

Preliminary Exploration of the Monetization of Land Tax in the Mid-Ming Dynasty's Western Shandong Region from an HGIS Perspective

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ABSTRACT

Transportation and retention are among the most important elements of the fiscal system during the Ming Dynasty, categorized as types of tax allocations used in the collection of the land tax, reflecting the fiscal relations between central and local governments. Thus, transportation and retention are central to the fiscal operations of the Ming Dynasty. This paper compiles fiscal data from the Western Shandong Region during the Ming Dynasty and discusses the transportation, retention, and the monetization issues of the land tax during the Wanli Reform. Using Geographic Information Systems, the spatial visualization of the traditional and new land tax transportation quotas was performed, revealing that the new tax regime is heavily constrained by the original quotas.

KEYWORDS

Ming Dynasty; Transportation; Retention; Shandong; Native; Land Tax.

1. INTRODUCTION

In the Ming Dynasty, transportation refers to the periodic and fixed quota transfer of taxes to central and frontier warehouses, as designated by the central government, with specified amounts for the capital and frontier regions. Retention refers to "a portion of the taxes retained locally for regular expenditures. Local retained taxes were mainly used for the stipends of princely states, military provisions outside the nine frontiers, local official salaries, and educational expenses. The use of retained funds also required central auditing, and expenditures had to be requested from the central government beforehand, not to be disbursed at the local level without central permission. Previous studies have discussed the issues of transportation and retention extensively. However, scholarly focus on the Ming Dynasty has predominantly been on the affluent regions of the south, while the northern areas have been somewhat overlooked; the reforms towards monetization of the land tax in the northern regions during the Ming Dynasty have been scarcely addressed.

2. MID-MING TRANSCRIPTION OF NATIVE LAND TAX DATA FROM DONGCHANG AND YANZHOU PREFECTURES

2.1. Data Transcription

The land, population, and land tax figures of various prefectures under the jurisdiction of the Shandong Provincial Government are often recorded in the "Shandong Tongzhi" of the Jiajing period, and there are also clear records of the flow of taxation in various prefectures. At the prefectural level, complete prefectural records of the Wanli period can be found for Qingzhou Prefecture, Laizhou Prefecture, Dongchang Prefecture, and Yanzhou Prefecture (Qingzhou Prefecture also has prefectural records from the Jiajing period), including "Qingzhou Prefecture Annals" of the Jiajing period [1], "Wanli Qingzhou Prefecture Annals" [2], "Wanli Laizhou Prefecture Annals" [3], "Wanli Yanzhou Prefecture Annals" [4], and "Wanli Dongchang Prefecture Annals" [5]. Except for the local chronicles of Yanzhou and Dongchang Prefectures, the rest of the prefectural records do not have records of silver figures. This article takes Dongchang Prefecture and Yanzhou Prefecture as data sources, visualizes and contrasts the spatial presentation of the summer tax and autumn grain land tax's transportation quotas and silver amounts, and conducts comparative analysis before and after.

The Ming Dynasty inherited the two-tax system since the Tang Dynasty. There were two payments each year, in summer and autumn, and the items paid were different. Naturally, the examination of retention and transportation should be discussed separately. Regarding the content and amount of local taxation in the Ming Dynasty, there were actually changes, as stated in Ming Dynasty notes:

"Our dynasty's military needs: there are quota, annual, and ad hoc allocations. During the Hongwu period, the national system was established, such as summer taxes, autumn grains, fishing taxes, tea taxes, silk and medicinal materials, all had regulations, which was the quota system. After the Xuande period, as the royal family multiplied, additional Lu rice was added, offices were established, and additional salaries and grains were added, which was the annual system. Furthermore, such as the construction of palaces and the purchase and transportation of large timber, this was the ad hoc system. The quota system had no increase or decrease, the annual system had increases without decreases, and the ad hoc system was dispatched when needed, and stopped when completed." [6].

The land tax figures in the local chronicles of the mid-Ming Dynasty basically belonged to the quota system inherited from the Hongwu fiscal system. The quota system was still the main content of local taxation during the Wanli period. Both autumn grain and summer taxes had fixed quotas, and both transportation and retention included autumn grain and summer taxes. Every year during the Ming Dynasty, "a portion of autumn grain and summer taxes from regions such as Huguang, Shandong, Henan, Jiangxi, and Nanjing were transported by water to the capital as grain for the grain transport." [7].

2.1.1. Yanzhou Prefecture

Complete records of the Wanli year of Yanzhou Prefecture can be found in the "Yanzhou Prefecture Annals"[8] of the first year of Wanli (1573) and the twenty-fourth year of Wanli. The restoration situation of Yanzhou Prefecture is detailed in Tables 1 and 2.

Table 1. Wanli Year (1573) Yanzhou Prefecture Quota and Retention Transcript of Land Tax in Local Currency

State-County	Transported Rice (Wanli Period) Stone	Transported Rice Converted to Silver (Wanli Period)	Transported Rice Converted to Silver (Wanli Period) Taels in	Retained Rice Converted to Silver (Wanli Period) Taels in County Annals	Data Source
Caozhou	6000	6954			The first year of Wanli, "Yanzhou

Dingtao County	2000	2306			Prefecture Annals"
Chengwu County	3500	2855			
Cao County	6500	7075			
Shan County	8500	6589			
Zou County	7500	6320			
Jinxiang County	5500	4239			
Yutai County	6000	2884			
Yixian County	6500	4469			
Tancheng County	15000	4746			
Yizhou	22000	10554.568			
Feixian County	12000	5629			
Zou County	750	6329			
Jining State	10000	10374.5			
Jiaxiang County	2400	1948			
Juye County	4000	3330			
Ziyang County	5500	4811			
Yuncheng County	3500	3235			
Qufu County	3000	2239			
Sishui County	4000	2683			
Ningyang County	8000	7669			
Dongping State	8300	8778			

Shouzhong County	2000	2224.1			
Yanggu County	11000	11406.18			
Dong'e County	6000	6416			
Pingyin County	4500	4444.62			
Teng County	16000	9811.57			
Wenshang County	12800	13360.7	7525	2309	Wanli "Wenshang County Annals"
Total Recorded in the	198000	157362			
Actual Sum Total	198000	157362			

Note: All data are kept in units of stones and rounded to the nearest integer.

Table 2. Wanli Year (1573) Yanzhou Prefecture Quota and Retention Table for Land Tax on Wheat in Local Currency

State-County	Transported Wheat (Wanli Period) Stone	Transported Wheat Converted to Silver (Wanli Period) Taels in Prefecture Annals	Transported Wheat Converted to Silver (Wanli Period) Taels in County Annals	Retained Wheat Converted to Silver (Wanli Period) Taels in County Annals	Data Source
Caozhou	2900	1766.3			The first year of Wanli, "Yanzhou Prefecture Annals"
Dingtao County	850	458.9			
Chengwu County	1800	721.2			
Cao County	3200	1950			
Shan County	4500	2237			
Jinxiang County	3300	1251.5			
Yutai County	3300	904.7			
Tancheng County	6100	1406.43			
Yizhou	13500	3294.29			

Feixian County	7100	1637			
Jining State	5600	2410.5			
Jiaxiang County	1400	481			
Juye County	2200	831			
Ziyang County	3150	1197.6			
Yuncheng County	1500	814			
Qufu County	1700	572			
Sishui County	2400	795.7			
Zou County	4100	1352			
Ningyang County	3800	1483			
Dongping State	3700	1818			
Shouzheng County	1000	526.9			
Yanggu County	6000	2631			
Dong'e County	3000	1361			
Pingyin County	2400	882			
Teng County	8500	1771.3			
Yixian County	3600	918			
Wenshang County	5900	2395	2397	822	Wanli "Wenshang County Annals"
Total Recorded in the	106500	37875			
Actual Sum Total	106500	37867.32			

Note: All data are kept in units of stones and rounded to the nearest integer.

By comparing the Yanzhou Prefectural Annals from the first year of Wanli (1573) with those from the twenty-fourth year of Wanli (1596), the author discovered that the land tax figures in the latter directly originated from the former. In both versions of the Yanzhou Prefectural Annals, it is consistently recorded that Caozhou had 300 shi less in retained rice.

Transporting 6,000 shi, with 300 shi allocated for transportation to Tancheng County pending the reclamation of the county's fallow land, upon which the actual levy of 6,300 shi and 6,954 liang nine qian six fen of silver will be reconsidered. [9][10]

2.1.2. Dongchang Prefecture

Table 3. Dongchang Prefecture Native Wheat and Rice Land Tax Transcription Table

State-County	Transported Rice (Wanli Period) Stone	Transported Rice Converted to Silver (Wanli Period) Taels	Transported Wheat (Wanli Period) Stone	Transported Wheat Converted to Silver (Wanli Period) Taels	Data Source
Puzhou	8000	7647	3100	1418.8	"Dongchang Prefecture Annals"
Fan County	7000	7617	1400	836.8	
Chaocheng County	10000	10325.73	3900	1977.619	
Liaocheng County	10000	8409	3800	1663	
Guan County	12500	13038.7	5000	2550.1	
Boping County	6000	5786	2200	1048	
Chiping County	12500	9853	5300	2143	
Qingping County	8500	8568	3300	1507	
Guantao County	10500	10785	4200	1961	
Qiu County	8500	8029.7	3300	1671	
Tangyi County	11000	11040	4400	2229	
Guancheng County	3500	3354	1400	829.6	
Linqing Prefecture	14500	15490.96	5500	3038	
Gaotang Prefecture	18000	17268.65	7600	3509.7	
Xiajin County	14000	13662	5800	2670.9	
En County	12500	12418	5200	2388	
Wucheng County	12500	12418			
Shen County					

Note: All data are kept in units of stones and rounded to the nearest integer.

Table 4. Zhengde Shen County Land Tax Situation

Type	Hongwu 24th Year	Yongle 10th Year	Tianshun 5th Year	Chenghua 17th Year	Hongzhi 4th Year	Hongzhi 14th Year	Zhengde 7th Year	Data Source
Summer Tax Wheat	30001	4273	4265	4265	4265	4265	4265	Zhengde "Shen County Annals" [20]
Autumn Grain Rice	7003	9970	9952	9952	9952	9952	9952	

Note: All data are kept in units of stones and rounded to the nearest integer.

Within Dongchang Prefecture, one can find the Wanli Dongchang Prefecture Annals [11], with county annals available including those from the Zhengde period Shen County Annals [12], Jiajing Chaocheng County Annals [13], Shunzhi Tangyi County Annals [14], Jiajing Gaotangzhou Annals [15], Jiajing Xiajin County Annals [16], Jiajing Wucheng County Annals [17], Jiajing En County Annals [18], and Wanli En County Annals [19]. Records of land tax in Shen County have been lost, and the recovery details for Dongchang Prefecture are detailed in Tables 3 and 4, where Table 3 covers the recovery content for autumn grain rice and summer tax wheat, and Table 4 presents the reconstructed land tax figures for Shen County from the Zhengde Shen County Annals.

Through the Zhengde Shen County Annals, the author found that since the year Yongle 10 (1412), the quotas for summer tax wheat and autumn grain rice in Shen County have remained unchanged; tax variations directly stemmed from population growth and changes in land quantity. "During the imperial era, the population was sparse with much wilderness, which gradually began to be cleared for agriculture from the Yongle period onwards; since then, there has been no increase or decrease."

3. SPATIAL VISUALIZATION OF LAND TAX DATA FROM DONGCHANG AND YANZHOU PREFECTURES

3.1. Spatial Visualization of Land Tax Data from Dongchang and Yanzhou Prefectures

The section headings are in boldface capital and lowercase letters. Second level headings are typed as part of the succeeding paragraph (like the subsection heading of this paragraph).

Using ArcGIS software, the author incorporated the summer wheat and autumn grain rice physical Transportation quotas, along with the silver-equivalent Transportation amounts from Dongchang and Yanzhou Prefectures into DEM data for spatial visualization. Figure 1A shows the physical Transportation quota for summer wheat, Figure 1B shows the silver-equivalent Transportation amount for summer wheat, Figure 1C shows the physical Transportation quota for autumn grain rice, and Figure 1D shows the silver-equivalent Transportation amount for autumn grain rice.

From the spatial visualization results, the changes in Dongchang and Yanzhou Prefectures before and after the Monetization reform are not significant. According to the natural break classification method, the Taxation system tends to average out after the Monetization reform, with greater flexibility in summer taxes, hence more noticeable structural changes in summer taxes. Figure 2A shows the natural break classification of the physical quota for summer taxes, Figure 2B shows the natural break classification for the silver-equivalent amount for summer taxes, Figure 2C shows the natural break classification for the physical quota for autumn grain, and Figure 2D shows the natural break classification for the silver-equivalent amount for autumn grain rice.

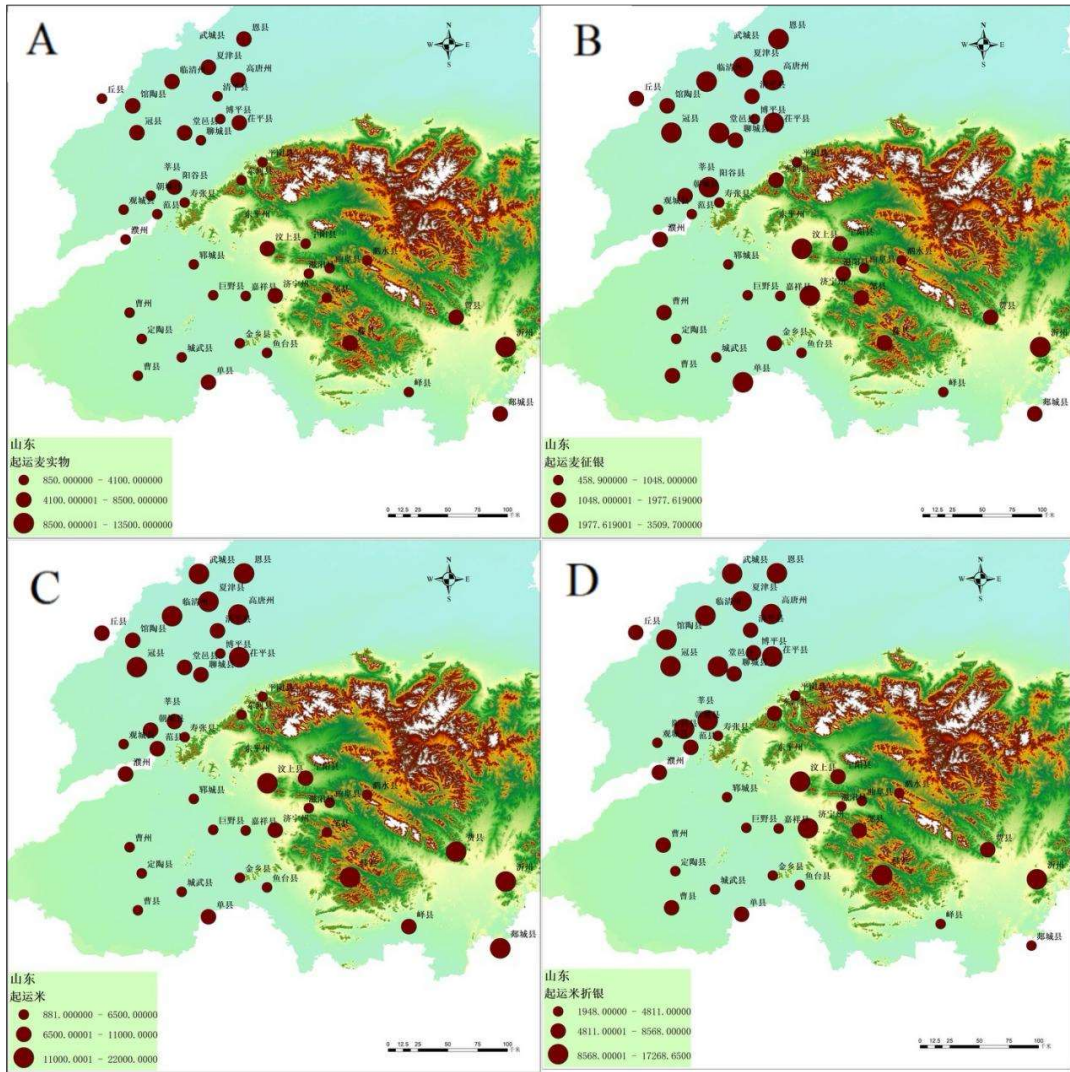


Figure 1. Spatial Visualization of Summer and Autumn Land Tax Transportation and Silver Conversion

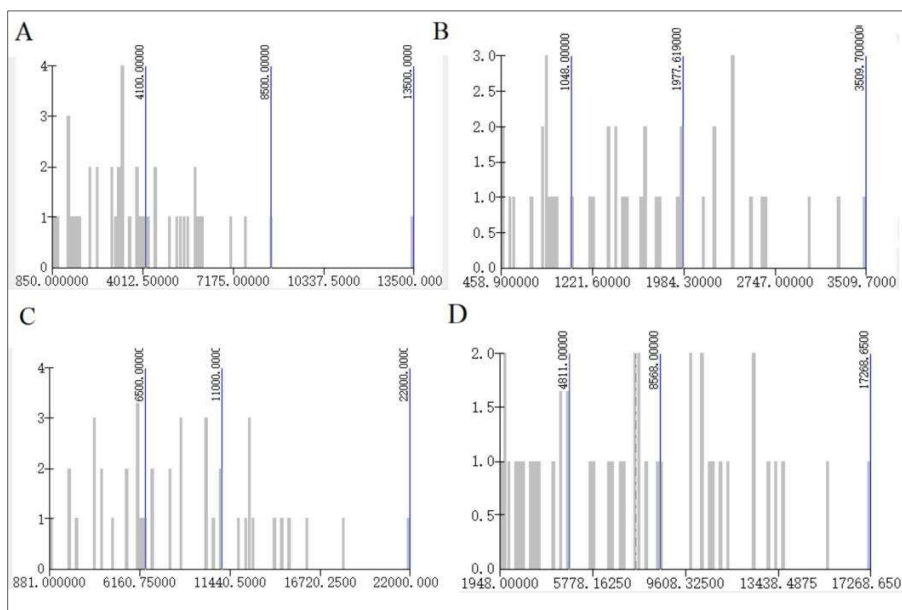


Figure 2. Natural Break Classification of Summer and Autumn Land Tax Transportation Quotas and Silver Conversion

4. THE IMPLICATIONS OF SILVER MONETIZATION QUOTAS FOR MID-MING SHANDONG PREFECTURAL AND COUNTY GOVERNMENTS

4.1. Existing Research on Silver Monetization of Shandong Land Tax based on the "Wanli Accounting Records"

The book "Organization and Study of the Ming Dynasty Wanli Accounting Records" addresses the issue of taxation silverization during the Ming Dynasty, calculating the proportion of silverization in various provincial administrations, prefectures, and counties. The method and purpose were to use computer simulations to restore the original state of Ming Dynasty financial accounting. "This paper solely relies on the original data from the 'Accounting Records' and the statistics derived from them without incorporating other texts for comparison, verification, or additional statistics. In the tables of this paper, apart from separate listings for treasure notes and copper coins, all other entries are uniformly measured in silver."

Due to missing original volumes, the data for Shandong Province had to be estimated through simulation for the provincial administration's total quotas, which can be found in the "Ming Legal Code" and the "Jiajing Shandong Comprehensive Gazetteer." The author had to simulate the total, transported, and retained tax amounts for all types of taxes during the summer and autumn in the prefectures, counties, and the province, including taxes such as horse fodder and agricultural sericulture. The following is an example list partially reconstructed by the author for Shandong Province.

Table 5. Dongchang Prefecture Summer and Autumn Grain Silver Conversion Table

County/State	Total Amount (Taels)	Transported (Taels)	Retained (Taels)
Liaocheng County	16919.01	11653.81	5265.2
Tangyi County	12085.01	8324.15	3760.86
Boping County	12085.01	8324.15	3760.86
Chiping County	16919.01	11653.81	5265.2
Qingping County	12085.01	8324.15	3760.86
Shen County	12085.01	8324.15	3760.86
Guan County	19336.01	13318.64	6017.37
Linqing State	20544.52	14151.07	6393.45
Qiu County	19336.01	13318.64	6017.37
Guantao County	19336.01	13318.64	6017.37
Gaotang State	20544.52	14151.07	6393.45
En County	20544.52	14151.07	6393.45
Xiajin County	24170.01	16648.3	7521.71
Wucheng County	15710.51	10821.4	4889.11
Puzhou	24170.01	16648.3	7521.71
Fan County	12085.01	8324.15	3760.86
Guancheng County	9668	6659.32	3008.68
Zhaocheng County	15710.51	10821.4	4889.11

(Data sourced from: "Organization and Study of the Ming Dynasty <Wanli Accounting Records> Volume Three")[21].

4.2. The Significance of Silver Monetization Quotas during the Wanli Period

Recent discussions have addressed the fixed quota system of Ming Dynasty land taxes. Ding Liang argues that although the Wanli Reform maintained the fixed land tax system, the process of converting obligations into silver allowed local fiscal authorities greater autonomy, breaking some of the rigidity in the financial system.[22] While he did not discuss the entire Ming land tax silver conversion process, the author found from certain local gazetteers in the Western Shandong region that there was flexibility in the silver conversion quotas of land taxes. Although the physical quotas remained the same, the silver conversion amounts were not fixed. An analysis of the silver transportation figures within Dongchang Prefecture during the Wanli era reveals regional differences in "silver conversion rates." [23] Overall, the silver conversion rates for summer taxes were lower than those for autumn grains. The rates also varied by county; the lowest silver conversion rate for summer wheat transportation in Chiping County was 0.4; the highest rate in Fan County was 0.6. Similarly, the transportation rates for autumn grains varied, with the lowest rate for rice in Chiping County being 0.79 and the highest in Fan County reaching 1.09. Within Dongchang Prefecture, Chiping County had the lowest silver conversion rates for both summer and autumn taxes, while Fan County had the highest rates.

Table 6. Dongchang Prefecture Summer and Autumn Grain Transportation and Retention Silver Conversion and Rates Table

County	Transported Wheat (Wanli Period) Stone	Wheat Converted to Silver (Wanli Period) Taels	Rate of Wheat Converted to Silver per Stone (Summer Tax)	Transported Rice (Wanli Period) Stone	Rice Converted to Silver (Wanli Period) Taels	Rate of Rice Converted to Silver per Stone (Autumn Grain)
Puzhou	3100	1418.8	0.46	8000	7647	0.96
Fan County	1400	836.8	0.60	7000	7617	1.09
Zhaocheng County	3900	1977.619	0.51	10000	10325.73	1.03
Liaocheng County	3800	1663	0.44	10000	8409	0.84
Guan County	5000	2550.1	0.51	12500	13038.7	1.04
Boping	2200	1048	0.48	6000	5786	0.96

Cou nty						
Chip ing Cou nty	5300	2143	0.40	12500	9853	0.79
Qing ping Cou nty	3300	1507	0.46	8500	8568	1.01
Gua ntao Cou nty	4200	1961	0.47	10500	10785	1.03
Qiu Cou nty	3300	1671	0.51	8500	8029.7	0.94
Tang yi Cou nty	4400	2229	0.51	11000	11040	1.00
Gua nche ng Cou nty	1400	829.6	0.59	3500	3354	0.96
Linq ing State	5500	3038	0.55	14500	15490.96	1.07
Gaot ang State	7600	3509.7	0.46	18000	17268.65	0.96
Xiaji n Cou nty	5800	2670.9	0.46	14000	13662	0.98
En Cou nty	5200	2388	0.46	12500	12418	0.99
Wuc heng Cou nty				12500	12418	0.99

(Data sourced from: Wanli "Dongchang Prefecture Gazette")[24].

By 1573, the "Yanzhou Prefecture Gazette" reported that the silver conversion prices for summer wheat and autumn rice transportation exhibited regional differences, and the silver conversion at various granaries also varied; similar phenomena were observed in the transportation of autumn tax horse fodder across counties. Taking Ningyang County in Yanzhou Prefecture during the Wanli period as an example.

The summer wheat tax and autumn grain rice transportation price adjustments in Ningyang County are as follows:

The Linqing Guangji warehouses adjusted 414 stones and 7 dou of wheat to rice, at eight qian per stone, totaling 331 taels and 7 qian 6 fen of silver; the Dezhou warehouse adjusted 354 stones, 4 dou, 3 sheng, and 5 he of wheat to rice, at eight qian per stone, totaling 283 taels, 5 qian 4 fen 8 li of silver. [25].

The Bohai warehouse adjusted 1,205 stones, 3 dou, 3 sheng, 3 he, 8 shao, and 5 chao of millet to rice, at one tael per stone, totaling 1,205 taels, 3 qian, 3 fen, 3 li, 8 hao, and 5 si of silver. The Yongning warehouse adjusted 244 stones, 6 dou, 7 sheng, and 5 he of millet to rice, at one tael and two qian per stone, totaling 293 taels, 6 qian, and 1 fen of silver. [26].

From the above, it can be concluded that the transportation price adjustments for the summer wheat tax and autumn grain rice vary according to the transportation destination, showing a similar pattern of price adjustments in Ningyang County for horse fodder.

The Liniufang warehouse adjusted 1,821 bundles of grass, at 6 fen 5 li per bundle, totaling 118 taels, 3 qian, 6 fen, 5 li of silver; the Zhongfu Waichang adjusted 3,362 bundles and 6 jin of grass, at 6 fen per bundle, totaling 201 taels, 7 qian, 4 fen, 4 li of silver. [27].

Before the monetization reforms, Ming Dynasty taxation primarily relied on tangible goods. However, with the massive influx of silver into the world market, China's domestic market faced severe silver inflation, making the rigid taxation policies unsustainable in a monetized market, leading to financial difficulties. Ray Huang in "Financial and Taxation Systems of Ming China in the Sixteenth Century" states: "The monetization reforms in Ming China did not start during the Wanli era but continued from the mid-Ming period until the Chongzhen era. The Single Whip Law was not created by Zhang Juzheng, and although his role in the Wanli Reforms was not pivotal, his reforms indeed extended the Ming Dynasty's lifespan by fifty years." [28].

The Wanli "Accounting Records" were compiled in the sixth year of Wanli (1578), while the land tax figures in the Wanli "Dongchang Prefecture Annals" date to the twelfth year of Wanli (1584), and the Wanli "Yanzhou Prefecture Annals" do not specify the year but were compiled in the first year of Wanli (1573). The Wanli "Shuntian Prefecture Annals" were engraved in the twenty-first year of Wanli (1593), and the compilation of the Wanli "Wenshang County Annals" was in the thirty-sixth year of Wanli (1608), covering the early to mid and late Wanli era. Both the Wanli "Yanzhou Prefecture Annals" and Wanli "Wenshang County Annals" recorded the tax situation in Wenshang County, but the authors found discrepancies in the autumn grain rice transportation silver amounts recorded in the Wanli "Wenshang County Annals" and Wanli "Yanzhou Prefecture Annals", although the summer wheat tax and horse fodder silver amounts showed only minor differences. The comparison of the Imperial Warehouse land acreage and velvet also showed a coexistence of original color and converted silver.

Table 7. Wenshang County Land Tax Compilation Table

Category	Yanzhou Prefecture Annals (Wanli Period)	Wenshang County Annals (Wanli Period)
Actual Rice Amount (Stone)	16858	16858
Transported Rice (Stone)	12800	12800
Retained Rice (Stone)	4058	4058
Transported Rice Converted to Silver (Taels)	13360.7	7525
Retained Rice Converted to Silver (Taels)	2309	2309
Actual Wheat Amount (Stone)	7225	7225
Transported Wheat (Stone)	5900	5900
Retained Wheat (Stone)	1325	1325
Transported Wheat Converted to Silver (Taels)	2397.34	2397.34
Retained Wheat Converted to Silver (Taels)	822.59	822.59
Actual Silk Floss in Brocade Amount (Pi)	201	201
Silk Floss in Brocade Converted to Silver (Taels)	140.89	140.89
Actual Agricultural Silk in Brocade Amount (Pi)	397	397
Agricultural Silk in Brocade Converted to Silver (Taels)	278.1	278.1
Actual Horse Feed Amount (Bundles)	39105	39105
Horse Feed Converted to Silver (Taels)	1807.4	1834.36
Imperial Warehouse Land Cotton Amount (Jin)	355.15	355.15
Imperial Warehouse Land Cotton Converted to Silver (Taels)	Natural color	24.91

(Data source: Wanli "Yanzhou Prefecture Annals" [29], Wanli "Wenshang County Annals" [30]).

5. SUMMARY

Apart from the examples of Dongchang Prefecture and Wenshang County in Shandong, the author also found in the provincial records and local chronicles of Zhejiang and Jiangxi that the tax system of the Ming Dynasty did not undergo significant changes due to the impact of the monetization of silver currency. In some regions, minor changes in tax amounts may have occurred due to population growth, land surveys, and changes in administrative divisions, but the scope of change remained

within a hundred stones. Within the same prefecture, the prices of physical and silver deductions would also differ among counties. For example, in counties with high autumn grain tax amounts, the price of silver deductions would be relatively low, while in counties with low tax amounts, the price of silver deductions would be relatively high. Therefore, it can be inferred that the physical tax deduction system of the Ming Dynasty seemed to have a lever for elastic adjustment. The tax amount remained unchanged, and the physical amounts of transportation and retention remained constant, but the discount for the exchange of physical summer and autumn taxes for silver would fluctuate in different years and locations. Therefore, the author believes that the "Wanli Accounting Record" itself is a tax amount book, and the collection amount and discount of tax silver in each region of the country have an elastic adjustment mechanism. The monetization results presented in the study of the "Wanli Accounting Record" are calculated based on the discount ratios recorded in the "Wanli Accounting Record", forming the impression of a fixed silver amount. It should be noted that the silver amount formed during the Wanli Reform is not fixed. Therefore, the issue of the rigidity and flexibility of the fiscal system of the Ming Dynasty still needs to be explored in order to obtain a more thorough and objective understanding.

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