Bridging the Divide: How E-commerce Mitigates Household Consumption Inequality in China

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Abstract: *This study develops a theoretical framework to analyze the impact of e-commerce development on consumption inequality. Drawing on micro-level data from the CHFS for 2015-2019 combined with large-scale data from e-commerce platforms, we conduct a comprehensive empirical analysis. The results indicate that e-commerce development significantly reduces consumption inequality at the household level, and this effect operates mainly via narrowing disparities in transaction costs and reducing income inequality. Specifically, households facing higher transaction costs increase their consumption owing to the enhanced convenience of e-commerce, while e-commerce also raises the income of low- and middle-income households, which in turn helps compress consumption disparities. Moreover, e-commerce development alleviates consumption disparities within and between cities, within both urban and rural households, and between urban and rural areas. It also promotes consumption mobility by helping low-consumption households move up to higher consumption tiers. These findings suggest that e-commerce development not only holds substantial potential for reducing micro-level household consumption inequality but also functions as a macro-level equalizing force that can narrow regional and urban-rural divides. Thus, e-commerce plays a crucial role in promoting consumption equity and supporting sustainable economic development by dynamically enhancing consumption mobility.*

Keywords: *E-commerce development; Consumption inequality; Income inequality; Consumption mobility*

JEL Classification Codes: Q16; G20

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1. Introduction

Unleashing consumption potential and narrowing consumption disparities are pivotal for the advancement of urban-rural integration, stimulating domestic demand, and reinforcing China's

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domestic economic circulation. The Report to the 20th National Congress of the Communist Party of China (CPC) underscores the need to "enhance the fundamental role of consumption in economic development", and the 2024 Government Work Report calls for a comprehensive policy approach that encompasses income growth, supply optimization, and the reduction of institutional constraints in order to unleash "consumption potential". Despite the substantial rise in overall consumption levels among Chinese residents, consumption inequality has increasingly become a concern throughout Chinese society. Such disparities directly reflect imbalances in living standards and welfare distribution (Sun et al., 2017), and consumption inequality in China manifests across multiple dimensions. Estimates based on micro-level data from the China Household Finance Survey (CHFS) indicate that in 2018, the average consumption expenditure of the top 10% of households was 25.9 times that of the bottom 10%. Moreover, consumption among high-expenditure households has grown markedly faster than that of low-expenditure households, pointing to a continued widening of the gap. Macro-level evidence reinforces this pattern: in 2021, the consumption level of urban residents was more than twice as large as that of rural residents. Significant disparities also persist within both urban and rural populations, and consumption levels in the more developed eastern regions consistently surpass those in central and western provinces.

E-commerce has emerged as a key driver of consumption patterns among both urban and rural Chinese households (Couture et al., 2021; Wang et al., 2022). In recent years, China's e-commerce sector has experienced rapid expansion as well: courier parcel volume increased from 20.67 billion in 2015 to 83.36 billion in 2020, and the value of nonbank online payment transactions surged from 49.5 trillion yuan to 294.6 trillion yuan.[1] However, the effect of e-commerce development on consumption inequality remains theoretically ambiguous due to the presence of both equalizing and "disequalizing" forces. Although E-commerce may help narrow consumption disparities by mitigating spatial constraints, integrating remote and underdeveloped regions into broader markets, and enhancing income opportunities for lower-income populations, it may also exacerbate existing inequalities. Participation in e-commerce requires a certain level of digital access, skills, and resources, which may disproportionately advantage already better-off households. In addition, the development of e-commerce remains concentrated in urban areas. In 2020, although China's total e-commerce transaction volume reached 36.2 trillion yuan, rural e-commerce transactions accounted for only 1.79 trillion yuan.[1] Economically advanced urban regions have continued to dominate e-commerce growth, potentially reinforcing the urban-rural divide.

This gives rise to several key questions. How does e-commerce development affect consumption inequality at the micro-household level? Can it reduce urban-rural and regional disparities while also enhancing consumption mobility? Through which mechanisms do these effects operate? Answering these questions is therefore essential to unravel the micro-macro linkages in consumption inequality amid China's digital transformation, with direct implications for leveraging digital development to narrow urban-rural consumption gaps and advance the "common prosperity" agenda.

[1] Source: *The 14th Five-Year Plan for E-commerce Development*, issued by the Ministry of Commerce, the Cyberspace Administration of China, and the National Development and Reform Commission in October 2021.

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This paper begins by developing a theoretical framework to analyze the impact of e-commerce development on consumption inequality across heterogeneous households. The framework suggests that whether e-commerce narrows consumption disparities depends on its effects on inter-household differences in transaction costs and income. Building on this framework, we employ data from the 2015-2019 waves of the CHFS to construct a relative deprivation index that captures consumption inequality at the micro-household level. In addition, using data from the Taobao and Tmall platforms, we develop a city-level index of e-commerce development. This empirical strategy enables a systematic examination of both the overall effects of e-commerce on household consumption inequality and the underlying mechanisms, while also allowing for the extension of the analysis to urban-rural disparities, regional differences, and consumption mobility. The empirical results show that e-commerce development significantly reduces consumption inequality between households, and this effect operates primarily through two channels: narrowing disparities in transaction costs and reducing income inequality. On the one hand, households facing higher transaction costs increase their consumption due to the enhanced convenience and accessibility of e-commerce. On the other hand, e-commerce development raises the income levels of low- and middle-income households, which in turn helps reduce consumption inequality. Further analysis indicates that at the macro level, e-commerce development reduces consumption disparities both within and between regions. Specifically, it narrows gaps within cities, between cities, within urban and rural groups, and between urban and rural households. In addition, e-commerce development dynamically mitigates disparities between consumption strata by enhancing the upward mobility of low-consumption households.

Compared to the existing literature, this study makes three contributions. First, it extends the literature on e-commerce and household consumption by shifting the analytical focus from consumption levels to consumption inequality. By constructing a relative deprivation index to capture disparities at the micro-household level, the paper examines how e-commerce development affects consumption inequalities across heterogeneous households. Although prior studies have largely concentrated on the impact of e-commerce on absolute consumption levels (Fan et al., 2018; Luo et al., 2019; Couture et al., 2021; Wang et al., 2022), they provide limited insight into whether e-commerce mitigates or exacerbates consumption inequality. Second, this study identifies the mechanisms through which the digital economy, represented by e-commerce, shapes consumption disparities. Existing research has primarily focused on the consumption effects of internet penetration or digital finance (Cheng & Zhang, 2019; Yi & Zhou, 2018). In contrast, leveraging a city-level e-commerce development index constructed from data from the Taobao and Tmall platforms, this paper offers a more granular analysis of the underlying channels. In particular, it highlights the dual roles of narrowing transaction cost differentials and reducing income inequality in shaping consumption outcomes. Third, the study contributes to the macro-level literature on consumption inequality by adopting a more comprehensive and integrated perspective. Previous research has predominantly examined disparities within cities or between urban and rural areas (Zhou et al., 2020; Sun et al., 2020). Building on micro-level household data, this paper further explores consumption inequalities both within and between regions, as well as the upward mobility of low-consumption households. This multi-dimensional framework naturally

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provides a deeper understanding of the micro, macro, and dynamic dimensions of consumption inequality and mobility between regions and between urban and rural China.

2. Literature Review and Theoretical Framework

Existing research has already extensively examined the relationship between e-commerce development and consumption growth. At the theoretical level, studies grounded in search theory suggest that e-commerce promotes consumption by reducing search costs (Fang & Xing, 2015; Sun et al., 2017), and empirically, the literature shows that e-commerce can directly increase household consumption by overcoming transaction frictions and spatial constraints (Fan et al., 2018; Luo et al., 2019; Couture et al., 2021; Wang et al., 2022). It may also indirectly stimulate consumption by fostering employment and entrepreneurship opportunities and by raising household income (Qiu and Zhou, 2021; Qin et al., 2022; Yang and Zhu, 2024). These studies establish the consumption-enhancing effects of e-commerce. However, whether this consumption growth exacerbates or mitigates disparities across micro-level households has received limited attention.

A related strand of literature investigates how broader digital economy factors, such as internet penetration and digital finance, affect urban-rural consumption inequality, yet the conclusions remain mixed. Some studies argue that improvements in shopping convenience (Cheng and Zhang, 2019) and the alleviation of liquidity constraints (Yi and Zhou, 2018) can stimulate rural consumption, thereby narrowing the urban-rural consumption inequality. In contrast, other studies find that although digital finance may increase rural household income, its direct effect on consumption remains limited, making it insufficient to reduce the urban-rural consumption disparity on its own (Zhang et al., 2020; Wan et al., 2022). Compared to general internet access or digital finance, e-commerce simultaneously reduces transaction costs and enhances income-generating opportunities, thus exhibiting a closer and more direct connection to household consumption behavior. However, empirical evidence that specifically addresses the impact of e-commerce development on consumption inequality remains scarce.

Consumption inequality itself has long been a central concern in the literature, and existing studies have examined a range of possible determinants, including income uncertainty and inequality (Blundell and Preston, 1998; Krueger and Perri, 2006; Zou et al., 2013), household structure and population aging (Qu and Zhao, 2008), price levels (Song et al., 2020), officials' career trajectories (Zhou et al., 2020), and housing rents (Sun et al., 2020). Nevertheless, this body of work has largely focused on disparities within urban areas. Given China's significant regional and urban-rural development imbalances, limited inter-stratum mobility, and the observed tendency for consumption inequalities to widen, it is essential to investigate how e-commerce development influences consumption inequality at the household, regional, and urban-rural levels, as well as whether it enhances the upward mobility of low-consumption households.

To clarify the mechanisms by which e-commerce affects consumption inequality, this paper presents a general theoretical framework. Specifically, we examine how e-commerce development shapes consumption disparities by altering differences in transaction costs and income between households. First, consider a representative household i, which earns income through labor and maximizes the following utility function:

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$$\max_{C_i, l_i} u(C_i, l_i) = \alpha \ln(C_i) + (1-\alpha)\ln(l_i) \tag{1}$$

$$\text{s.t. } (p + t_i)C_i \le w_i(L - l_i) \tag{2}$$

Where C_i denotes the consumption level of household i, l_i represents the leisure time, and α captures the household's preference for consumption. Equation (2) specifies the budget constraint, where w_i denotes the wage rate (income per unit of labor time), and L represents the household's total labor supply. Under perfectly competitive market conditions, p denotes the market price of goods, and $p+t_i$ represents the effective price paid by each consumer.[2] Here, t_i refers to the transaction cost incurred per unit of consumption, including search costs, transportation expenses, and the time cost associated with shopping. Jensen (2007) and Xu et al. (2013) argue that information asymmetry leads to price dispersion across consumers. In this study, transaction cost t_i is used to capture such dispersion. Because households differ in search costs, travel expenses, and time costs, they face heterogeneous transaction costs, which results in variation in the effective prices they pay. By maximizing household utility, the optimal consumption level of household i can be derived as:

$$C_i^* = \frac{\alpha w_i L}{p + t_i} \tag{3}$$

It follows that households with higher income levels and lower transaction costs achieve higher optimal consumption. Without loss of generality, consider two types of households, denoted as Household 1 and Household 2, and assume that Household 2 has a higher level of consumption than Household 1 ($C_2 > C_1$). The consumption inequality between the two households can therefore be expressed as:

$$\Delta C = C_2 - C_1 = \frac{\alpha w_2 L}{p + t_2} - \frac{\alpha w_1 L}{p + t_1} \tag{4}$$

Existing studies suggest that e-commerce development can raise household income by promoting employment and entrepreneurship (Qiu and Zhou, 2021; Qin et al., 2022) and can also reduce transaction costs by improving shopping convenience (Fan et al., 2018; Luo et al., 2019; Couture et al., 2021; Wang et al., 2022). Accordingly, we model income w_i and transaction cost t_i as functions of the level of e-commerce development e, such that $dw_i / de = \omega_i e > 0$ and $dt_i / de = \tau_i e < 0$ for $i = 1, 2$. Here, ω_i and τ_i capture the marginal effects of e-commerce development on income growth and transaction cost reduction, respectively.

Taking the first-order derivative of Equation (4) with respect to the level of e-commerce development e yields:

$$\frac{d\Delta C}{de} = \frac{d\Delta C}{dt_2}\frac{dt_2}{de} + \frac{d\Delta C}{dt_1}\frac{dt_1}{de} + \frac{d\Delta C}{dw_2}\frac{dw_2}{de} + \frac{d\Delta C}{dw_1}\frac{dw_1}{de} = \underbrace{\frac{e\tau_1 C_1}{p + t_2}\left(\phi - \frac{C_2\tau_2}{C_1\tau_1}\right)}_{TransactionCostEffect} + \underbrace{\frac{e\omega_1 C_2}{w_2}\left(\frac{\omega_2}{\omega_1} - \phi\right)}_{IncomeEffect} \tag{5}$$

[2] Both Jensen (2007) and Xu et al. (2013) posit that information asymmetry leads to variations in the effective prices faced by individual consumers, a phenomenon known as price dispersion. In this study, we utilize transaction costs t_i to operationalize this dispersion. This framework acknowledges that because search costs, travel expenses, and the opportunity cost of time vary across individuals, households face distinct transaction cost gaps that ultimately result in heterogeneous effective prices paid by different consumers.

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where $\phi = (p + t_2)/(p + t_1)$[3].

Equation (5) indicates that whether e-commerce development narrows consumption inequality depends on the direction and relative magnitude of the income transaction cost effects. The sign of the transaction cost effect remains theoretically ambiguous in the existing literature. It may be negative ($C_2\tau_2 / C_1\tau_1 > \phi$), indicating that e-commerce disproportionately reduces transaction costs for low-consumption households. By narrowing disparities in transaction costs, e-commerce can thus reduce overall consumption inequality. This mechanism can be attributed to the ability of e-commerce platforms, through convenient mobile payment systems and efficient last-mile delivery, to lower barriers faced by households with initially high transaction costs, thereby stimulating their consumption (Luo et al., 2019). Empirical evidence further shows that the establishment of rural e-commerce service points reduces digital access barriers, enhances the accessibility and convenience of online shopping, and helps low-education households lower transaction costs and increase consumption (Wang et al., 2022). However, the transaction cost effect may also be positive ($C_2\tau_2 / C_1\tau_1 < \phi$), indicating that e-commerce preferentially reduces transaction costs for high-consumption households, thereby widening transaction cost disparities and amplifying consumption inequality. This can occur because e-commerce, as a modern retail modality, entails certain usage thresholds that may exclude disadvantaged groups. As a result, a welfare gap between users and nonusers may emerge, giving rise to a consumption-side "digital divide" (Zhang et al., 2021). Supporting this view, empirical studies have found that the consumption-enhancing effects of e-commerce are concentrated primarily among younger households that already face relatively lower transaction costs (Couture et al., 2021).

The direction of the income effect is likewise subject to debate in the existing literature. It may be negative ($\omega_2 / \omega_1 < \phi$), indicating that e-commerce development disproportionately increases the income of low-consumption households, thereby narrowing consumption inequality through a reduction in income disparities. This can be explained by the role of rural e-commerce in enhancing market transparency, integrating fragmented agricultural markets into broader value chains, and connecting local producers to larger markets, which in turn raises the income of rural households, particularly those in less developed areas (Jensen, 2007; Xu et al., 2013). In addition, e-commerce generates positive spillover effects by stimulating the development of related industries such as logistics, warehousing, and packaging, thereby creating employment opportunities for low-income groups (Gao et al., 2018). Empirical evidence supports this view, showing that e-commerce development can reduce income inequality both within rural areas and between urban and rural regions (Fang et al., 2023; Qiu and Zhou, 2021) and that it tends to raise the income of middle- and low-income rural households more substantially (Ma et al., 2021). However, the income effect may also be positive ($\omega_2 / \omega_1 > \phi$), suggesting that e-commerce development disproportionately benefits

[3] From a more rigorous perspective, e-commerce development also exerts a price effect in addition to the income and transaction cost effects: $(d\Delta C / dp)/(dp / de) = [C_1/(p + t_1) - C_2/(p + t_2)]$. Within the current theoretical framework, if low-consumption households face significantly higher transaction costs, e-commerce development may actually widen the consumption gap. This occurs because the price reductions resulting from increased product supply could disproportionately boost the expenditures of high-consumption cohorts, who are better positioned to leverage these lower prices. However, due to the unavailability of granular, micro-level price data, this study does not further explore the price effect in the subsequent empirical sections.

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high-consumption households, thereby widening income disparities and, in turn, increasing consumption inequality. One explanation for this is that compared to the relatively low barriers to participating in e-commerce on the consumption side, the thresholds for generating income through e-commerce activities are considerably higher. As a result, e-commerce may widen the "digital divide" on the production side. Moreover, intensified competition between online merchants often requires substantial investment in advertising and platform operations. Merchants with limited capital are more likely to be excluded (Zeng, 2018), accelerating the concentration of gains among a smaller group and exacerbating income inequality. Consistent with this perspective, empirical studies have found that e-commerce participants tend to earn significantly higher incomes than nonparticipants and that adoption of e-commerce business models is more prevalent in relatively developed regions and among wealthier households (Li et al., 2021; Tang et al., 2020).

In summary, the question of whether e-commerce development narrows or widens consumption inequality depends on how it reshapes disparities in transaction costs and income across households. Given the lack of consensus in the existing literature, this paper undertakes a comprehensive empirical analysis by integrating representative e-commerce data with micro-level household survey data, thereby providing evidence from micro, macro, and dynamic perspectives.

3. Research Design

3.1 Data Sources

To examine the impact of e-commerce development on consumption inequality, this study draws on three primary data sources. First is the CHFS. Initiated in 2011 by Southwestern University of Finance and Economics, the CHFS is a nationally representative household survey that collects detailed micro-level information on assets, insurance, income, and consumption from more than 40,000 households. It is characterized by multiple survey waves and broad geographic coverage, making it particularly well suited for analyzing household-level inequality. In recent years, the CHFS has been widely used in studies of income and consumption disparities in China. For example, Yang and Deng (2020) employed this dataset to estimate relative deprivation indices for rural household income. In this paper, we use the 2015, 2017, and 2019 waves of the CHFS to construct relative deprivation measures of household consumption that correspond to consumption inequality in 2014, 2016, and 2018. Community-level characteristics were obtained from the China Urban and Rural Governance Survey conducted in the same years by the Survey and Research Center for China Household Finance at Southwestern University of Finance and Economics.

Second is e-commerce development data from the AliResearch Institute. This dataset contains city-level transaction information for Taobao (including Tmall) over the period 2014-2018. Key indicators include the number of online buyers per 10,000 residents, per capita online consumption (total online transaction value divided by city population), and per capita order volume (total number of online orders divided by city population). Existing studies typically rely on provincial-level e-commerce indices, such as those compiled by the National Engineering Laboratory for E-Commerce Transaction Technology at Tsinghua University, or aggregate national statistics

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released by the National Bureau of Statistics and the Ministry of Commerce. However, city-level measures remain relatively scarce. As one of China's leading e-commerce platforms, the AliResearch dataset provides granular and representative information on e-commerce activity, thus offering significant analytical value. Consistent with prior studies (Luo et al., 2019; Qin et al., 2022), we use these data to construct a city-level e-commerce development index.

Third is data were sourced from the *China City Statistical Yearbook* and the China Stock Market and Accounting Research (CSMAR) database. These sources provided city-level control variables for 2014, 2016, and 2018, including per capita GDP, the share of secondary and tertiary industries, internet penetration rates, and the development level of the express delivery industry.

3.2 Regression Model

To examine the relationship between e-commerce development and household consumption inequality, we specify the following regression model:

$$Inequality_{ijt} = \alpha + \beta EC_{jt} + \gamma X_{ijt} + \mu_i + \eta_t + \varepsilon_{ijt} \quad (6)$$

3.2.1 Dependent variable: consumption inequality ($Inequality_{ijt}$)

In Equation (6), the dependent variable $Inequality_{ijt}$ measures the consumption inequality of household i in city j in year t relative to other households. In the existing literature, micro-level income or consumption inequality is commonly captured by the Yitzhaki Index (Yitzhaki, 1979) and the Kakwani Index (Kakwani, 1984). These measures reflect the notion of "relative deprivation" (Runciman, 1966), whereby a household evaluates its own consumption level in comparison with all other households in its reference group. The closer a household's consumption is to the group average, the lower its level of relative deprivation. Compared to macro-level inequality measures, such as the Gini coefficient or quantile ratios, the Kakwani Index offers two key advantages. First, it ensures consistency between micro and macro perspectives. Specifically, the Kakwani Index can be viewed as a micro-level extension of the Gini coefficient: the average of household-level Kakwani indices within a region corresponds to the regional Gini coefficient (Huang et al., 2019). Although the Gini coefficient is primarily used for aggregate analysis, the Kakwani Index enables precise measurement of inequality at the household level, thereby linking micro-level heterogeneity with macro-level outcomes. Second, the Kakwani Index is less sensitive to subjective sample selection than quantile-based measures. Quantile ratios capture disparities between specific segments of the distribution (e.g. top versus bottom groups), but the choice of these groups is inherently subjective. By contrast, the Kakwani Index uses the full sample as the reference group and thus provide a more comprehensive and objective measure of consumption inequality. In recent years, the Kakwani Index has gained increasing attention in empirical research. For example, Yang and Deng (2020) used CHFS data to construct relative deprivation indices for rural household income and examine the effects of pension systems on income inequality. Similarly, Zhang et al. (2022) employed data from the China Family Panel Studies (CFPS) to develop individual-level measures of consumption deprivation and analyze the impact of housing wealth on consumption disparities.

Following the approach of Yang and Deng (2020), we adopt other households in the national

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sample as the reference group from which to construct the consumption inequality measure.[4] Specifically, the per capita consumption expenditure of each surveyed household is compared to that of all other households in the sample, thereby capturing the relative consumption inequality faced by each household. Let n denote the total number of households in the sample, μ_x represent the mean consumption level, and $x_i(i=1...n)$ denote the consumption of each household, with households ordered from lowest to highest consumption. Here $\mu^+_{x_k}$ is specified as the mean consumption of samples with consumption above x_k, and such samples account for $\gamma^+_{x_k}$ of the total sample. For each household, relative deprivation can be measured using the calculation formulas for the Kakwani Index and the Yitzhaki Index, the two measures of consumption inequality, defined as follows:

$$Kakwani = \frac{1}{n\mu_x}\sum_{i=k+1}^{n}(x_i - x_k) = \gamma^+_{x_k}[(\mu^+_{x_k} - x_k)/\mu_x] \tag{7}$$

$$Yitzhaki = \frac{1}{n}\sum_{i=k+1}^{n}(x_i - x_k) = \gamma^+_{x_k}[(\mu^+_{x_k} - x_k)] \tag{8}$$

As noted by Walker and Smith (2002), the Kakwani Index addresses the normalization and dimensionless flaws of the Yitzhaki Index. Accordingly, we employ the Kakwani Index as the core explanatory variable indicator, and the Yitzhaki Index is used for robustness checks.

3.2.2 Core explanatory variable: e-commerce development (EC_{jt})

The core explanatory variable, EC_{jt}, captures the level of e-commerce development in city j in year t. It is constructed using city-level transaction data from the AliResearch Institute database for the period 2014-2018. Following Qin et al. (2023), we apply Z-score standardization to three component indicators, buyers per 10,000 residents, per capita online consumption, and per capita order volume, to achieve dimensionless processing and ensure comparability across cities and years. Consistent with the methodology underlying the "Alibaba E-commerce Development Index",[5] the standardized indicators are aggregated using an arithmetic mean to form a composite index of e-commerce development. In addition, for robustness analysis, we replace the composite index with each individual component indicator in separate regressions and compare the results with the baseline estimates.

3.2.3 Control variables (X_{ijt})

To account for other factors that may influence consumption inequality, we incorporate a set of control variables at both the household and city levels, following Yin and Guo (2021) and Zhou et al. (2020). At the household level, we control for key demographic and socioeconomic characteristics of the head of household head, including gender, marital status, education level, age, and age squared (divided by 100). To capture household financial capacity, we include the

[4] Using the national sample instead of the city sample as the benchmark allows the measure to reflect not only disparities between households within the same city, but also differences between cities. This is particularly important given that regional consumption imbalances constitute a major source of overall inequality (Li and Hong, 2021). To address the potential bias arising from reference group selection, we conduct robustness checks using alternative reference groups at the city, county, and community levels.

[5] Source: *Report on the 2013 China City and County E-commerce Development Index*, released by AliResearch in January 2014.

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logarithm of household net assets. In addition, to control for household-level factors related to participation in the digital economy, we introduce indicators for whether a household engages in online entrepreneurship and whether it has adopted digital payment tools (e.g. WeChat Pay or Alipay). At the city level, we include the logarithm of per capita GDP and the shares of the secondary and tertiary industries to control for regional economic development and industrial structure. To account for infrastructure and digital connectivity, we also include the internet penetration rate, measured as the proportion of internet users in the city. Furthermore, given the lack of direct measures of express delivery development, we proxy the level of local express delivery industry development using the share of employment in the transportation, warehousing, and postal sectors.

The baseline model incorporates household fixed effects μ_i to control for unobserved, time-invariant household characteristics that may affect consumption inequality, as well as year fixed effects η_i to capture macroeconomic shocks and aggregate trends such as overall economic growth and demand fluctuations. Since the analysis links city-level e-commerce development to household-level consumption inequality, standard errors are clustered at the city level to address potential intra-city correlation.

To ensure that our analysis focus on households where the head is of prime working age and likely to be the primary decision-maker for consumption, we restrict the sample to households with heads aged between 18 and 70. Observations with missing or anomalous values for key variables are excluded. Furthermore, income and consumption variables are winsorized at the 5th and 95th percentiles (two-sided 5%) to mitigate the influence of outliers. After matching the household survey data with the e-commerce dataset, the final sample comprised 52,937 valid observations across the 2015, 2017, and 2019 survey waves.

4. Empirical Results

4.1 Baseline Regression

Table 1 presents the baseline regression results for the relationship between e-commerce development and consumption inequality. The reported coefficients represent marginal effects, with the Kakwani index as the dependent variable. Column (1) includes only year and household fixed effects, and Columns (2) through (3) progressively incorporate household- and city-level control variables.

As shown in Column (1), after controlling for unobserved household and time-specific factors, the coefficient on e-commerce development is -0.015 and statistically significant at the 1% level. In Columns (2) and (3), after adding household and city characteristics, the coefficient decreases slightly to -0.011 but remains significant at the 1% level. This indicates that even after accounting for a wide range of confounding factors, e-commerce development continues to exert a significant negative effect on consumption inequality. Examining the control variables yields several important insights. Households with greater net assets and higher levels of education exhibit smaller consumption gaps, highlighting the role of wealth accumulation and human capital in enhancing the consumption capacity of disadvantaged groups. In contrast, households with

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older heads tend to face larger consumption disparities, possibly because declining labor capacity leads to lower income and consumption levels. Married households also display relatively larger consumption gaps, which may reflect the crowding-out effect of marriage-related expenditures.

With respect to digital participation, the use of online payment methods significantly reduces consumption inequality, underscoring the importance of payment convenience in facilitating household consumption. By contrast, the effect of online entrepreneurship is not statistically significant, which may be due to the initial costs and risks associated with starting online businesses, which may limit the short-term impact of entrepreneurship on income and consumption. At the city level, only per capita GDP exhibits a significantly negative coefficient, suggesting that higher levels of economic development contribute to narrowing consumption disparities by enhancing the consumption capacity of lower-income groups. The coefficients on internet penetration and express delivery industry development are also not statistically significant, possibly because these factors serve as foundational conditions for e-commerce, and their effects are largely captured by the e-commerce development index. Overall, these results support the theoretical prediction that e-commerce development reduces consumption inequality ($d\Delta C / de > 0$). However, answering the question of whether this effect operates through changes in transaction cost disparities ($C_2\tau_2 / C_1\tau_1$) or income gaps (ω_2 / ω_1) requires the further investigation found in our subsequent mechanism analysis.

TABLE 1. Baseline Regression Results

Variable	Consumption Kakwani		
	(1)	(2)	(3)
E-commerce development	-0.015*** (0.004)	-0.012*** (0.003)	-0.011*** (0.004)
Logarithm of household net assets		-0.011*** (0.001)	-0.011*** (0.001)
Marital status of household head		0.035*** (0.005)	0.035*** (0.005)
Gender of household head		0.003 (0.003)	0.003 (0.003)
Age of household head		0.006*** (0.001)	0.006*** (0.001)
Squared age of household head divided by 100		-0.006*** (0.001)	-0.006*** (0.001)
Years of schooling of household head		-0.002*** (0.001)	-0.002*** (0.001)
Online entrepreneurship		-0.006 (0.013)	-0.006 (0.013)
Online payment		-0.033*** (0.003)	-0.033*** (0.003)
Natural log of GDP per capita			-0.028* (0.016)
Share of the tertiary industry			-0.040 (0.044)
Share of the secondary industry			0.020 (0.041)
Internet penetration rate			-0.003 (0.014)

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Table 1 Continued

Variable	Consumption Kakwani		
	(1)	(2)	(3)
Development level of courier services			0.023 (0.334)
Household fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Constant term	0.412*** (0.002)	0.308*** (0.028)	0.370*** (0.051)
Observations	52937	52937	52937
R^2 value	0.762	0.766	0.766

Note: *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Robust standard errors clustered at the city level are reported in parentheses.

4.2 Endogeneity Analysis

The potential endogeneity in this study arises from two main sources. First, although we control for household- and city-level characteristics and include household fixed effects, omitted variable bias may still exist. Second, there may be reverse causality between e-commerce development and consumption inequality. For example, widening consumption inequalities could stimulate local e-commerce development. To address these concerns, we relied on an instrumental variable (IV) approach using Two-Stage Least Squares (2SLS).

Following Huang et al. (2019), the first instrumental variable is the number of post offices in each city in 1984. Since e-commerce can be viewed as an extension of traditional communication technologies, and the historical distribution of post offices may influence the adoption of internet usage habits and online transaction behavior, this satisfies the relevance condition for an instrument. Furthermore, as the role of traditional postal services has diminished over time, their direct impact on current household consumption behavior is negligible, satisfying the exclusion restriction. Following Tian and Zhang (2022), the second instrumental variable is whether a city was selected as a node in the 1998 “Eight Vertical and Eight Horizontal” national fiber-optic backbone network. Cities designated as network nodes typically benefited from more advanced telecommunications infrastructure, making households in these areas more likely to engage in online transactions, thus satisfying the relevance condition. Additionally, the selection of these node cities was primarily based on geographic considerations to address long-distance communication needs rather than local economic conditions, and therefore is unlikely to directly affect current consumption decisions, satisfying the exclusion restriction. Since the e-commerce development index varies over time whereas the above instruments are time-invariant, we follow Zhang et al. (2020) by interacting the instrumental variables with the national-level e-commerce development index (excluding the focal city) to construct time-varying instruments. We also test the statistical validity of both instruments.

Table 2 presents the results of the endogeneity analysis. The first-stage F-statistic is greater than 10, indicating that weak instrument concerns are unlikely. In addition, the Hansen over-identification test yields p-values greater than 10%, so we fail to reject the null hypothesis that all instruments are exogenous. These results jointly confirm the validity of the instrumental variables. Importantly, the second-stage regression results show that e-commerce development continues

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to have a significantly negative effect on consumption inequality, consistent with the baseline findings.[6]

TABLE 2. 2SLS Estimation Results

Variable	E-commerce development	Consumption Kakwani
	(1)	(2)
E-commerce development		-0.020** (0.009)
Hub city dummy × National average e-commerce development (excluding local city)	0.455*** (0.119)	
Historical Number of Post Offices × National Average E-commerce Development (excluding local city)	0.007*** (0.002)	
Control variable	Yes	Yes
Household fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Constant term	0.501 (0.702)	0.381*** (0.050)
Observations	52856	52856
R^2 value	0.827	0.051
First-stage F-statistic	-	27.659
Over-identification test	-	1.538 [0.215]

Note: P-values are reported in square brackets. Other details are consistent with Table 1.

4.3 Robustness Checks

To ensure the reliability of the empirical findings, we conducted a series of robustness tests. Specifically, we: (1) replaced the dependent variable with alternative measures of consumption inequality; (2) used disaggregated indicators of e-commerce development; (3) employed alternative data sources to construct e-commerce indices; (4) adopted different fixed-effects specifications; (5) modified the reference group used in calculating consumption inequality; and (6) implemented quantile regressions. The baseline results remained qualitatively unchanged across all these specifications.

5. Mechanism Analysis

After establishing that e-commerce development reduces consumption inequality, we now further explore the underlying mechanisms. In particular, we examine whether this effect operates through narrowing transaction cost disparities and reducing income inequality.

5.1 Narrowing Transaction Cost Disparities

Our theoretical framework suggests that one key channel through which e-commerce affects consumption inequality is by altering transaction cost disparities across households. Even when

[6] For further robustness, we conducted additional endogeneity analysis using two alternative sets of instrumental variables: "City Altitude and Distance to Hangzhou" and "City Altitude and Historical Fixed-Line Telephone Volume". The core conclusions remained consistent.

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income differences are controlled, households may still face heterogeneous transaction costs, which in turn influence their consumption behavior. Households with higher transaction costs tend to encounter more barriers in consumption, resulting in lower consumption levels. For example, low-education households may have limited ability to assess product characteristics, functions, and quality, leading to higher information and search costs, and rural households are constrained by the urban-rural dual structure, which restricts the flow of goods and results in underdeveloped consumption markets and limited product availability, thereby increasing transaction barriers. Similarly, households located in lower-tier cities (third-tier and below) and noneastern regions (Central, Western, and Northeastern China) often face disadvantages such as geographic remoteness, smaller market size, and lower levels of commercial agglomeration, all of which contribute to higher transaction costs. As a result, households that face higher transaction costs tend to have lower consumption levels, and those with lower transaction costs enjoy higher ones, ultimately leading to consumption inequality. Therefore, if e-commerce development, after controlling for income, disproportionately increases the consumption of low-education households, rural households, and those in less-developed or remote regions, it would provide indirect evidence that e-commerce reduces transaction cost disparities, thereby narrowing the overall consumption gap.

To test this mechanism empirically, this section adopts the logarithm of household per capita consumption as the dependent variable. We control for income but also introduce interaction terms between e-commerce development and household characteristics to examine whether e-commerce disproportionately increases consumption among households that face higher transaction costs. Following Qin et al. (2022), households are classified into high- and low-education groups based on whether the household head has at least a junior high school education, and into rural and urban households based on residence status.[7]

Table 3 reports the regression results. Column (1) shows that e-commerce development has a significantly stronger effect on increasing consumption among low-education households. This finding is consistent with Wang et al. (2022) and suggest that e-commerce platforms (e.g. Taobao) reduce the technical barriers associated with digital technologies by improving user experience, thereby enabling less-educated households to access a wider range of consumption opportunities. Column (2) indicates that e-commerce development contributes more to the consumption growth of rural households. This aligns with Cheng and Zhang (2019) and implies that in the context of underdeveloped rural consumption markets, e-commerce helps integrate urban and rural markets, improves the availability of goods, and reduces barriers to consumption for rural residents. Furthermore, Columns (3) and (4) show that e-commerce development has a stronger positive effect on households in lower-tier cities and noneastern regions. This suggests that e-commerce effectively alleviates transaction barriers caused by geographic remoteness, smaller market

[7] The dummy variables for low-education and rural households are time-varying and are therefore included in the regression model. In the CHFS data, urban-rural status is determined primarily by the type of sampled community. Consequently, a small proportion of households may change their urban-rural classification due to relocation. In our sample, 1.6% of households experienced a change in urban-rural status. For the low-education dummy, classification is based on the educational attainment of the head of household, defined in the CHFS as the individual with the highest economic status within the family. Since the designated head of household may change across survey waves, this variable also exhibits time variation. In our sample, 24% of households experienced a change in head of household.

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size, and limited commercial resources, compensates for the shortcomings of offline retail, and promotes cross-regional circulation of goods. This result is also consistent with Fan et al. (2018), who find that e-commerce significantly improves consumer welfare in remote areas. Overall, these results indicate that the transaction cost effect is negative ($C_2\tau_2 / C_1\tau_1 < \phi$). That is, e-commerce development reduces transaction costs more substantially for disadvantaged groups (such as low-education, rural, and remote-region households), thereby narrowing transaction cost disparities and ultimately reducing the consumption gap.[8]

TABLE 3. E-commerce Development and the Narrowing of Transaction Cost Disparities

Variable	Natural log of household consumption per capita			
	(1)	(2)	(3)	(4)
E-commerce development	0.002 (0.014)	0.005 (0.014)	0.019 (0.014)	0.008 (0.014)
Low-education households × E-commerce development	0.014** (0.007)			
Low-education households	-0.013 (0.017)			
Rural households × E-commerce development		0.036** (0.016)		
Rural households		-0.015 (0.039)		
Lower-tier market regions × E-commerce development			0.063*** (0.023)	
Non-eastern regions × E-commerce development				0.043*** (0.016)
Natural log of household income per capita	0.095*** (0.005)	0.095*** (0.005)	0.095*** (0.005)	0.095*** (0.005)
Control variable	Yes	Yes	Yes	Yes
Household fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Constant term	8.910*** (0.174)	8.904*** (0.176)	8.863*** (0.172)	8.927*** (0.169)
Observations	52937	52937	52937	52937
R^2 value	0.768	0.768	0.768	0.768

Note: Since the control variables include the logarithm of household per capita income, the estimated coefficient on e-commerce development reflects its net effect on consumption after removing the income channel. All other specifications are consistent with Table 1.

5.2 Reducing the Income Gap

As discussed in the theoretical framework, one important channel through which e-commerce development affects consumption inequality is by altering income disparities. Differences in household income levels directly translate into differences in consumption. Therefore, if e-commerce development disproportionately increases the income of low- and middle-income households, it can reduce consumption inequality by narrowing the income gap. To test this mechanism, this section constructs an income-based Kakwani index to measure income inequality.

[8] We further examined the mechanism at the community level, focusing on how e-commerce reduces consumption disparities by narrowing gaps in transaction costs, and these results showed that, after controlling for household income, e-commerce development leads to a larger increase in consumption among households located in communities with smaller populations, lower transportation accessibility, or nonplain regions.

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In addition, following Xu et al. (2020) we use income quantile gap indicators to examine heterogeneous effects across different income groups.

Table 4 reports the empirical results. Column (1) shows that e-commerce development significantly reduces income inequality, and Column (2) further demonstrates that a reduction in income inequality leads to a decrease in consumption inequality, confirming that the income channel is an important mechanism through which e-commerce affects consumption disparities. Columns (3)-(5) use the logarithms of income quantile gaps, Q50-Q10, Q90-Q10, and Q90-Q50, as dependent variables. Here, Q50-Q10 represents the difference in per capita household income between the median (50th percentile) and the 10th percentile within a city, and the other measures are defined analogously. These indicators allow for a more nuanced assessment of how income disparities evolve across different segments of the distribution and the results of this estimation show that e-commerce development significantly reduces the income gap between high- and low-income households as well as between high- and middle-income households. This suggests that e-commerce has a stronger income-enhancing effect on middle- and low-income groups. Collectively, these results confirm that the income effect is negative ($\omega_2 / \omega_1 < \phi$), consistent with our theoretical prediction. E-commerce development disproportionately raises the income of middle- and low-income households, thereby narrowing income disparities and in turn, reducing consumption inequality. A plausible mechanism driving this equalizing income effect is that e-commerce growth stimulates ancillary industries (e.g., logistics, packaging), which generate flexible employment opportunities for low- and middle-income households (Qiu and Zhou, 2022).[9]

TABLE4. The Impact of E-commerce on Income Inequality

Variable	Income Kakwani	Consumption Kakwani	Income Q50-Q10	Income Q90-Q10	Income Q90-Q50
	(1)	(2)	(3)	(4)	(5)
E-commerce development	-0.011*** (0.004)	-0.010*** (0.004)	-0.054 (0.043)	-0.108*** (0.037)	-0.148*** (0.046)
Income Kakwani		0.127*** (0.006)			
Control variable	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Household fixed effects	Yes	Yes	No	No	No
City fixed effects	No	No	Yes	Yes	Yes
Constant term	0.588*** (0.060)	0.296*** (0.051)	7.895*** (2.596)	13.169*** (2.399)	14.512*** (2.959)
Observations	52937	52937	459	459	459
R^2 value	0.783	0.770	0.908	0.886	0.808

Note: In Columns (3)-(5), the household- and city-level control variables are consistent with those in the baseline regressions. Household-level controls are aggregated to the city level by taking their means. All other specifications follow Table 1.

[9] To substantiate these findings, we constructed a binary indicator equal to 1 for households with per capita income below the annual provincial median and 0 otherwise and included its interaction with e-commerce development in the regression. We also divided households into four groups according to income quartiles and conducted subgroup regressions. Both approaches consistently show that e-commerce development exerts a stronger income-enhancing effect on low- and middle-income households. Furthermore, we also examined the heterogeneous effects of e-commerce development on income inequality. These results show that the income-equalizing effect of e-commerce is concentrated primarily in nonlower-tier markets and among households engaged in nonagricultural employment.

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6. Further Analysis

The preceding analysis showed that at the micro level e-commerce development reduces consumption inequality by narrowing transaction cost disparities and lowering income inequality. From a macro perspective, however, consumption inequality in China arises from multiple dimensions. First, due to uneven regional development, consumption disparities exist both within cities and between cities. How does e-commerce development affect these two dimensions of inequality? Second, significant disparities exist not only between urban and rural areas but also within urban and rural households. How does e-commerce influence both between-group and within-group consumption inequality? Third, limited mobility constrains low-consumption households from moving into higher-consumption groups, leading to a persistent or even widening consumption inequality over time. Can e-commerce development enhance upward mobility for low-consumption households? This section undertakes a systematic empirical investigation of these questions.

6.1 How Does E-commerce Affect Intra-city and Inter-city Consumption Inequality?

In the baseline analysis, the Kakwani index is constructed at the household level to capture the degree of consumption inequality faced by each household. In this subsection, we shift the unit of analysis to the city level[10] to examine how e-commerce development affects consumption inequality within cities and between cities. Intra-city consumption inequality is measured by recalculating the Kakwani index using households within each city as the reference group. The average of these household-level indices within each city is then used to construct a city-level indicator of internal consumption inequality (denoted as *Kakwani_inside*). Inter-city consumption inequality is measured by approximating city-level consumption using the mean per capita household consumption within each city. Based on this, a Kakwani index is constructed by comparing each city with all other cities in the sample, yielding a measure of between-city consumption inequality (denoted as *Kakwani_between*).

Columns (1) and (2) of Table 5 show that e-commerce development significantly reduces both intra-city and inter-city consumption inequality, which suggests that e-commerce not only improves the consumption environment within cities but also enhances market integration across regions. By facilitating the flow of goods and reducing market segmentation, e-commerce helps narrow cross-regional consumption inequalities and promotes more balanced regional development.

TABLE 5. E-commerce Development and Intra-city vs. Inter-city Consumption Inequality

Variable	*Kakwani_inside*	*Kakwani_between*
	(1)	(2)
E-commerce development	-0.014** (0.006)	-0.019** (0.009)
Control variable	Yes	Yes
Year fixed effects	Yes	Yes
City fixed effects	Yes	Yes

[10] In this context, "city" refers to a regional administrative unit that encompasses both its urban and rural constituents.

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Table 5 Continued

Variable	*Kakwani_inside*	*Kakwani_between*
	(1)	(2)
Constant term	0.162 (0.369)	-0.359 (0.551)
Observations	459	459
R^2 value	0.955	0.909

Note: In Columns (1)-(2), household-level control variables are aggregated to the city level by taking their means, and city-level controls remain consistent with those in the baseline regression. Unlike the baseline specification, city fixed effects are employed because the unit of observation in this regression is the city rather than the household. *Kakwani_inside* measures intra-city consumption inequality, and *Kakwani_between* measures inter-city consumption inequality. All other specifications follow Table 1.

6.2 How Does E-commerce Affect within- and between Urban-Rural Consumption Inequality?

Although the baseline regression uses the full national household sample, this subsection divides households into urban and rural groups to examine how e-commerce development affects consumption inequality within each group and between the two groups. Within-group consumption inequality is measured by dividing households into urban and rural groups and calculating the Kakwani index for each household using only other households within the same group as the reference. This yields two dependent variables: *Kakwani_rural* and *Kakwani_urban*, which capture consumption inequality within rural and urban households, respectively. To assess between-group inequality, we estimate a regression with the logarithm of household per capita consumption as the dependent variable, including e-commerce development, a rural household dummy variable, and their interaction term. This specification allows us to examine whether e-commerce has differential effects on rural versus urban household consumption. Table 6 reports the results. Columns (1) and (2) show that the coefficient on e-commerce development is significantly negative, indicating that e-commerce reduces consumption inequality within both urban and rural households. Column (3) shows that the interaction term between e-commerce development and the rural dummy is significantly positive, suggesting that e-commerce has a stronger positive effect on rural household consumption. As a result, the urban-rural consumption inequality is narrowed. These findings imply that e-commerce development helps alleviate the structural imbalances associated with China's urban-rural dual system.

TABLE 6. E-commerce Development and within- and between Urban-Rural Consumption Inequality

Variable	(1)	(2)	(3)
	Kakwani_rural	Kakwani_urban	Natural logarithm of household per capita consumption
E-commerce development	-0.061** (0.026)	-0.029** (0.015)	0.004 (0.014)
Rural households × E-commerce development			0.038** (0.016)
Rural households			-0.021 (0.037)
Control variable	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Household fixed effects	Yes	Yes	Yes

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Table 6 Continued

Variable	(1)	(2)	(3)
	Kakwani_rural	Kakwani_urban	Natural logarithm of household per capita consumption
Constant term	-0.472* (0.266)	0.019 (0.158)	9.777*** (0.175)
Observations	18317	34077	52937
R^2 value	0.771	0.804	0.764

Note: Control variables are identical to those in the baseline regression. All other specifications follow Table 1.

6.3 Can E-commerce Promote Upward Consumption Mobility among Low-consumption Households?

The preceding empirical results demonstrate that e-commerce development significantly reduces consumption inequality between households. However, commonly used inequality measures, such as the Kakwani index, capture only static disparities at a given point in time. In contrast, consumption mobility reflects the dynamic evolution of inequality by examining whether households move across consumption strata over time.[11] This subsection investigates whether e-commerce development facilitates upward mobility among low-consumption households, thereby mitigating the long-term persistence or widening of consumption inequality.

Following Yin et al. (2024) and Peng and Zhou (2022), we construct an indicator variable, $Mobility_{(ijt)}$, to represent a household's consumption group at a specific time point, which serves as a proxy for consumption mobility. Specifically, households are grouped based on their consumption levels, and the variable is defined as follows: if household i moves to a higher consumption group in period t compared to period $t-1$, the variable takes the value 1 (upward mobility); if the household remains in the same group, it takes the value 0 (no mobility); and if the household moves to a lower group, it takes the value -1 (downward mobility). Given that the dependent variable is ordinal and discrete, an ordered *Probit* model is employed for estimation. Consumption mobility is calculated using data from 2017 and 2019, with 2015 serving as the base period. To explore heterogeneity across consumption groups, and further examine its impact on consumption inequality, the final model in this section is specified as follows:

$$Mobility_{ijt} = \alpha + EC_{jt} + \beta EC_{jt} \times Base_{ijt} + \gamma X_{ijt} + City_j + Year_t + \varepsilon_{ijt} \quad (9)$$

Here, $Mobility_{ijt}$ represents household consumption mobility, and EC_{jt} denotes the e-commerce development level of the city where the household is located. $Base_{ijt}$ is a set of dummy variables for the household's consumption group in the base period[12]; the interaction terms "e-commerce development" × "specific base-period consumption groups" correspond to the low, lower-middle, middle, upper-middle, and high consumption tiers, respectively, and X_{ijt} represents the control

[11] Scholarship on social mobility has traditionally focused on income and defined income mobility as the change in an individual's or household's relative economic rank between two points in time. This study extends that conceptual framework to "consumption mobility".

[12] For the years 2015, 2017, and 2019, household consumption was partitioned into five equal quintiles, Low, Lower-Middle, Middle, Upper-Middle, and High, with 2015 established as the baseline period.

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variables included in the baseline regression. Given that households may exhibit cross-city mobility, controlling for household fixed effects might be overly restrictive. Therefore, we control for year and city fixed effects instead.

Table 7 reports the heterogeneous effects of e-commerce development on household consumption mobility. The regression coefficients for the interaction terms between e-commerce development and the low, lower-middle, and middle base-period consumption groups are significantly positive, and the coefficient for the high base-period group is significantly negative. These findings indicate that e-commerce development facilitates the upward mobility of households initially in lower consumption tiers in subsequent periods. Conversely, households in the high-consumption base group may experience a relative decline in their rank, likely due to the "catch-up" effect or the upward pressure from rising consumption levels in the middle-income strata. Overall, this suggests that e-commerce development enhances total household consumption mobility, thereby narrowing the disparities between different cohorts dynamically.

TABLE 7. The Heterogeneous Impact of E-commerce on Consumption Mobility

Variable	*Mobility*				
	(1)	(2)	(3)	(4)	(5)
E-commerce development	-0.023 (0.059)	-0.006 (0.048)	0.026 (0.046)	0.055 (0.048)	0.130*** (0.047)
E-commerce development × Low base-period consumption group	0.462*** (0.066)				
E-commerce development × Lower-middle base-period consumption group		0.311*** (0.025)			
E-commerce development × Middle base-period consumption group			0.159*** (0.028)		
E-commerce development × Upper-middle base-period consumption group				-0.000 (0.034)	
E-commerce development × High base-period consumption group					-0.362*** (0.050)
Control variable	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Urban fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	26032	26032	26032	26032	26032

Note: Same as Table 1.

7. Concluding Remarks and Policy Implications

Our findings indicate that e-commerce development significantly reduces consumption inequality between households at the micro level, and this effect operates through two primary channels: narrowing disparities in transaction costs and reducing income inequality. Households that face higher transaction costs increase their consumption due to the convenience provided by e-commerce, but e-commerce development also raises the income levels of low- and middle-income households, thereby reducing consumption inequality. In addition, e-commerce development effectively reduces consumption disparities within and between cities, within urban households and within rural households, and between urban and rural households. From a dynamic

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perspective, it also promotes upward consumption mobility among low-consumption households. These findings demonstrate not only the potential of e-commerce to alleviate consumption inequality at the micro level but also its important role in narrowing cross-regional and urban-rural consumption disparities and enhancing consumption mobility at the macro level. We thus offer the following policy recommendations for leveraging e-commerce development to reduce consumption inequality.

First, priority should be given to the role of e-commerce in enhancing the income-generating capacity of low- and middle-income groups. E-commerce development helps reduce consumption inequality by increasing the income levels of these groups, highlighting its significant potential to benefit low- and middle-income households and promote inclusive growth. Continued support should be provided for the development of the e-commerce sector, with full consideration given to the role of related industries, such as logistics, warehousing, and express delivery, in promoting entrepreneurship and employment. In addition, targeted training and skills development programs should be strengthened to help low- and middle-income households acquire relevant e-commerce knowledge and capabilities, thereby creating more flexible employment opportunities. Furthermore, policies that support e-commerce development in rural and less-developed regions should be further advanced. This includes strengthening infrastructure, expanding e-commerce service outlets, and fostering regionally distinctive brands. Efforts should be made to incubate and promote agricultural products with local characteristics, including through livestreaming, to enhance brand influence and drive local industrial development. In addition, policy support for e-commerce entrepreneurship should be improved, particularly by increasing tax incentives and fiscal support for micro and small enterprises so as to encourage rural households to participate in online consumption and engage in e-commerce-based entrepreneurship, thereby sustainably increasing rural incomes and improving living standards.

Second, to unlock the consumption potential of rural areas and lower-tier markets, the construction of logistics and distribution systems should be accelerated to reduce transaction costs. Since e-commerce development narrows disparities in transaction costs, helping households with higher transaction costs reduce transaction barriers and increase their consumption levels, efforts should be made to promote the development of county-level joint distribution centers and township-level integrated transportation service stations, improve rural postal and logistics systems, and expand last-mile delivery coverage in rural areas. Additionally, greater efforts are needed to tap the consumption potential of lower-tier markets and non-eastern regions by strengthening local logistics infrastructure and encouraging logistics enterprises to adopt advanced technologies to improve transport efficiency. It is also important to enhance the training of logistics personnel to improve service quality and promote the digital transformation of the commercial circulation sector. Moreover, private enterprises and social capital should be encouraged to invest in the logistics industry, thereby reducing long-distance transportation costs and addressing the "last-mile" problem in commodity circulation.

Third, barriers to interregional commodity flows should be removed to promote more balanced regional development. E-commerce development helps reduce consumption disparities within and between cities, within urban and rural households, and between urban and rural areas, which

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reflects the advantage of e-commerce in overcoming geographic constraints and promoting coordinated regional development. Accordingly, efforts should be made to strengthen resource integration and collaborative innovation across regions, connect the entire chain of production, distribution, circulation, and consumption, and fully leverage the role of e-commerce in industrial and supply chains. It is also necessary to advance the development of an integrated regulatory framework for e-commerce markets. This includes harmonizing laws, regulations, and industry standards across regions, eliminating barriers to interregional commodity circulation caused by market segmentation, and systematically removing impediments to factor mobility between cities and between urban and rural areas, thereby enabling e-commerce to more effectively promote balanced development.

Fourth, e-commerce development should be leveraged to promote upward mobility among low-consumption households and to enhance consumption mobility. Improving consumption mobility is crucial for achieving a sustained reduction in consumption inequality, and e-commerce development increases the probability of upward mobility among low-consumption groups, which in the long run helps them escape the "poverty trap". Accordingly, the government should continue to advance the development of information infrastructure and increase the penetration of information terminals, thereby improving the inclusiveness of e-commerce and addressing inequalities in the distribution of digital resources. This may help to narrow the "access gap" within the digital divide and provide channels for upward mobility for low-consumption groups. Finally, greater emphasis should be placed on improving the educational attainment of these groups and strengthening their ability to apply digital technologies so as to further narrow the digital divide and ensure that the benefits of e-commerce development continue to accrue to low-consumption households.

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