

Navigating the Landscape of Chinese Inequality: Empirical Findings on Income and Wealth, 2011- 2019

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ABSTRACT

This paper gives a comprehensive analysis of income and wealth inequality in China during its recent remarkable economic transformation. Using comprehensive data from the China Household Finance Survey (CHFS) between 2011 and 2019, I present the first empirical study on income and wealth inequality in urban and rural China. The results indicate a steady rise in income inequality over time, resulting in persistent wealth inequality. These findings shed light on policies that aim at reducing economic inequality.

Introduction

Over the past decade, the issue of inequality has received substantial attention under the context of China's remarkable economic transformation. The dynamic interplay between rapid economic growth and rising inequality has become a salient concern for researchers and policymakers. However, our understanding of the changes in income and wealth distribution in China during this pivotal period remains limited.

This limitation is mostly due to restricted data availability. Aiming at protecting privacy, government has restrictions on the release of socioeconomic datasets. This paper aims to fill this gap using detailed household survey data on income and wealth. Using novel longitudinal datasets from China Household Finance Survey (CHFS) from 2011 to 2019, this paper empirically explores earnings, income, and consumption inequalities within both urban and rural China in this period. To my knowledge, this paper is the first comprehensive analysis of income and wealth inequality in China between 2010 and 2019. It emphasizes how short-term income inequality translates to long-term wealth inequality.

The main contribution of this paper is twofold. First, it extends the existing studies on income and wealth inequalities to the most recent period when micro data is available. Second, it joins the ongoing debate surrounding China's economic landscape. As China propels itself toward global economic prominence, a profound comprehension of internal wealth and income disparities becomes paramount. Such insights are valuable to policymakers, economists, and social scientists striving to ensure that economic advancement translates into widespread prosperity and well-being for all citizens.

The paper is structured as follows. Section 2 discusses two closely related papers and the contribution of this paper in the literature. Section 3 describes the datasets this paper use and a representativeness check is performed on the main dataset. Section 4 presents stylized facts and employs descriptive statistics. Section 5 explores income and wealth inequality over time from 2011 to 2019. Section 6 analyzes the correlation between income inequality and wealth inequality, focusing on both short-term and long-term effects. Section 7 concludes.

Literature Review

My paper is related to the literature that attempt to measure income and wealth inequality and explain over-time changes in inequality.

Existing studies mostly use macroeconomic datasets or micro survey data that focus on household income dynamics to measure income inequality. Piketty et al. (2019) combine national accounts, surveys, and newly acquired tax data to analyze the growth and dispersion of income and wealth in China from 1978 to 2015. Ding and He (2018) use the Urban Household Survey and CHIPS data between 1986 and 2010 to quantify income and wealth inequality. Similarly, Cai et al. (2010) use UHS data for the period 1992–2003. Their data covers all provinces in China. Santaaulalia-Llopis and Zheng (2016) use the Chinese Health and Nutrition Survey (CHNS), a micro household-level survey data that measures inequality. Blundell et al. (2008) use the Consumer Expenditure Survey to study income inequality in the US.

Among all these papers, this paper is most closely related to Ding and He (2018) and Cai et al. (2010). Ding and He (2018) explore the dynamics of consumption and disposable income inequality within China using the annual Urban Household Survey (UHS) data from 1986 to 2010. This unique approach reveals a consistent pattern where total consumption inequality consistently exceeded disposable income inequality over the examined time frame. They also investigate the relationship between consumption inequality and disposable income inequality. They find a robust connection between these two forms of inequality resulting from a dramatic increase in uninsurable income shocks.

Cai et al. (2010) study income and consumption inequality changes in urban China from 1992 to 2003 using comprehensive UHS data. They also find a strong correlation between income and consumption inequality changes. By analyzing provincial-level panel data, they attribute increasing income inequality to three key factors: SOE reforms, urbanization, and globalization. Their research identifies SOE reforms as the primary driver of the rising urban inequality.

My paper differs from Ding and He (2018) and Cai et al. (2010), using a novel longitudinal dataset CHFS. This dataset provides detailed information on household income and wealth, both urban and rural. Consequently, the data allows me to study the evolution of income each household surveyed in all waves of the China Household Finance Survey.

Methods

Data

*China Statistical Yearbook*¹

This paper utilizes 5 phases of the China Statistical Yearbook carried out biyearly by China's National Bureau of Statistics (NBS) between the years 2010 and 2020. The survey captures a representative sample of the population across various administrative levels, including provincial, county, city, town, and neighborhood segments. All provincial units, including directly administered metropolitans, are encompassed in the survey.

Selected households maintain detailed records of their income and expenditures, facilitated by NBS staff stationed in local offices. Consequently, the dataset offers a closely record on urban households' financial inflows and outflows, shedding light on income sources and expenditure categories.

¹ The data can be downloaded here: <http://www.stats.gov.cn/english/Statisticaldata/yearbook/>.

The dataset also provides individual-level attributes of household heads, encompassing age, education, and occupation. This comprehensive dataset allows an exploration of how individual characteristics intersect with living conditions and economic behavior.

China Household Finance Survey

The research paper also utilizes data from China Household Finance Survey (CHFS). The survey is conducted by the China Family Finance Survey and Research Center, which is a non-profit academic institution established by Southwestern University of Finance and Economics. The survey was first completed in 2011, and subsequently in 2013, 2015, 2017, and 2019.

The CHFS is a national-wide survey of households across China, excluding Tibet, Xinjiang, Inner Mongolia, Hong Kong, Macao, and Taiwan. The survey randomly selected household from different provinces for recurrent interviews and diary-keeping (e.g., detailed consumption expenditures per month). The most recent survey samples cover around households in 29 provinces and more than 260 counties (districts and county-level cities).

From the survey, I obtain information on housing, assets, debt and credit, income and expenditure, social security and insurance, intergenerational transfer payments, demographic characteristics, employment status, among others. Table 1 summarize the five waves of the data used in my paper.

Table 1. Sample size of CHFS.

Year	# of Obs	Provinces
2011	8438	25
2013	28141	29
2015	37289	29
2017	40011	29
2019	34643	29

The Representativeness of CHFS

Before I use the data from CHFS to analyze the income and wealth distribution within China, I compare the data from CHFS to the macro data from the China Statistical Yearbook provided by NBS to check their consistency.

For each dataset from CHFS during the period 2011-2019, I calculate the per capita income for both urban and rural households in CHFS separately with the following formula:

$$\text{Per capita income} = \frac{\sum_h \text{income}_h}{\sum_h N_h}$$

where income_h denotes annual income of household h , and N_h shows the size of household h .

Then, I compare the results to the data from China Statistical Yearbook.

Figure 1 shows this representativeness check. Diagram A shows the per capita income of urban household in both CHFS and NBS's macro data during 2011-2019. Before 2016, the two data series were nearly identical. However, the income data of CHFS slightly decrease compared to NBS's dataset since 2016. Simultaneously, I use diagram B to compare the income per capita of rural household in the two datasets. Although they are slightly diverging in 2010 and 2016, they have showed the same trend.

Overall, this comparison demonstrates a high level of consistency between the trend of average household income within CHFS and the NBS’s macro data, proves that CHFS is a reliable dataset. Hence, I confidently move forward to empirical analysis, relying on CHFS dataset.

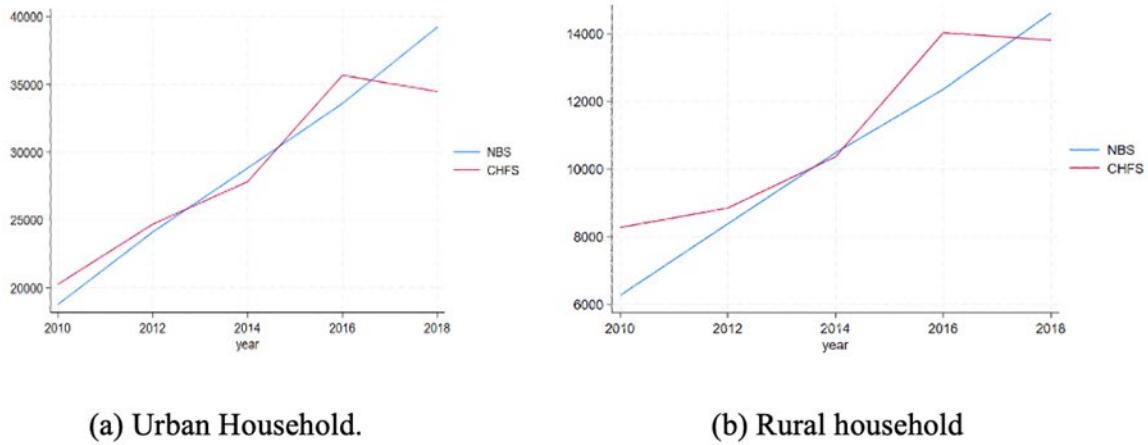


Figure 1. Average Household Income in CHFS and NBS

Stylized Facts

Descriptive Statistics

Before my analysis, I would like to address the descriptive data I conduct from CHFS data. It provides an initial understanding of the people’s income and properties characteristics in both urban and rural China. By offering a concise summary of the main trends and patterns in the data, it can not only help me to identify anomalies or deviations, while also establishing the groundwork for more complicated analyses. This, in turn, ensures that subsequent interpretations and conclusions are based on the comprehension of the fundamental characteristics in the data.

Table 2. Descriptive Statistics of CHFS Data (2011—2019)

	2011		2013		2015		2017		2019	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
# household members	3.2	3.9	3.2	4.0	3.3	4.1	3.0	3.5	3.0	3.3
Annual income										
10th percentile	3000.0	2200.0	5160.0	2520.0	5570.0	1980.0	9800.0	2300.0	8881.5	2780.0

25th percentile	16481.8	7200.0	24000.0	7000.0	25000.0	7960.0	33635.0	7233.0	31757.8	8414.0
Median	36000.0	17250.0	50400.0	22245.0	55079.0	23489.0	67817.5	24959.6	66572.0	25265.8
Mean	65386.5	32071.3	79706.0	35610.6	92553.9	42682.1	107210.6	49676.0	103070.3	45610.3
75th percentile	66332.0	35633.8	90400.0	48465.0	100000.0	53590.0	119973.6	59048.5	117315.0	58266.0
90th percentile	124583.6	60691.5	153000.0	81450.0	173560.0	94830.0	205598.0	107107.0	201591.0	108000.0
Net asset										
10th percentile	20250.0	6540.0	38858.0	20625.0	61155.1	22990.0	30250.0	10045.0	61229.0	21254.0
25th percentile	120300.0	21200.0	179890.0	54500.0	215000.0	59250.0	200450.0	37445.5	235291.0	61921.5
Median	300250.0	80650.0	469400.1	138143.7	541690.3	153808.7	594616.0	149570.5	642815.0	180276.0
Mean	662717.4	187264.4	1019710.6	283441.5	1175013.6	329219.2	1480144.9	368614.3	1553363.5	411354.5
75th percentile	735500.0	161000.0	1073200.1	304007.5	1255721.3	333947.8	1574246.0	378026.5	1609229.0	416532.5
90th percentile	1623000.0	321000.0	2410900.3	609359.9	2705448.3	676500.0	3795254.0	836002.0	3660912.0	907000.0
Housing wealth										
10th percentile	0.0	5000.0	0.0	0.0	0.0	0.0	0.0	1924.0	0.0	3000.0
25th percentile	100000.0	20000.0	0.0	464.7	0.0	0.0	118670.0	13124.5	100000.0	20000.0
Median	255000.0	70000.0	245000.0	33324.1	20000.0	0.0	402500.0	80000.0	400000.0	100000.0
Mean	606300.3	171193.0	583116.8	119674.1	467538.7	83162.9	1149201.4	224513.6	1052421.3	231855.6
75th percentile	660000.0	150000.0	654999.8	130000.0	500000.0	65000.0	1200000.0	243743.5	1100000.0	225158.0

90th percentile	150000 0.0	30000 0.0	150000 0.3	28000 0.0	130000 0.0	20526 7.0	300000 0.0	50000 0.0	290000 0.0	50000 0.0
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Table 2 presents descriptive statistics derived from the China Household Finance Survey (CHFS) data spanning 2011 to 2019. The dataset shows an upward trajectory in income, asset, and housing wealth across urban and rural China.

In terms of income, the table shows a great growth in income of both urban and rural households in China. Urban households exhibit a pronounced upward trajectory in their median annual income over the observed span, rising from \$36,000 in 2011 to \$66,572 by 2019. Rural households, though starting from a lower base, also reveal a growth trajectory, with the median income escalating from \$17,250 in 2011 to \$25,265.8 in 2019. Similarly, urban household net assets significantly increase from \$300,250 in 2011 to \$642,815 by 2019. Rural households followed suit, advancing from \$80,650 in 2011 to \$180,276 in 2019.

Despite the evident growth in both income and wealth, the table also highlights a rise in inequality. The extended disparity of incomes at the 10th and 90th percentiles, especially within the urban sector, underscores the increasing income inequality. So as the asset inequality, the expanding gap in net assets between the lower and upper percentiles in both demographic segments speaks to the deepening asset inequality.

However, in terms of housing wealth, urban households recorded notable fluctuations. Their median housing wealth doubled to \$400,000 by 2019 from \$255,000 in 2011. In contrast, rural households, starting with a median wealth of \$70,000 in 2011, witnessed a more modest increase to \$100,000 by 2019. However, the persistent zero value at the 10th percentile for urban households from 2011 to 2019 implies a significant segment of the urban populace either lacked home ownership or had minimal housing wealth. The rural scenario offers a slightly more optimistic outlook, as there's an evident increase in housing wealth over the same duration.

Results

In this section, I examine income, housing, and asset inequality changes in urban and rural China from 2010 to 2018, drawing insights from the CHFS dataset. Throughout this paper, my primary focus centers on two inequality metrics: the variance of logarithmic income and the Gini coefficient, in order to examine the income and wealth inequality specifically. And bellowing sections show my results.

Variance of log Income and Wealth

I first look at the change of inequality over time base on the variance of logarithmic income and assets. The calculations are conducted separately for urban and rural households. As numerous households possess no asset or housing wealth, there are a substantial amount of zeros exist in the dataset. Therefore, I use the formula $Var(\log(1 + asset))$ to remain all those observations in the dataset.

Table 3. Var. of log Over Time

Year	2010		2012		2014		2016		2018	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural

Income	1.2985	1.2843	1.2880	1.3122	1.4467	1.4005	1.4319	1.5113	1.4158	1.3604
Financial wealth	1.9181	1.6747	1.6833	1.4046	1.6343	1.4093	1.9251	1.7634	1.6982	1.5185
Housing wealth	4.0934	2.4359	5.9818	4.9003	6.5569	5.6570	4.3142	3.2068	4.6933	3.1971

Table 3 shows the data I construct based on CHFS.

In terms of income inequality, the table above reveals a distinct upward trend of income inequality between 2010 and 2018. For urban households, the Var. of log reached its peak at 1.4467 in 2014, up from 1.2985 in 2010. Although there was slight decrease to 1.4158 in 2018, it still signifies a noticeable growth in income inequality in urban China. In contrast, rural households demonstrate a steady increase from 2010 (1.2843) to 2016 (1.5113).

Regarding asset inequality, the dynamics in urban areas follows a cyclical pattern, but with a notably higher initial variance (1.9181 in 2010) and a sharp rise in 2016 (1.9251). Conversely, rural areas experienced a decline until 2014 (1.4093), followed by an increase in 2016 (1.7634). In general, it is still evident that this figure is consistently growing overtime, indicating a worrisome increase in inequality.

Housing wealth displays the most dramatic fluctuations. For urban area, the variance of log housing wealth reached its zenith at 6.5569 in 2014, followed by a sharp decline in 2016 (4.3142) and a modest rebound in 2018 (4.6933). On the order hand, rural areas saw an upward trajectory until 2014 (5.6570), followed by a decline in subsequent years, reaching 3.1971 in 2018. This extreme volatility of housing wealth inequality is probably due to the fluctuant property market and changing of government policies that are impacting investments on real estates.

Gini Coefficient for Urban and Rural Household

After examining inequality through the lens of variance of logarithmic metrics, I also calculate the Gini coefficient to check their consistency. Gini coefficient, as a widely used measuring index that accounts for the entire wealth distribution, it measures inequality on a scale from 0 to 1, making it easier to interpret and compare the inequality overtime. I calculate the Gini coefficient of urban and rural households separately in each year with the following formula:

$$Gini\ Coefficient = \sum_{i=1}^n X_i Y_i + 2 \sum_{i=1}^n X_i (1 - V_i) - 1$$

where X_i denotes the proportion of population, Y_i shows the proportion of income, and V_i shows the proportion of the accumulated income in the dataset.

Table 4. Gini Coefficient in Urban and Rural China during 2011 to 2019

Year	2011	2013	2015	2017	2019
Urban	0.531498	0.51169	0.5016	0.58154	0.537206
Rural	0.60446	0.514535	0.532686	0.559337	0.526947

Table 4 shows my result. In urban areas, the Gini coefficient initially decreases from 0.531498 in 2011 to 0.5016 in 2015, but then skyrocketed to 0.58154 in 2017 and finally moderated to 0.537206 in 2019. This pattern perfectly aligns with the trend of rising and then falling inequality, consistent with the findings derived from the variance of logarithmic metrics.

Just like the it shows by Var. of log, Gini coefficient in rural areas shows more variation. Starting at a high level of 0.60446 in 2011, and then sharply dropped to 0.514535 by 2013. Afterwards, it showed a moderate increase peaking at 0.559337 in 2017, before declining slightly to 0.526947 in 2019, showing a fluctuation of wealth inequality in rural China.

The data for both the variance of log and the Gini coefficient provide complementary perspectives on inequality trends in urban and rural China, reveals a concerning increase in inequality in both rural and urban areas. The emerging wealth inequality in accumulation and distribution necessitates a comprehensive exploration of its underlying causes and the development of potential policy solutions.

Discussion: Analyze the Correlation between Income Inequality and Wealth Inequality

After observing the trends in income and asset inequality, I continuously delve into the relationship between these the aspects disparities, income and wealth inequality. In this section, I analyze the co-movement of income and asset inequality, aiming to illustrate how changes in one form of inequality are associated with changes in another. Understanding this interplay could offer valuable insights into the mechanics of inequality and inform public policy aimed to solve it.

To provide a comprehensive understanding of the relationship between income and asset inequality, I run the regression for both short run and long run. The short-run analysis aims to capture immediate responses in asset growth with the changes in income, focusing on two-year intervals. This analysis offers a snapshot of how households' assets react to fluctuations in income inequality over relatively brief periods. At the same time, I also run the regression over more extended period, specifically from 2013 to 2019. This extended analysis reveals whether there is a persistence effect of income inequality on wealth inequality.

By investigating the correlation between income and asset inequality over both in short run and long run aspects, this study offers a nuanced understanding of the extent to which income inequality influences wealth inequality.

Short Run Effects

I first start with the short-run effects. I use data from four periods: 2011-2013, 2013-2015, 2015-2017, and 2017-2019 to run the following regression:

$$\log\left(\frac{Asset_{h,t+2}}{Asset_{h,t}}\right) = \alpha_0 + \beta \log\left(\frac{income_{h,t+2}}{income_{h,t}}\right) + \epsilon_h$$

Here, $\log\left(\frac{Asset_{h,t+2}}{Asset_{h,t}}\right)$ is the growth rate in asset of household h from year t to t+2, and similarly $\log\left(\frac{income_{h,t+2}}{income_{h,t}}\right)$ is the growth rate in income of household h from year t to t+2.²

² Suppose $Asset_{h,t+2} = Asset_{h,t}(1 + g)$ where g is growth rate from year t to year t+2. Then we have $\log(Asset_{h,t+2}) = \log(Asset_{h,t}) + \log(1 + g)$

For each period, I merge data from year t and $t + 2$, retaining only those households that appear in both survey waves. After running the regression, we obtain four beta values: 0.1416 (se=0.0133), 0.1303 (se=0.0061), 0.1825 (se=0.006), and 0.1542 (se=0.0077).

Statistically, these coefficient estimates (i.e., estimated beta's), with their low standard errors, suggest that changes in income are significantly associated with changes in assets in the short run. At the same time, the positive beta values indicate a positive coloration between income inequality and wealth inequality. Meaning that expansion of income inequality does stand as a factor of increasing inequality overall. However, the value of betas only varies from 0.1303 to 0.1825. This indicates that although the relationship between income and asset inequality is statistically significant, it exhibits a relatively moderate magnitude. In simpler terms, the low beta values show that changes in income inequality explain only a modest portion of the variation in asset or wealth inequality.

This moderate relationship can be influenced by various factors, including liquidity constraints, economic shocks, policy interventions, and behavioral characteristics, as previously discussed. These factors may act as moderating variables, reducing the direct translation of income into assets and thereby impacting the strength of the relationship between income and asset inequality.

Hence, while income inequality does contribute to wealth inequality, it is far from being the sole determinant. This underscores the need for a more nuanced approach in policy formulation aimed at reducing overall economic disparities. Such policies should consider the multifaceted factors at play and address them comprehensively to achieve more equitable outcomes.

Long Run Effects: How Persistent is Income and Wealth Inequality?

For long-run effects, I extend the analysis to a longer period, using data from 2013 to 2019, and run the following regression equations to show the persistence of income and wealth inequality:

$$\log(Asset_{h,2019}) = \alpha_0 + \beta \log(Asset_{h,2013}) + \epsilon_h$$

$$\beta = 0.6718 \text{ (se} = 0.010\text{)}$$

$$\log(Income_{h,2019}) = \alpha_0 + \beta \log(Income_{h,2013}) + \epsilon_h$$

$$\beta = 0.3921 \text{ (se} = 0.0126\text{)}$$

My findings reveal a β value of 0.6718 (se=0.010) for assets and a β value of 0.3921 (se=0.0126) for income. Both of the β values are indicated by low level of standard values (0.010 and 0.0126), affirming the statistical robustness of my results.

The β values themselves serve as measures of persistence in inequality over the examined period. A β value closer to 1 would imply a high level of persistence, meaning that households that were wealthier or poorer in 2013 generally remained so in 2019. Our β value of 0.6718 for assets suggests a fairly strong level of persistence in wealth inequality. In contrast, the β value for income, at 0.3921, is substantially lower, indicating less stability in income inequality over the long term.

In summary, these findings imply that wealth inequality tends to be more stable and persistent over time compared to income inequality. This underscores the need for policy measures that not only address income disparities but also focus on systemic factors contributing to enduring asset inequality.

$$\Leftrightarrow \log\left(\frac{Asset_{h,t+2}}{Asset_{h,t}}\right) = \log(1 + g) \approx g \text{ (for small } g\text{)}$$

Conclusion

In conclusion, this paper addresses a gap in the existing literature by conducting a thorough empirical analysis of income and wealth inequality in China. Utilizing the rich longitudinal dataset from the China Household Finance Survey (CHFS), this study has uncovered evidence of increasing inequality over time in both income and wealth from 2011 to 2019, using different metrics including the variance of logarithmic income and assets, as well as the Gini coefficient.

Furthermore, this research also examines the interplay between income and wealth inequality. I run short-term and long-term regressions, showing a moderate relationship between income and asset inequality. Of particular note, wealth inequality demonstrates a stronger persistence over time than income inequality, revealing the self-reinforcing nature of wealth inequality. This underscores the importance of multifaceted policy interventions on both income disparities and the distribution of wealth.

Nevertheless, limitations do exist in this paper. Despite the comprehensiveness of the CHFS dataset, data constraints do exist, and the research should consider the ongoing rapid socio-economic changes in China. Moreover, I only discuss the effect of income inequality on wealth inequality. Future research endeavors may explore the intersection of income and wealth inequality with other socio-economic indicators such as liquidity constraints, economic shocks, policy interventions, and behavioral characteristics. Additionally, future research should consider the possibility of utilizing alternative data sources to validate the findings presented in this study.

In conclusion, this paper serves as an essential initial stride toward understanding the multifaceted problem of inequality in China's socio-economic landscape. Additionally, it provides empirical evidence that can guide the formulation of more equitable policies, with the ultimate aim of ensuring that China's remarkable economic transformation benefits all of its population, particularly the vulnerable segments. As China continues its ascent in the global economic arena, the imperative to address internal inequality becomes increasingly critical—not just for China but for the entire world.

Acknowledgments

I would like to acknowledge and give my warmest thanks to my mentor Dr. Sun Shilong who made this work possible. His guidance and advice carried me through all the stages of writing my project. Additionally, I extend my sincere appreciation to my counselor, Olivia Chen, for facilitating my collaboration with Dr. Sun. Her efforts in building this bridge were essential to the success of this project, and her support has been greatly appreciated.

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