strengthening agricultural infrastructure construction and further promoting agricultural development and increasing farmers' income*. Xinhua News Agency. Retrieved December 31, 2019, from <http://www.farmer.com.cn/2019/06/30/99840190.html>
- Central Committee of Communist Party of China. (2008b, October 19). *Decision of the Central Committee of the Communist Party of China on Several Major Issues in Promoting Rural Reform and Development*. Xinhua News Agency. Retrieved December 31, 2019, from http://www.gov.cn/jrzg/2008-10/19/content_1125094.htm
- Central Committee of Communist Party of China. (2010, January 1). *Opinions of the CPC Central Committee and the State Council on strengthening the overall planning of urban and rural development and further consolidating the foundation of agricultural and rural development*. Xinhua News Agency. Retrieved December 31, 2019, from http://www.moa.gov.cn/ztl/nyfzhjsn/zyhwj/201208/t20120823_2864994.htm
- Central Committee of Communist Party of China. (2013a, November 15). *Decision of the Central Committee of the Communist Party of China on Several Major Issues of Comprehensively Deepening Reform*. Xinhua News Agency. Retrieved December 31, 2019, from http://www.scio.gov.cn/zxbd/nd/2013/document/1374228/1374228_1.htm
- Central Committee of Communist Party of China. (2013b, January 31). *Opinions of the CPC Central Committee and the State Council on accelerating the development of modern agriculture and further enhancing the vitality of rural development*. Xinhua News Agency. Retrieved December 31, 2019, from http://www.gov.cn/jrzg/2013-01/31/content_2324293.htm
- Central Committee of Communist Party of China. (2014, November 20). *Opinions on guiding the orderly transfer of farmland and developing agricultural moderate scale managing*. Xinhua News Agency. Retrieved December 31, 2019, from http://www.gov.cn/gongbao/content/2014/content_2786719.htm
- Central Committee of Communist Party of China. (2018, December 23). *Opinions on the pilot work of rural land expropriation, construction land entering the market, and homestead system reform*. Xinhua News Agency. Retrieved December 31, 2019, from <http://www.npc.gov.cn/npc/c12491/201812/3821c5a89c4a4a9d8cd10e8e2653bdde.shtml>
- Chalamwong, Y., & Feder, G. (1988). The impact of landownership security: theory and evidence from Thailand. *The World Bank Economic Review*, 2(2), 187-204.
- Chang, J. H., & Teng, C. C. (2017). Intrinsic or extrinsic motivations for hospitality employees' creativity: The moderating role of organisation-level regulatory focus. *International Journal of Hospitality Management*, 60(1), 133-141.
- Chang, X., & Liu, L. (2018). Characterizing rural household differentiation from the perspective of farmland transfer in eastern China using an agent based model. *Human Ecology*, 46(6), 875-886.
- Chen, F., & Peng, B. Z. (2000). 农用土地价格初步研究 温州市农用地案例分析[Analysis on the agricultural land price: A case of agricultural land in Wenzhou City]. *Scientia Geographica Sinica*, 20(1), 65-71.
- Chen, G. (2011, December 1). *Chengdu has become an example of rural land rights confirmation and certification*. Chengdu Daily. Retrieved December 31, 2019, from <http://roll.sohu.com/20111201/n327481392.shtml>
- Chen, J. Z. (2010). 成都建设世界现代田园城市的产业与制度支撑 [The industrial and institutional support for Chengdu to build a modern garden city]. *Journal of The Chengdu Municipal Party College Of C.P.C*, 26(1), 25-27.

- Chen, R. Z., & Chen, P. (2013). 现代农业进程中的农民土地权益保障机制建设 基于豫中 L 市涉农企业参与农地流转的调查 [Farmer land rights security mechanism building in the agriculture modernization process: A survey on agriculture Enterprise participation in farmland transfer in L city in the middle of Henan]. *Journal of Huazhong Agricultural University*, 33(5), 55–60.
- Chen, R. S., Ye, C., Cai, Y. L., Xing, X. S., & Chen, Q. (2014). The impact of rural out-migration on land use transition in China: Past, present and trend. *Land Use Policy*, 40(9), 101–110.
- Chen, Y., & Li, M. (2017, June 5). *Chengdu: Farmland transfer deals with over 50 mu area could enjoy performance bond insurance subsidy*. Chengdu Daily. Retrieved December 31, 2019, from <http://scnews.newssc.org/system/20170605/000785065.html>
- Chen, Y. H., Lee, C. L., Chen, G. R., Wang, C. H., & Chen, Y. H. (2018). Factors causing farmland price-value distortion and their implications for peri-urban growth management. *Sustainability (Switzerland)*, 10(8), 1–18.
- Chen, Y. L., Zhao, K., & Bi, Y. (2013). 我国农地流转中中介服务组织体系构建及其运行机制[Construction and operation mechanism of intermediary service organisation system in China's farmland transfer]. *Jiangsu Agricultural Sciences*, 41(10), 398–401.
- Chen, Y. Q., & He, Y. B. (2005). 论土地利用/ 覆盖变化研究中的尺度问题 [Scale issues in the analysis of land use/cover change]. *Economic Geography*, 25(2), 152–155.
- Cheng, L. G., Zhang, Y., & Liu, Z. B. (2016). 农地确权促进了中国农村土地的流转吗? [Did rural land rights confirmation promote China's rural land transfer?] *World of Management*, 32(1), 88–98.
- Chengdu Government. (2016, January 18). *Implementation Opinions of Chengdu Government on Accelerating the Transformation of Agricultural Development Mode*. Chengdu Government Website. Retrieved December 31, 2019, from <http://gk.chengdu.gov.cn/govInfoPub/detail.action?id=78323&tn=6>
- Chengdu Government. (2017, June 25). *Opinions of General Office of Chengdu Government on promoting performance bond insurance of farmland transfer deals*. Chengdu Government Website. Retrieved December 31, 2019, from <http://gk.chengdu.gov.cn/govInfoPub/detail.action?id=90680&tn=6>
- Chengdu Government. (2018, January 1). *Overview of Chengdu*. Chengdu Government Website. Retrieved December 31, 2019, from http://www.chengdu.gov.cn/chengdu/c100343/qyfw_qykb_notit.shtml
- Chengdu Statistics Bureau. (2018, October 17). *Main data bulletin of the third national agricultural census in Chengdu*. Chengdu Government Website. Retrieved December 31, 2019, from http://www.cdstats.chengdu.gov.cn/htm/detail_122634.html
- Chinese Ministry of Agriculture. (2016, June 29). *Operational Standards for Rural Land Management Rights Circulation and Trading Market*. Xinhua News Agency. Retrieved December 31, 2019, from http://www.moa.gov.cn/nybg/2016/diqiqi/201711/t20171128_5921711.htm
- Clark, C. (1967). Von Thunen's isolated state. *Oxford Economic Papers*, 19(3), 370–377.
- Coase, R. H. (1960). The Problem of Social Cost. *Journal of Law and Economics*, 3(1), 1–44.
- Cotteleer, G., Gardebroek, C., & Luijt, J. (2008). Market power in a GIS-based hedonic price model of local farmland markets. *Land Economics*, 84(4), 573–592.
- Czyzewski, B., Trojanek, R., & Matuszczak, A. (2018). The effects of use values, amenities and payments for public goods on farmland prices: Evidence from Poland. *Acta Oeconomica*, 68(1), 135–158.
- Davison, M. L., Kwak, N., Seo, Y. S., & Choi, J. (2002). Using hierarchical linear models to examine moderator effects: Person-by-organisation interactions. *Organizational Research*

- Methods*, 5(3), 231–254.
- Deininger, K., & Jin, S. (2005). The potential of land rental markets in the process of economic development: Evidence from China. *Journal of Development Economics*, 78(1), 241–270.
- Deininger, K., & Jin, S. (2009). Securing property rights in transition: Lessons from implementation of China's rural land contracting law. *Journal of Economic Behavior and Organization*, 70(1–2), 22–38.
- Dempster, A. P., Rubin, D. B., & Tsutakawa, R. K. (1981). Estimation in covariance components models. *Journal of the American Statistical Association*, 76(374), 341–353.
- Deng, D. C. (2007). 农地流转的交易成本与价格研究 农地流转价格的决定因素分析 [Research on the transaction cost and farmland transfer price: Analysis of the determinants]. *Research on Financial and Economic Issues*, 29(9), 89–95.
- Deng, D. C. (2009). 制度安排, 交易成本与农地流转价格 [Policy arrangements, transaction costs, and farmland transfer price]. *Academic Journal of Zhongzhou*, 31(2), 58–61.
- Deng, X. P. (1994a). 邓小平文选第一卷 [Selected Works of Deng Xiaoping Vol 1]. People's Publishing House.
- Deng, X. P. (1994b). 邓小平文选第三卷 [Selected Works of Deng Xiaoping Vol 3]. People's Publishing House.
- Ding, Y. K., & Li, D. Q. (1999). 湄潭农村改革试验区延长土地承包期五十年的实践与思考 [Meitan rural reform experimental zone practice and thinking of extending the land contract period for 50 years]. *Chinese Rural Economy*, 16(3), 13–17.
- Donoso, G., Cancino, J., Olguín, R., & Schonhaut, D. (2013). A comparison of farmland value determinants in Chile between 1978–1998 and 1999–2008. *Ciencia e Investigación Agraria*, 40(1), 85–96.
- Drescher, K., Henderson, J. R., & McNamara, K. T. (2001, August 5–8). *Farmland price determinants*. American Agricultural Economics Association Annual Meeting, Chicago, Illinois, United States.
- Drescher, K., & McNamara, K. T. (1999, August 23–27). *Determinants of German farmland prices*. 39th Congress of the European Regional Science Association: “Regional Cohesion and Competitiveness in 21st Century Europe”, Dublin, Ireland.
- Du, S. H., & Ge, S. B. (2018). 绿色发展国家中心城市特征和动力源泉 成都国家中心城市建设印记 [Green development, features and power sources of national central cities: The construction path of Chengdu as a national central city]. *West Forum on Economy and Management*, 29(1), 1–4.
- Du, T., & Zhu, D. L. (2018). 中国土地流转价格时空演化与宏观机制研究 [Studies on the spatial-temporal evolution and macro-mechanism of land circulation price in China]. *Resources Science*, 40(11), 2202–2212.
- Du, T., Zhu, D. L., Zhang, L. X., & Zhao, Y. (2016). 河南省耕地流转价格空间分异及形成机制分析 [Spatial distribution and formation mechanism of cultivated land transfer price in Henan province]. *Transactions of the Chinese Society of Agricultural Engineering*, 32(20), 250–258.
- Du, W. X., & Huang, X. J. (2005). 区域农户农地流转意愿差异及其驱动力研究: 以上海市, 南京市, 泰州市, 扬州市农户调查为例 [Regional difference and influencing factors of farm households' willingness of rural land transmission: A case study of Shanghai, Nanjing, Taizhou and Yangzhou cities in Yangtze-delta region]. *Resources Science*, 27(6), 90–94.
- Dunford, R. W., Marti, C. E., & Mittelhammer, R. C. (1985). A case study of rural land prices at the urban fringe including subjective buyer expectations. *Land Economics*, 61(1), 10–16.

- Duvivier, R., Gaspart, F., & De Frahan, B. H. (2005). A panel data analysis of the determinants of farmland price: An application to the effects of the 1992 Cap Reform in Belgium. *Management Science*, 40(4), 429–439.
- Eagle, A. J., Eagle, D. E., Stobbe, T. E., & van Kooten, G. C. (2015). Farmland protection and agricultural land values at the urban-rural fringe: British Columbia's agricultural land reserve. *American Journal of Agricultural Economics*, 97(1), 282–298.
- Epple, D. (1987). Hedonic prices and implicit markets: Estimating demand and supply functions for differentiated products. *The Journal of Political Economy*, 95(1), 59–80.
- Gu, J. (2017, July 3). *Qionglai, Sichuan: Innovating the risk prevention mechanism for rural land transfer*. Farmers' Daily. Retrieved December 31, 2019, from http://www.moa.gov.cn/ztzl/ncggssyq/ggal/201707/t20170703_5734696.htm
- Feder, G. (1988). *Land policies and farm productivity in Thailand*. Johns Hopkins University Press.
- Feng, H. C., & Liu, F. (2018). 农地确权能提升村级土地流转价格吗? 基于全国 202 个村庄的分析 [Can farmland rights confirmation increase the price of farmland circulation: Analysis based on 202 villages in China]. *Xinjiang State Farms Economy*, 38(3), 57–66.
- Feng, L., Jiang, Y., Ye, J. P., & Zhu, K. L. (2013). 中国农村土地调整制度变迁中的农户态度: 基于 1999-2010 年 17 省份调查的实证分析 [Farmers' attitudes towards the reform of China's rural land adjustment policy: Empirical analysis based on the Survey of 17 Provinces from 1999 to 2010]. *Management World*, 29(7), 44–58.
- Feng, Y. F., Dong, Y. X., Liu, Y. H., & Wang, F. (2010). 基于农户调查的大城市郊区农地流转特征 及影响因素研究: 以广州市番禺区 467 户调查为例 [A study on farmland circulation characteristics and its influencing factors based on a household survey in metropolitan suburbs: A case on Panyu district, Guangzhou city]. *Resources Science*, 32(7), 1379–1386.
- Fu, J. T., Ji, Y. Q., & Hu, H. (2016). 新一轮承包地确权登记颁证是否促进了农户的土地流转: 来自江苏省 3 县市区经验证据 [Did the new round of land rights confirmation really boost land transfer actions of farmers: Experience from three counties in Jiangsu province]. *Journal of Nanjing Agricultural University*, 16(1), 105–113.
- Fu, W. K. (1999). 土地制度形成中的农户作用: 一个村庄调地过程的个案分析 [The role of farmers in the formation of land system: A case study of the process of land adjustment in a village]. *The World of Survey and Research*, 12(5), 36–54.
- Gao, J., Li, S. P., & Song, G. (2017). 基于广义多层线性模型的农户土地承包经营权退出意愿 [Farmers' willingness to quit the rural land contractual management right based on hierarchical generalised linear model]. *Journal of China Agricultural University*, 4(22), 162–170.
- Gao, Q. (2016). 当前土地确权工作中几个关键问题的思考 [Thoughts on several key issues in current land right confirmation]. *Issues in Agricultural Economy*, 34(1), 40–42.
- Gao, Y. (2010). 农村土地流转的国际经验及对中国的启示 [International experience of rural land transfer and its enlightenment to China]. *World Agriculture*, 393(1), 45–49.
- Goldstein, H. (1986). Multilevel mixed linear model analysis using iterative generalised least squares. *Biometrika*, 73(1), 43–56.
- Guo, A. Q., Gao, X. W., & Qin, L. (2016). 土地承包经营权流转价格研究: 以河北省故城县青罕镇为例 [Research on conversion price of land contracting operation rights: Evidence from Qinghan town in Gucheng county in Hebei province]. *Prices Monthly*, 37(6), 12–16.
- Han, H. (2017). 农业补贴方式对农地流转价格的影响 [The impact of agricultural subsidies on the price of farmland transfer]. *Journal of Agricultural Management Institute*

- of Ministry of Agriculture, 9(28), 70–76.
- Hart, O., & Moore, J. (1990). Property rights and the nature of the firm. *Journal of Political Economy*, 98(6), 1119–1158.
- He, J. W., Wang, Z. H., & Zhang, J. L. (2013). 工商资本进入农业要引更要导 关于工商资本进农业的思考和建议 [Thoughts and suggestions on industrial and commercial capital entering agriculture]. *Management and Administration on Rural Cooperative*, 31(7), 14–17.
- He, X. B. (2013). *地权的逻辑 [The logic of land rights]*. Oriental Publish.
- Hu, X. Y. (2007). 促进我国农地流转的整体性政策框架研究: 基于市场形成的逻辑 [Research on the policy framework to promote the farmland transfer in China: Based on the logic of market formation]. *The World of Survey and Research*, 9(10), 1–4.
- Huang, B. Q., & Rutherford, R. (2007). Who you going to call? Performance of realtors and non-realtors in an MLS setting. *Journal of Real Estate Finance and Economics*, 35(1), 77–93.
- Huang, H. X., Miller, G. Y., Sherrick, B. J., & Gomez, M. I. (2006). Factors influencing Illinois farmland values. *American Journal of Agricultural Economics*, 88(2), 458–470.
- Huang, H. Q. (2015). 规范农村土地流转完善风险防范机制: 以南通市农村土地流转为例 [Standardize the transfer of farmland, improve the risk prevention mechanism: Evidence from Nantong City]. *Modern Economic Research*, 2015(3), 55–58.
- Huang, J., & Wang, J. (2014). 国外农业现代化进行中土地流转制度对中国的启示 [Enlightenment of land transfer system in foreign agricultural modernization to China]. *World Agriculture*, 425(9), 1–5.
- Huang, Y. T. (2012). 农地流转规模化进程中的农地制度创新研究 [Agricultural land system research in the process of circulation and scale of agricultural land]. *Social Sciences in China*, 66(1), 58–64.
- Huang, Z. X., & Lai, Y. B. (2017). 基于 Fuzzy-Ahp 模型的农地流转金融支持绩效评价: 以福建为例 [The performance of financial support for rural land transfer based on Fuzzy-Ahp]. *Journal of Huaqiao University*, 6(6), 61–74.
- Hüttel, S., Wildermann, L., & Croonenbroeck, C. (2016). How do institutional market players matter in farmland pricing? *Land Use Policy*, 59(1), 154–167.
- Ikeda, K., Kobayashi, T., & Hoshimoto, M. (2008). Does political participation make a difference? The relationship between political choice, civic engagement and political efficacy. *Electoral Studies*, 27(1), 77–88.
- Jatileksono, T., & Otsuka, K. (1993). Impact of modern rice technology on land prices: The case of Lampung in Indonesia. *American Journal of Agricultural Economics*, 75(3), 652–665.
- Jauregui, A., & Hiteb, D. (2010). The impact of real estate agents on house prices near environmental disamenities. *Housing Policy Debate*, 20(2), 295–316.
- Jiang, A. L. (2003). 国有土地分配与转让的现实状况, 存在问题与解决对策 [Problems and solutions in the realistic situation of the distribution and transfer of state-owned land]. *Finance and Trade Research*, 24(2), 8–12.
- Jiang, L., Deng, X. Z., & Seto, K. C. (2013). The impact of urban expansion on agricultural land use intensity in China. *Land Use Policy*, 35(11), 33–39.
- Jin, L. F., & Ran, S. Q. (2011). 农村土地流转的风险及防范机制研究 [Research on the risks and preventive mechanisms of farmland transfer]. *Reform and Development*, 5(11), 69–70.
- Jin, S., & Deininger, K. (2009). Land rental markets in the process of rural structural transformation. *Journal of Comparative Economics*, 37(4), 629–646.
- Jin, Y. S. (1997). 农村土地权力的实质与流转机制建立的条件 [The essence of farmer

- households' land rights and the conditions for the establishment of the circulation mechanism]. *Chinese Rural Economy*, 14(1), 121~128.
- Katz, M. L., & Shapiro, C. (1985). Network externalities, competition, and compatibility. *American Economic Review*, 75(3), 424–440.
- Ke, X. L., Qi, L. Y., & Huang, X. (2015). 城镇化对农地利用强度的影响 [Impact of urbanization on agricultural land use intensity]. *Journal of South China Agricultural University*, 14(2), 20–26.
- Keynes, J. M. (1936). *The general theory of employment, interest, and money*. Macmillan.
- Kuang, W. D., & Li, T. (2012). 土地出让方式, 地价与房价 [Land transfer mode, land price and house price]. *Journal of Financial Research*, 33(8), 56–69.
- Kunimitsu, Y. (2005). Impacts of paddy field consolidation projects on farmland rental transactions. *The Japanese Journal of Rural Economics*, 7(1), 49–60.
- Kunimitsu, Y. (2006). Effects of socio-institutional and emotional factors on Japanese farmland rental transactions. *Journal of Agricultural and Applied Economics*, 38(1), 33–46.
- Lancaster, K. J. (1966). A new approach to consumer theory. *Journal of Political Economy*, 74(2), 132–157.
- Lee, S., & Choi, J. (2017). The impact of micro urban space structure on land price of commercial real estate. *Spatial Information Research*, 25(2), 181–194.
- Lee, V. E. (2000). Using hierarchical linear modeling to study social contexts: The case of school effects. *Educational Psychologist*, 35(2), 125–141.
- Lehn, F., & Bahrs, E. (2018). Analysis of factors influencing standard farmland values with regard to stronger interventions in the German farmland market. *Land Use Policy*, 73(1), 138–146.
- Li, C. H., Yang, C. X., Chen, L., & Cheng, X. Y. (2015). 基于农户收益风险视角的土地流转期限影响因素实证分析 [Empirical analysis on factors of land transfer term based on household income and risk perspectives]. *China Population, Resources, and Environment*, 5(25), 66–70.
- Li, G. (2013, November 13). *Sample of land rights confirmation and reform in Chengdu: the five-year history of Wayao Village*. 21st Century Business Herald. Retrieved December 31, 2019, from <https://business.sohu.com/20131113/n390043375.shtml>
- Li, G. C., Feng, Z. C., & Fan, L. X. (2009). 小农户真的更加具有效率吗 来自湖北省的经验证据 [Is the small-sized rural household more efficient? The empirical evidence from Hubei province]. *China Economic Quarterly*, 9(1), 95–123.
- Li, H. Y., Zhang, K. X., & Zhang, S. R. (2016). 天津市农村人均可支配收入的影响因素分析及十三五指标预测 [Analysis of influencing factors of rural per capita disposable income in Tianjin and forecast of indicators in the thirteenth five-year plan]. *Contemporary Economics*, 33(11), 42–44.
- Liang, S. M., & Jin, T. T. (2005). 中国大城市建成区扩张与城郊耕地保护研究: 以北京, 上海和广州为例 [Research on urban residential expansion in major cities and suburban cultivated land protection]. *Environmental Protection*, 43(11), 59–63.
- Liao, H. L. (2003). 农村承包地调整 [Adjustments of the contracted farmland in rural China]. *China Rural Survey*, 24(2), 1–15.
- Lin, T., Song, G., & Qiao, Y. B. (2017). 东北粮食主产区农户主导型农村土地流转价格影响因素 [Influence factors on price of farmland transfer organised by farmers in main grain-producing region of northeast China]. *Transactions of the Chinese Society of Agricultural Engineering*, 33(18), 260–266.
- Lindley, D. V., & Smith, A. F. M. (1972). Bayes estimates for the linear model. *Journal of the Royal Statistical Society: Series B (Methodological)*, 34(1), 1–18.

- Liu, P., & Fu, M. C. (2007). 收益还原法评估农用地价格有关问题探讨 [Discussion on agricultural land price assessment by income capitalization approach]. *System Sciences and Comprehensive Studies in Agriculture*, 23(1), 78–82.
- Liu, Y., Wang, C. G., Tang, Z., & Nan, Z. B. (2018). Will farmland transfer reduce grain acreage? Evidence from Gansu province, China. *China Agricultural Economic Review*, 10(2), 277–292.
- Livanis, G., Moss, C. B., Breneman, V. E., & Nehring, R. F. (2006). Urban sprawl and farmland prices. *American Journal of Agricultural Economics*, 88(4), 915–929.
- Longford, N. T. (1987). Fisher scoring algorithm for variance component analysis with hierarchically nested random effects. *ETS Research Report Series*, 1987(2), i-20.
- Lu, J., & Peng, Z. M. (2010). 农村产权交易的制度建构: 基于成都, 武汉农村产权交易所的实证研究 [System construction of rural property rights transactions: based on the empirical research of Chengdu and Wuhan agriculture equity exchange]. *Rural Economy*, 28(9), 12–15.
- Lu, Y., & Zhu, D. L. (2006). 构建与农地流转市场相适应的农地价格体系 [Constructing a farmland price system compatible with the market]. *Price: Theory & Practice*, 26(2), 52–54.
- Luo, B. L. (2018). 40-year reform of farmland institution in China: Target, effort and the future. *China Agricultural Economic Review*, 10(1), 16–35.
- Luo, D. Q., Zhou, Y. X., & Jiang, W. (2009). 基于农户调查的重庆市农村土地流转研究 [Study on farmland circulation in Chongqing based on household survey]. *China Land Science*, 23(5), 47–52.
- Ma, J. H. (2016). 耕地质量等别监测成果应用方法研究 [Methods of monitoring cultivated land quality based on variation function and cultivated land gradation type]. *Chinese Journal of Agricultural Resources and Regional Planning*, 37(10), 55–60.
- Ma, X. L., Che, X. C., Li, N., & Tang, L. (2019). 耕地流转与规模经营改善了农业环境吗? 基于耕地利用行为对农业环境效率的影响检验 [Has cultivated land transfer and scale operation improved the agricultural environment? An empirical test on impact of cultivated land use on agricultural environment efficiency]. *China Land Science*, 33(6), 62–70.
- Ma, X. L., Heerink, N., Feng, S. Y., & Shi, X. P. (2015). Farmland tenure in China: Comparing legal, actual and perceived security. *Land Use Policy*, 42(1), 293–306.
- Macours, K., de Janvry, A., & Sadoulet, E. (2010). Insecurity of property rights and social matching in the tenancy market. *European Economic Review*, 54(7), 880–899.
- Marx, K. (1867). *Capital: A Critique of Political Economy*. Verlag von Otto Meisner, Hamburg.
- Mela, G., Longhitano, D., & Povellato, A. (2012, February 23-24). *The evolution of land values in Italy: Does the influence of agricultural prices really matter?* 123rd European Association of Agricultural Economists Seminar, Dublin, Ireland.
- Ministry of land resources of China. (2011, November 12). *Ministry of land resources, Central Rural Work Leading Group Office, Ministry of finance, Ministry of Agriculture: Some opinions on the registration and certification of rural collective land*. Xinhua News Agency. Retrieved December 31, 2019, from http://www.moa.gov.cn/gk/zcfg/nybgz/201111/t20111122_2414394.htm
- National People's Congress of China. (1982, December 4). *Chinese Constitution*. National People's Congress of China. Retrieved December 31, 2019, from http://www.npc.gov.cn/wxzl/wxzl/2000-12/06/content_4421.htm
- National People's Congress of China. (1987, January 1). *Land Management Law*. National People's Congress of China. Retrieved December 31, 2019, from

- http://www.npc.gov.cn/wxzl/gongbao/2000-12/06/content_5004471.htm
- National People's Congress of China. (2002, August 30). *Rural Land Contract Law*. National People's Congress of China. Retrieved December 31, 2019, from http://www.npc.gov.cn/wxzl/gongbao/2002-08/30/content_5299419.htm
- National People's Congress of China. (2007, March 16). *Property Law of PRC*. National People's Congress of China. Retrieved December 31, 2019, from http://www.npc.gov.cn/wxzl/wxzl/2007-03/16/content_366956.htm
- Nickerson, C. J., & Lynch, L. (2001). The effect of farmland preservation programs on farmland prices. *American Journal of Agricultural Economics*, 83(2), 341–351.
- Qin, H. (2012). 从俄国到中国: 土地革命的理论与实践 [From Russia to China, the theory and practice of land revolution]. *History References*, 8(1), 15–24.
- Qin, H., & Jin, Y. (2010). *田园诗与狂想曲: 关中模式与前近代社会的再认识 [Pastorals and rhapsodies: A research for peasant society and peasant culture]*. Language & Culture Press.
- Ren, X. N., & Meng, Q. G. (2015). 工商资本进入农村土地市场的机制和问题研究: 安徽省大岗村土地流转模式的调查 [Mechanism and trap study of business capital into the rural land market: A survey from Dagang village government-led model in Anhui province]. *Journal of Henan University (Social Science)*, 55(5), 53–60.
- Rochet, J. C., & Tirole, J. (2003). Platform competition in two-sided markets. *Journal of the European Economic Association*, 1(4), 990–1029.
- Rosen, S. (1974). Hedonic prices and implicit markets: product differentiation in pure competition. *Journal of political economy*, 82(1), 34–55.
- Rysman, M. (2009). The economics of two-sided markets. *Journal of economic perspectives*, 23(3), 125–43.
- Schmitz, A. (1995). Boom/bust cycles and Ricardian rent. *American Journal of Agricultural Economics*, 77(5), 1110–1125.
- Shan, S. D., & You, J. X. (2002). 市场比较法及其在农地价格评估中的应用 [Market comparison method and its application to agricultural land appraisal]. *Journal of Tongji University*, 30(11), 1398–1401.
- Shen, J. P., Washington, A. L., Palmer, L. B., & Xia, J. G. (2014). Effects of traditional and nontraditional forms of parental involvement on school-level achievement outcome: An HLM study using SASS 2007–2008. *Journal of Educational Research*, 107(4), 326–337.
- Shen, Y., Zhu, S. B., Deng, Y., Teng, L. Y., & Zhao, R. R. (2012). 农地使用权流转价格的影响因素分析: 来自于农户和区域水平的经验 [An analysis of the factors of the price of farmland use rights circulation: The experience from farmers and regional level]. *China Rural Survey*, 33(3), 2–17.
- Shi, Y. J., Phipps, T. T., & Colyer, D. (1997). Agricultural land values under urbanizing influences. *Land Economics*, 73(1), 90–100.
- Shigeto, S., Hubbard, L., & Dawson, P. (2008). On farmland prices and rents in Japan. *Agricultural Economics*, 39(1), 103–109.
- Sklenicka, P., Molnarova, K., Pixova, K. C., & Salek, M. E. (2013). Factors affecting farmland prices in the Czech Republic. *Land Use Policy*, 30(1), 130–136.
- Smith, A. (1776). *The wealth of nations*. New York Modern Library.
- Song, G., & Lin, T. (2016). 东北粮食主产区农村土地承包经营权规模化流转定价机制研究: 以黑龙江省克山县为例 [Research on the price mechanism for use rights scale transfer farmland in northeast major grain producing region: Evidence from Keshan]. *China Land Sciences*, 30(6), 44–51.
- Song, Y., & Chen, Q. Y. (2014, March 13–17). 基于金融支持视角的农村土地流转研究: 以福建省沙县为例 [Research on rural land circulation based on the perspective of

- financial support: evidence from Sha county, Fujian province*]. Fujian Land Institute Annual Conference, Fuzhou, China.
- State Council of PRC. (1990, May 19). *Interim regulations on the appropriating and transfer of the urban state-owned land use rights*. State Council of PRC. Retrieved December 31, 2019, from http://www.gov.cn/zhengce/2020-12/25/content_5574204.htm
- State Council of PRC. (1998, December 27). *Basic Farmland Protection Regulation*. State Council of PRC. Retrieved December 31, 2019, from http://www.gov.cn/gongbao/content/2011/content_1860862.htm
- State Council of PRC. (2014, November 14). *Interim Regulations of Unified Real Estate Registration*. State Council of PRC. Retrieved December 31, 2019, from http://www.gov.cn/zhengce/content/2014-12/22/content_9325.htm
- Su, B. Z., Li, Y. H., Li, L. Q., & Wang, Y. (2018). How does nonfarm employment stability influence farmers' farmland transfer decisions? Implications for China's land use policy. *Land Use Policy*, 74(5), 66–72.
- Tan, R., Beckmann, V., van den Berg, L., & Qu, F. T. (2009). Governing farmland conversion: Comparing China with the Netherlands and Germany. *Land Use Policy*, 26(4), 961–974.
- Tao, G. S., Hu, J. F., Li, Z. Y., Yin, J. B., & Yang, B. Y. (2018). 农村产权交易平台市场化运营的永嘉模式: 永嘉县农村产权交易平台市场化建设运营的创新做法和经验 [The Yongjia model of market-oriented operation of rural property rights trading platforms]. *Zhejiang Economy*, 20(5), 4–10.
- Temesgen, C., & Dupraz, P. (2014, July 27-29). *The role of farmers' competition on farmland price in local markets: Bretagne region of France*. Agricultural & Applied Economics Association Annual Meeting, Minneapolis, MN, United States.
- Tian, J. Y. (2019). 农村产权交易平台促进农村土地承包经营权流转及其运作: 以浙江省为例 [Rural property rights trading platform promotes the transfer and operation of rural land contracted management right: Taking Zhejiang province as an example]. *Journal of Zhejiang Wanli University*, 32(5), 1–6.
- Tian, L. (2008). The Chengzhongcun land market in China: Boon or bane? - A perspective on property rights. *International Journal of Urban and Regional Research*, 32(2), 282–304.
- Tobler, A. W. R. (1970). A computer movie simulating urban growth in the Detroit Region. *Economic Geography*, 6(1), 234–240.
- United States Department of Agriculture. (2013, October 1). *Rural-Urban Continuum Codes*. United States Department of Agriculture Economic Research Service. Retrieved December 31, 2019, from <https://www.ers.usda.gov/data-products/rural-urban-continuum-codes/>
- Uyar, B., & Brown, K. (2007). Neighbourhood affluence, school-achievement scores, and housing prices: Cross-classified hierarchies and HLM. *Journal of Housing Research*, 16(2), 97–116.
- von Thünen, J. H. (1826). *The Isolated State*. Palgrave MacMillan, London.
- Wang, A. G. (2016). 不动产统一登记背景下对农村土地产权的思考: 以重庆市耕地承包经营权为例 [Reflections on the property rights of rural land under the background of unified real estate registration: Evidence from Chongqing]. *Theoretic Observation*, 116(2), 71–72.
- Wang, H., & Yang, H. J. (2018). 大城市郊区农地流转特征及影响因素实证研究: 基于西安市秦岭北麓 684 户农户调查 [Analysis on the spatial difference of rural land circulation and its influencing factors: Investigation on farmers in four counties of the north of Qinling mountains]. *Journal of Northwest University*, 48(2), 4–10.
- Wang, H., Riedinger, J., & Jin, S. (2015). Land documents, tenure security and land rental development: Panel evidence from China. *China Economic Review*, 36(1), 220–235.

- Wang, J. Y., & Liu, Y. S. (2013). Tourism-led land-use changes and their environmental effects in the southern coastal region of Hainan Island, China. *Journal of Coastal Research*, 29(5), 1118–1125.
- Wang, S. G. (2008). 农民合作社的全要素合作, 政府支持与可持续发展 [All-factor farmer cooperatives, government support and sustainable development]. *Rural Economy*, 26(11), 3–6.
- Wang, X. H. (2010). 促进农地经营权的合理流转和适度规模经营 [Promote the rational transfer of farmland management rights and moderate scale management]. *Agricultural Science-Technology and Information*, 8(32), 3–4.
- Wang, Y. H., Li, X. B., Li, W., & Tan, M. H. (2018). Land titling program and farmland rental market participation in China: Evidence from pilot provinces. *Land Use Policy*, 74(5), 281–290.
- Wang, Y. L. (2013). 新型城镇化与土地制度改革中的核心问题 [The core issues in the new urbanization and land system reform]. *Research on Economics and Management*, 12(5), 48–52.
- Wang, Y. Y., Hu, Y. Q., & Lv, W. P. (2011). 农村土地流转中介组织构建与发展问题研究: 以浙江省杭州市为例 [Study on the intermediary organisation construction and development in farmland transfer: Taking Hangzhou city in Zhejiang province as an example]. *Inner Mongolia Agricultural Science and Technology*, 39(3), 4–6.
- Wang, Y. Y., Cai, Y. Y., & Zhu, L. L. (2017). 农业补贴政策的区域效应及影响因素分析: 以湖北省武汉、荆门、黄冈等典型主体功能区为实证 [Analysis on the regional effect and influencing factors of agricultural subsidy policies: Evidence from Wuhan, Jinmen, and Huanggang in Hubei province]. *Journal of Huazhong Agricultural University*, 127(1), 8–17.
- Weersink, A., Clark, S., Turvey, C. G., & Sarker, R. (1999). The effect of agricultural policy on farmland values. *Land Economics*, 75(3), 425–439.
- Wei, H., & Wen, F. Q. (2014). 工商企业租种农户承包地现状与完善对策: 基于湖北省 7 个地区的实地调查 [Status quo of farmers' contracted land in industrial and commercial enterprises and measures for improvement: Based on field surveys in 7 regions of Hubei province]. *Rural Economy*, 32(5), 38–42.
- Wen, G. H., & Yang, G. Q. (2019). 耕地细碎化对农户耕地生产率的影响机理与实证 [Impact mechanism and empirical study of cultivated land fragmentation on farmers' cultivated land productivity]. *China Population, Resources, and Environment*, 29(5), 138–148.
- Wen, T. (2008, December 26). *The first case of farmland transfer by electronic bidding in Chengdu*. WCC Daily. Retrieved December 31, 2019, from <https://finance.sina.com.cn/china/dfjj/20081226/15435690249.shtml>
- Wood, D., & Lenné, J. M. (2005). “Received wisdom” in agricultural land use policy: 10 years on from Rio. *Land Use Policy*, 22(2), 75–93.
- Wu, L., & Zhou, L. Q. (2014). 我国土地承包经营权流转典型模式比较研究 [A comparative study on the typical farmland transfer modes of in China]. *Journal of Northeast Agricultural University*, 12(1), 1–6.
- Wu, X. B., & Wang, F. Y. (2015). 新型农业经营主体发展中的土地流转价格问题: 基于湖北省荆州市的调研数据的实证分析 [Farmland transfer price issues in the development of new managing entities: Empirical analysis based on survey data in Jingzhou City, Hubei province]. *Price: Theory & Practice*, 374(8), 38–40.
- Wu, X. B., Wang, F. Y., & Li, D. S. (2016). 规模化经营中土地流转价格影响因素的实证分析 [An empirical analysis on the influencing factors of land transfer price in scale

- operation]. *Statistics and Decision*, 32(10), 87–91.
- Wu, Y. P., & Xue, J. (2009). 对农用地估价方法的反思 [Introspection on agricultural land evaluation models]. *China Land Science*, 23(9), 36–40.
- Wu, Z. J., Kong, X. Z., & Zheng, L. W. (2011). 农地流转价格的影响因素研究: 基于皖浙两省 413 户农户的调查 [On factors influencing farmland transfer rent and the role of land share cooperatives: A study based on the survey of 413 households in Anhui and Zhejiang]. *Journal of Jiangsu Agricultural University (Social Science Edition)*, 10(3), 1–6.
- Xi, J. P. (2015, May 1). *Xi Jinping's speech at the twenty-second collective learning of the Central Political Bureau*. Xinhua News Agency. Retrieved December 31, 2019, from http://www.xinhuanet.com/politics/2015-05/01/c_1115153718.htm
- Xian, L. (2017, June 7). *Sichuan Qionglai insurance for land transfer: performance insurance issues the industry's first compensation*. Chinese Central Television Station. Retrieved December 31, 2019, from <http://tv.cctv.com/2017/06/07/VIDEVOmd8XW2EgzTuzX8lrM170607.shtml>
- Xiao, W. D., & Liang, C. M. (2016). 农村土地三权分置的内涵, 基本要义及权利关系 [The connotation, basic principles and rights relationship of the “three-rights separation” of farmland]. *Chinese Rural Economy*, 32(11), 17–29.
- Xie, J. C., & Lu, H. S. (2001). 论城市土地收益分配制度创新 [On institutional innovation of benefit distribution system from urban land]. *Urban Research*, 90(5), 148–162.
- Xu, S. F., He, X. H., & Xu, L. B. (2019). Market or government: who plays a decisive role in R&D resource allocation? *China Finance Review International*, 9(1), 110–136.
- Yan, J. M., & Wang, C. (2011). 基于城乡统筹发展的土地管理制度改革创新模式评析与政策选择: 以成都统筹城乡综合配套改革试验区为例 [Pattern analysis and policy choice on reform and innovation of land administration system based on urban-rural integration development: A case study of integrated reform pilot area for urban-rural integration development in Chengdu]. *China Soft Science Magazine*, 26(7), 1–8.
- Yang, G. L., Kong, R., & Yang, W. J. (2014). 农地承包经营权转让意愿价格: 一个供求均衡陕西省三县区 721 户农户调查 [Price of willing to farmland transfer, an equilibrium of supply and demand: Evidence from Shaanxi province]. *Rural Economy*, 32(2), 22–26.
- Yang, L., & Hao, J. M. (2014). 工商企业参与土地流转的思考: 基于江苏省南通市的调研 [Thinking of industrial and commercial enterprises participating in farmland transfer: Based on the investigation of Nantong city, Jiangsu province]. *Jiangsu Agricultural Sciences*, 42(6), 423–425.
- Yang, W. J., & Meng, Z. (2009). 农用地估价方法综述 [A review of farmland appraisal methods]. *Modern Agricultural Science and Technology*, 25(10), 247–249.
- Yao, Y. (2000). 中国农地制度: 一个分析框架 [The system of farmland in China: An analytical framework]. *Social Sciences in China*, 21(2), 54–65.
- Ye, J. P., Feng, L., Jiang, Y., Prosterman, R., & Zhu, K. L. (2010). 2008 年中国农村土地使用权调查研究: 17 省份调查结果及政策建议 [2008 research on use rights of China's rural land: Survey results and policy recommendations of 17 provinces]. *Management World*, 26(1), 64–73.
- Ye, Q. L., & He, L. Z. (2015). 农村土地流转中的潜在风险及防范策略研究: 基于企业参与农地经营框架下的分析 [Research on potential risks and prevention strategies in farmland transfer: Based on the analysis under the framework of enterprises participating in farmland management]. *Agricultural Economy*, 25(1), 26–27.
- You, H. Y., & Wu, C. F. (2010). 农地流转, 禀赋依赖与农村劳动力转移 [Farmland transfer, endowment dependence, and rural labour force transfer]. *Management World*,

- 26(3), 65–75.
- Yu, F. (2009). 从招拍挂制度看房价与地价的关系 [On the relationship between house price and land price from the perspective of bidding, auction and listing system]. *Finance Economy*, 13(6), 31–32.
- Yuan, M. B., & Zhu, Q. Z. (2014). 农地流转实践表达与农业经营主体的生成逻辑分析 [Analysis on farmland transfer practice and logic of generation of agricultural operation]. *Ancient and Modern Agriculture*, 28(1), 1–8.
- Zhang, L., Zhao, S. X. B., & Tian, J. P. (2003). Self-help in housing and Chengzhongcun in China's urbanization. *International Journal of Urban and Regional Research*, 27(4), 912–937.
- Zhang, L., Feng, S. Y., & Qu, F. T. (2014). 农地流转区域差异及其成因分析: 以江苏省为例 [Regional differences of farmland transfer and its influencing factors: A case study of Jiangsu province]. *China Land Science*, 28(5), 73–80.
- Zhang, M., & Chen, S. M. (2008). 基于 Hedonic 定价理论的上海房地产价格实证分析 [An empirical analysis of shanghai real estate prices based on hedonic pricing theory]. *Finance Economy*, 42(3), 72–74.
- Zhang, S. M. (2014). 人口结构变动视角下的我国农村土地流转 [Rural land transfer in China: From the perspective of population structure change]. *Economic Geography*, 34(8), 132–136.
- Zhang, W. (2014, December 2). *Xi Jinping: adhere to three bottom lines in rural land system reform*. Xinhua News Agency. Retrieved December 31, 2019, from http://www.gov.cn/xinwen/2014-12/02/content_2785771.htm
- Zhang, X. W., Zhu, D. L., & Wang, X. (2005). 土地招拍挂制度及地价与房价关系的实证研究: 以沈阳市为例 [An empirical study on the system of land bidding, auction and listing and the relationship between land price and housing price: Evidence from Shenyang]. *Price: Theory & Practice*, 22(6), 40–41.
- Zhao, Q. Z., & Tang, Z. (2008). 农用地流转现状与农户土地流转合约选择的实证研究: 以四川省绵竹市为例 [An empirical study on the status quo of farmland transfer and the choice of farmers' land contracts: Evidence from Mianzhu]. *China Rural Survey*, 29(3), 13–20.
- Zhao, X., & Tan, G. R. (2006). 看不见的手打败了多只看得见的手: 对当前宏观调控及房地产调控的分析 [An invisible hand defeats visible hands: Analysis of current macroeconomic readjustment and on property market]. *China Opening Herald*, 14(3), 5–10.
- Zhao, Y. (2012). 对不同土地出让方式的理论和实证比较: 基于拍卖理论并以北京市土地市场为例 [Theoretical and empirical comparison of different land transfer methods: Based on auction theory]. *Nankai Economics Studies*, 27(4), 97–112.
- Zhong, B., & Liu, J. C. (2008, October 28). *A visit to the first village of Chengdu rural property right system reform*. Chengdu Evening News. Retrieved December 31, 2019, from <http://city.sina.com.cn/city/2008-10-28/106084.html>
- Zhou, Q. R. (2009). *还权赋能: 成都市统筹城乡综合改革实践的调查研究 [The road to property rights delineation: experience of Chengdu, China]*. Peking University Press.
- Zhou, Q. R. (2013). *城乡中国 [Urban and Rural China]*. CITIC Press.
- Zhu, L. Z. (2014). 我国农地土壤污染的现状与法制对策 [Current status of soil pollution in farmland in China and legal measures]. *Green Leaf*, 7(5), 37–43.
- Zhu, Q. Z., Hu, P. H., & Xu, H. Z. (2014). 论家庭农场: 优势, 条件与规模 [Discussion about family farms: Advantage, requirement, and scale]. *Issues in Agricultural Economy*, 35(7), 11–17.

Zhu, R. Y. (2001). 中国大陆农用地估价研究 [Study of the farmland appraisal]. *Journal of HIT (Social Sciences Edition)*, 3(1), 88-92.