Asian Development Policy Review
ISSN(e): 2313-8343
ISSN(p): 2518-2544
DOI: 10.55493/5008.v11i2.4838
Vol. 11, No. 2, 99-109.

URL: www.aessweb.com

Globalization and regional consumption disparity in China: A disaggregated analysis

Jabbar Ul-Haq[1]
Hubert Visas[2+]
Qazi Muhammad Adnan Hye[3]
NGOH Christopher Sam[4]
Kainat Hameed[5]

[1]*Department of Economics, University of Sargodha, Sargodha, Pakistan.*
Email: jabbar.ulhaq@uos.edu.pk
[2]*School of International Trade & Economics, University of International Business and Economics, Beijing 100029, China.*
Email: hubertvisas@uibe.edu.cn
[3]*Academic Research and Development Wing, Dubai, United Arab Emirates.*
Email: Adnan.econ@gmail.com
[4]*Higher Institute of Commerce and Management, University of Bamenda, Republic of Cameroon.*
Email: samngoh@yahoo.com
[5]*Department of Economics, University of Sargodha, Sargodha, Pakistan.*
Email: kainathameed22@gmail.com

(+ Corresponding author)

Article History
Received: 18 May 2023
Revised: 4 July 2023
Accepted: 20 July 2023
Published: 2 August 2023

Keywords
China
Disaggregated analysis
Globalization
Regional analysis
Regional disparity.

ABSTRACT

Developing countries are increasingly concerned about globalization's impact on regional disparities. This paper looks at the relationship between globalization and regional (rural-urban) differences in consumption in China. It does this by separating globalization into the trade of domestic-invested enterprises (DIEs) and the trade of foreign-invested enterprises (FIEs). Feasible generalized least square (FGLS) is used for empirical analysis based on panel diagnostics. For the robustness of the findings, we also employed panel-corrected standard errors (PCSE) model. The results show a reduction in China's regional (i.e., urban-rural) consumption disparity (RCD) caused by both DIEs and FIEs trade perspectives. The impact of FIEs trade on regional disparity is higher than that of DIEs trade, reflecting the fact that FIEs are predominantly labor-intensive. Our findings are robust and unaffected by the type of trade disaggregation or the econometric techniques used (i.e., FGLS and PCSE). However, the results for the three regions differ depending on the type of trade disaggregation. To achieve the goal of economic development and closing the regional consumption gap, the government must pay close attention to the distribution effects of FIEs and DIEs trade separately and implement a set of measures to reinforce its strengths and mitigate its weaknesses.

Contribution/ Originality: This paper employed disaggregated trade data (i.e., DIEs and FIEs trade at the Chinese province level) and a better proxy for regional income inequality to study the impact of globalization on regional consumption disparity in China and across its regions (i.e., Eastern China, Central China, and Western China).

1. INTRODUCTION

The debate over globalization is lively, often passionate, and sometimes violent (Fischer, 2003). Since 1978, when it initiated the Reform and Opening-up Policy, China has aspired to integrate into the globalized world. China's admission to the World Trade Organization (WTO) in 2001 cemented its position as an important contributor to the globalization process in the international economic system. As a result, China's aggregate economic volume has increased rapidly since the initiation of reform and opening-up, and China's involvement in

international trade has grown significantly. The most critical aspects of the reform and opening-up policy are domestic reform and opening up to the outside world. From the perspective of domestic reform, one of the implications is the migration of the rural labor force, whereas from the standpoint of opening to the rest of the world, it is evident that China has embraced an export-oriented economic growth strategy to attract foreign investors and promote the development of processing trade (Wei, Yang, & Huang, 2012). Moreover, China's extremely high level of individual disparity is at the root of the country's noticeable regional disparities (Bin & Fracasso, 2017). Thus, the most debatable issue of our time is how regional disparities respond to globalization.

Various interpretations have emerged as a result of this debate. Proponents of globalization claim that it has been a significant force in reducing poverty and increasing economic equality in developing economies (Dollar, 2005). While opponents of globalization claim that lower trade restrictions have slowed the rate of poverty reduction and wage growth (Dix-Carneiro & Kovak, 2017; Kovak, 2013; Topalova, 2010). This perspective is mirrored by China and many other traditional economies that have seen significant rises in inequality as a result of economic liberalization (Mazur, 2000; Wei et al., 2012). The impact of globalization on regional inequality, however, remains inconclusive (Wei et al., 2012; Wei & Wu, 2001).

Chinese inward foreign investment increased by leaps and bounds, reaching approximately $139 billion in 2018, putting China second in the world after the United States in terms of inbound foreign investment (Ullah, Zhao, Abdul Kamal, & Zheng, 2022). From 2005 to 2020, there has been a notable increase in the disparity between China's trade and gross domestic product (GDP). This is due, albeit in part, to the sustained and robust growth of China's real GDP and a gradual decline in trade by foreign-invested enterprises (FIEs). Domestic-invested enterprises (DIEs) trade contributes to overall trade, which, on the other hand, is growing rapidly. FIEs have mainly invested in labor-intensive industries in China because they are mainly manufacturing companies (Wei et al., 2012), indicating that overall trade potential between DIEs is greater than that between FIEs. So, we decided to proceed with globalization by decomposing it into two sections to better understand the position: FIEs and DIEs.

The findings of this study show that globalization and regional inequality are associated in China. Globalization has tended to narrow the regional disparity in consumption. Our findings are consistent with those of Wei and Wu (2001) and contradict (Wan, Lu, & Chen, 2007; Wei et al., 2012). FIEs trade has consistently lessened the rural-urban consumption gap in all three regions; the result is, however, statistically insignificant. DIEs trade, for its part, has a mixed impact on RCD in three regions. DIEs have significantly reduced RCD in the central region, while it has mixed results in eastern and western regions but is statistically insignificant. The impact of economic growth and industrial structure on RCD in all regions is similar to the overall case and statistically significant.

Previous research has primarily focused on the relationship between globalization and urban-rural income disparities involving only international trade while ignoring the impact of disaggregated trade (i.e., FIEs trade and DIEs trade)[1]. This paper contributes to the literature by exploring the impact of globalization on the urban-rural disparity in per capita consumption (i.e., regional disparity in consumption) in China as a whole as well as across its regions. The use of income as an indicator of inequality is widely criticized because current income somehow doesn't indicate a household's long-term wealth. Temporary income spikes or declines inflate this measure. Adjusting for changes in savings and borrowing results in a steady flow of spending (Blundell & Preston, 1998). Consumption expenditure, rather than current income, is a more direct and precise measure of long-term earning ability (Bhagwati, 1964; Blundell & Preston, 1998; Cutler & Katz, 1992; Pendakur, 1998). Developing countries need to use consumption as an indicator of income inequality. Given China's relevance in analyzing global

[1] The only exception is the study by Visas, Ul-Haq, and Khanum (2022) that investigated the impact of DIEs and FIEs on life expectancy in China and across the Chinese regions.

inequality trends, focusing on the country requires little justification. By incorporating DIEs and FIEs trade disaggregation, the study uses data from 2001 to 2017 to examine the shocks of the transition period after China's admission into the WTO. Furthermore, this country-specific study helps to reduce the heterogeneity and data comparability issues that are common in cross-country studies (Atkinson, 1970; Topalova, 2007).

The following sections make up the article: Section 2: Globalization and Regional Inequality: A Theoretical Perspective; Section 3: Methodology and Data Description; and Section 4: Conclusions and Implications for Future Research.

2. GLOBALIZATION AND REGIONAL INEQUALITY

China has gone through a long process of globalization. Prior to 1978, the country's trade with the rest of the world was restricted. Before the year 1978, China's trading relationships with the rest of the world were severely limited. In 1978, under the leadership of Deng Xiaoping, the government of China officially adopted "opening to the outside world" as a national economic policy in Wei and Wu (2001). 1978–1993 was a period when market reform was the goal and replacing the old system was the top priority; 1994–2001 was a period when a new international trading system was created to meet the needs of the socialist market economic system; and 2002–2007 was a period of transition as a result of WTO membership (Wei et al., 2012).

Thus, since 1977, the trade-to-GDP ratio has been increasing, rising from 8.38 percent in 1977 to 64.47 percent in 2006, before falling to 35.83 percent in 2019 because of the country's sustained rapid growth in real GDP and a declining trend in trade that FIEs report. So, we decided to split the trade into two parts. The first part deals with the portion of trade that is accounted for by FIEs, while the second part deals with the contribution of DIEs to the overall trade. Furthermore, there are significant regional variations in the extent of globalization, especially when China is divided into three regions: eastern, central, and western China. Although there appear to have been convergences within each area, east China attracts far more foreign investment and trade than the central and western regions, which promotes regional inequality. Rather than the more traditional measures of inequality in the distribution of income or wealth, such as the Theil index or Gini coefficient, we concentrate on inequality between urban and rural residents. The descriptive summary statistics of all provinces are presented in Table 1.

Table 1. Descriptive summary statistics.

Variable	N	Mean	Std. dev.	Min	Max
RCD*	527	2.947	0.755	1.595	7.052
DTO_L	527	0.305	0.380	0.016	1.722
DTO_R	527	0.294	0.345	0.011	1.668
FTO	527	0.150	0.246	0	1.213
LGDP	527	8.943	1.203	4.935	11.404
IS	465	46.559	8.188	19.738	61.5

Note: "N" shows a number of observations. '*' for details of variables, see Table 2.

2.1. Theoretical Perspective

Lewis argues that developing nations have two distinct economies: a large and almost exclusively agricultural subsistence sector employing a relatively large rural labor force, and a small capitalist sector that is almost entirely urbanized. He believed that rural workers' marginal output was negligible, zero, or even negative and was counterproductive to growth. Capital accumulation, according to Lewis, is a key factor in economic growth. Lewis argued that spontaneous bottom-up market processes would alter urban-rural relations as market forces drew surplus rural laborers from the rural subsistence sector to the urban capitalist sector. As the number of physically fit rural residents decreased, rural wages increased, allowing the urban-rural gap to gradually close (Chen, LeGates, Zhao, & Fang, 2018).

China's international trade and rural-urban income gap have entered a new era of change and increased exposure to the outside world as a result of reform policies, particularly those pertaining to internal reform and increased exposure to the outside world. China has adopted an export-oriented economy that attracts foreign capital and attempts to expand processing trade (Wei, Li, & Guo, 2013).

As China's reforms progressed, the number of people employed in rural areas gradually increased, from 2 million in 1983 to 30 million in 1989, 62 million in 1993, 75.5 million in 2000, 83.99 million in 2001, 100 million in 2002, and 132 million in 2006 (Wei et al., 2012). This massive influx of rural labor has increased rural employment rates, reduced the rural labor surplus, raised rural incomes, and provided steady, low-cost labor for industrial manufacturing and foreign trade, especially processing trade. Statistics and practice show that China's foreign trade and rural labor force have grown together. Foreign trade has affected the rural labor force and wage and income gaps through quantitative and qualitative employment effects and labor productivity. Thus, international trade is a major factor in rural-urban inequality (Wei et al., 2012).

2.2. Justification for Distinguishing between DIEs and FIEs Trade

Morrison (2019) asserts that trade and investment reforms in China in the early 1990s stimulated FDI inflows. These inflows accelerated China's productivity gains and rapid economic and trade expansion. China had 445,244 foreign-invested enterprises (FIEs) with 55.2 million employees in 2010 (CSY, 2012). Between 1990 and 2003, FIEs accounted for a 2.3% to 35.9% increase in China's industrial production before falling to 25% in 2011. In addition, FIEs accounted for a significant portion of China's international trade, comprising 58.3% of exports and 59.7% of imports, but these rates have since declined to 41.7% and 43.7%, respectively, in 2018. Both the share of Chinese exports and imports slightly decreased from 2005 to 2018, but China's real GDP grew at a much faster rate between 1979 and 2018, growing by 9.5% annually. The 2008 global financial crisis had a substantial negative impact on China's economy. From 2008 to 2010, China's real GDP grew by an average of 9.7% per year. Despite the fact that the rate of GDP growth slowed from 10.6% in 2010 to 6.8% in 2018, the trend remains upward. Because of the continued growth in RGDP and the slight decline in trade that FIEs are responsible for, the difference between China's GDP and trade widened between 2005 and 2020. The trend of DIEs and FIEs trade over time in China is presented in Figure 1.

It is implied that DIEs trade is crucial in this situation because China's real GDP is expanding at a faster pace. A considerable portion of the world's trade volume has been captured by China as a result of its efforts to leverage its comparative advantage of low-cost but high-quality labor to bring in foreign investment and promote international trade. Given that FIEs are often manufacturing firms, the majority of their investments in China have been in labor-intensive sectors (Wei et al., 2012), indicating that generally, DIE trade exceeds FIE trade. To better comprehend the state of China's trade, we need to split trade openness into two categories: the trade openness (ratio) of foreign-invested enterprises (FIEs) and domestic-invested enterprises (DIEs). Studies already conducted have compared the impact of domestic and international capital investment (Yang, Brosig, & Chen, 2013), domestic and foreign trade (Xie, Wang, & Wang, 2017), foreign and domestic investment (Elmarzougui, Larue, & Tamini, 2016), and international and domestic integration (Poncet, 2003) to be able to evaluate the contribution of each in China.

3. DATA AND METHODOLOGY

This paper examines the effects of globalization on regional disparities in China's per capita consumption from the perspectives of domestic and foreign trade. China's eastern region is comprised of eight provinces and three municipalities. The provinces of eastern China are Hebei, Liaoning, Jiangsu, Zhejiang, Fujian, Guangdong, Shandong, and Hainan, and the municipalities are Beijing, Tianjin, and Shanghai. The central region comprises eight provinces, including Jilin, Heilongjiang, Shanxi, Anhui, Jiangxi, Henan, Hubei, and Hunan. The western

region consists of 11 provinces and one municipality. Chongqing is the municipality, and the 11 provinces are Guangxi, Sichuan, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia, Xinjiang, and Inner Mongolia.

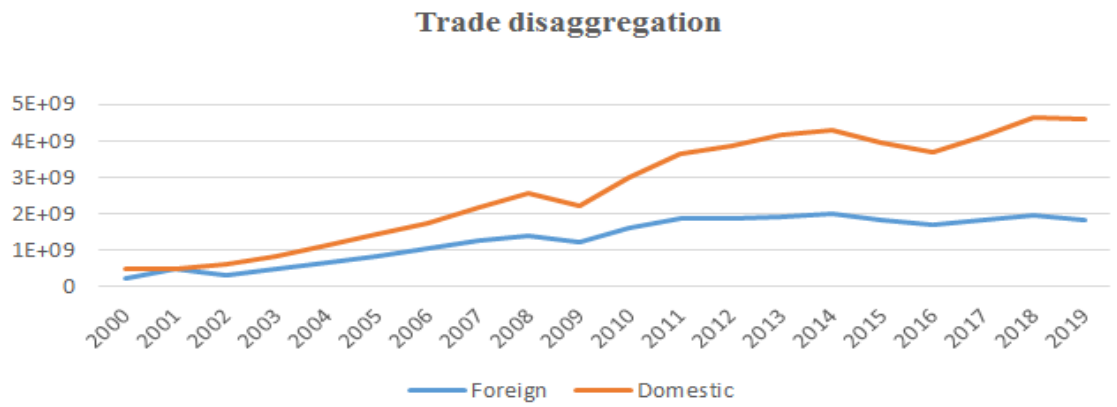

Figure 1. DIEs and FIEs trade over time in China.

Table 2. Variables description.

Variable	Code	Explanation
Regional disparity	RCD	The ratio of urban to rural per capita expenditure
DIEs trade 1	DTO_L	The ratio of total import and export volumes of DIEs based on the place where the business unit is located to regional GDP (RGDP)
DIEs trade 2	DTO_R	The ratio of total import and export volumes of DIEs based on the place of registration of the business and sources of goods to RGDP
FIEs trade	FTO	The ratio of trade between FIEs and RGDP
Industrial structure	IS	The proportion of provincial GDP accounted for by the second industry in town
Regional GDP	LGDP	Log of the regional gross product

Note: Data of all variables, used in analysis, is taken from China national bureau of statistics (CNBS).

Panel data from 31 Chinese provinces and regions from 2001 to 2017 was used to examine how domestic and international trade influence regional inequality. The raw data with DIEs and FIEs trade disaggregation is available on the National Bureau of Statistics website (http://www.stats.gov.cn/).

GDP (u, p, t) and POP (u, p, t) denote GDP and population for the urban portion of province p in year t, respectively, while GDP (r, p, t) and POP (r, p, t) denote GDP and population in year t for the rural portion of province p in year t. The ratio of the two respective per capita consumptions (RCD (p, t)) is used to determine the urban-rural consumption inequality in years t.

$$RCD(p, t) = [GDP(u, p, t) / POP(u, p, t)] / [GDP(r, p, t) / POP(r, p, t)] .$$

The openness of province p in year t by FIEs and DIEs is then measured by:

$$OPEN(p, f, t) = [EXP(p, f, t)+IMP(p, f, t)] / GDP(p, t)$$

$$OPEN(p, d, t) = [EXP(p, d, t)+IMP(p, d, t)] / GDP(p, t)$$

The following equation is used in the current study to analyze the effect of globalization on China's regional disparities.

$$RCD(p, t) = f(TO, IS, LGDP) \quad (1)$$

Where TO be either DTO_L or DTO_R or FTO in turn. In Equation 1, RCD depicts the urban-rural consumption disparity as estimated by the ratio of the two per capita consumptions. DTO and FTO denote DIEs and FIEs trade openness ratios. IS denotes the changes in the infrastructure of provinces. Table 2 presents a description of the variables used in this study. Thus, our main model under consideration is as follows:

$$RCD(p, t) = \alpha + \beta\, TO(p, t) + \gamma LGDP(p, t) + \Theta\, IS(p, t) + \mu(p, t)$$

Where TO be either DTO_L or DTO_R or FTO in turn.

The study used both the feasible generalized least squares method and the fixed-effects estimator with Driscoll-Kraay standard errors to figure out the relationship between globalization and differences in consumption between rural and urban China. Cross-sectional dependency is a drawback in panel data sets and leads to erroneous estimations. In contrast to conventional methodologies, the Driscoll and Kraay (1998) method takes into consideration cross-sectional dependence, producing a robust estimated standard error. The error structure is assumed to be heteroskedastic, autocorrelated up to a specific lag, and correlated across the entities by the Driscoll-Kraay approach.

The Driscoll-Kraay estimate is a nonparametric method that is very adaptable and more useful as the duration increases because it is not constrained by the limited behaviour of the number of panels; as a result, the estimator is dependent on the big T asymptotic. When N>T (in our case N=31>T=15), Driscoll-Kraay standard errors (Driscoll & Kraay, 1998) were employed to address cross-sectional dependence. Such standard errors are heteroskedastic as well as robust to very general forms of cross-sectional and temporal dependency. The balanced and unbalanced panel data can both be used using the Driscoll-Kraay covariance estimation. To ensure there are no gaps in the data, the absolute of all negative values is taken after being logarithmically transformed.

For a pooled ordinary least squares (OLS) estimate for a linear model, the Driscoll-Kraay standard error is denoted by:

$$Y_{i,t} = Z'_{it}\beta + \varepsilon_{i,t},$$

Where i=1,…,N, t=1,…,T , Y (i,t) symbolizes the dependent variable RCD(p, t) = [GDP(u, p, t) / POP(u, p, t)] / [GDP(r, p, t) / POP(r, p, t)], Zi,t denotes the independent variables (TO, IS, LGDP) and marks the unknown coefficients with a (K + 1) 1 vector, with the first element being 1; I stands for the cross-sectional units at time t. All of the observations are layered, and the expression is as follows:

$$Y = \left[Y_{1,t_{1,1}}, \ldots\ldots, Yy_{2,t_{2,1}}, \ldots\ldots, Y\right]'$$

and

$$Z = \left[Z_{1,t_{1,1}}, \ldots\ldots, Zx_{2,t_{2,1}}, \ldots\ldots, Z\right]'$$

This is presuming that for all s, t, the scalar error terms I s are uncorrelated with Zi,t (strong exogeneity). However, $\varepsilon_{i,t}$ can show cross-sectional dependency, autocorrelation, and heteroscedasticity. Using OLS regression, it may be reliably predicted under the above assumptions, producing the following results (Hoechle, 2007):

$$\hat{\beta} = (Z'Z)^{-1}Z'Y$$

For clarity, the square roots of the diagonal elements of the asymptotic covariance matrix are used to describe the coefficient estimates of the Driscoll-Kraay standard errors (Driscoll & Kraay, 1998):

$$V(\hat{\beta}) = (Z'Z)^{-1}\hat{S}_T(Z'Z)^{-1}$$

We used the Hoechle (2007) method to make Driscoll-Kraay standard errors for linear panel models that are consistent with heteroscedasticity and resistant to most types of cross-sectional dependence. The presence of heteroscedasticity and autocorrelation (serial correlation) in panel data is a matter of concern. We used the Modified Wald test and the Wooldridge test to check for heteroscedasticity and autocorrelation problems, respectively. For cross-sectional independence in panel data, we use Pesaran's test of cross-sectional independence. The regressions were estimated using either fixed effects or random effects estimators. For each regression, the choice between the two estimation methods was based on the Hausman test for each (i.e., DIEs and FIEs) scenario

independently. For robustness checks, we employed the Feasible Generalized Least Squares (FGLS) and Panel-Corrected Standard Error (PCSE) techniques, which also address cross-sectional dependence, serial correlation, and heteroscedasticity issues in panel data (Dix-Carneiro & Kovak, 2017; Kovak, 2013; Topalova, 2010).

4. RESULTS

Wooldridge's (2002) autocorrelation test revealed that there is autocorrelation. There is equal evidence of group-wise heteroscedasticity. The results are shown in Table 3. Whereas the results of CD tests are presented in Table 4.

Table 3. Heteroskedasticity and serial correlation dialogistic tests.

Test statistics	Error process	Test
Modified Wald test	Heteroscedasticity	3374.90***
Wooldridge test (F-test)	No serial correlation	150.727***

Note: Modified Wald test for group-wise Heteroskedasticity in fixed effect regression model H0: sigma (i) ^2 = sigma^2 for all i: No Heteroskedasticity. Serial correlation: Wooldridge test for autocorrelation in panel data H0: no first-order autocorrelation. *** denotes 1% level of significance.

Table 4. Pesaran (2004) test of cross-sectional independence in panel data.

Models	CD-test statistic	P-value
DTO_L case	16.020***	0.000
DTO_R case	15.436***	0.000
FTO case	15.605***	0.000

Note: Each row represents a separate model. In all three models, the regional disparity is our dependent variable, IS and lGDP is our other independent variable. We also employed Pesaran (2015) test for weak CSD and found similar findings. *** denotes 1% level of significance.

4.1. From the National Perspective

From a national standpoint, the results of the impact of trade openness on urban-rural consumption disparity are represented in Table 5[2]. Regression results indicate that trade openness has a significant negative impact on China's urban-rural consumption disparity.

Table 5. Regional disparity in consumption and trade openness in China.

Variables	1	2	3
DTO_L	-0.354*** (0.083)		
DTO_R		-0.302*** (0.097)	
FTO			-0.523*** (0.119)
LGDP	-0.329*** (0.047)	-0.346*** (0.043)	-0.345*** (0.042)
IS	0.006* (0.003)	0.010*** (0.003)	0.010*** (0.003)
F-stat	60.30	48.03	51.68
P-val	0.000	0.000	0.000

Note: The dependent is the regional consumption disparity (RCD) in all FE-DSKE models. Parentheses indicate standard errors. *** indicates 1%, * indicates 10% significance level.

[2] Following Al-Malki, Hassan, and Ul-Haq (2022) we also used the generalized method of moments (GMM) for further robustness of our results. All models present in Table 5 are also estimated by GMM. GMM estimates also confirm our findings. The results are available upon request.

The coefficients of DTO_L, DTO_R, and FTO show that a 1 percentage point rise in trade openness causes a 0.354, 0.302, and 0.523 percentage point decrease in urban-rural consumption disparity in China, respectively. The urban-rural consumption imbalance in China is negatively associated with economic growth, whereas the industrial structure is positively correlated. It shows that industries dominate urban regions and that improving the industrial structure will boost urban consumption while reducing rural consumption. The findings show that globalization has helped reduce RCD in China.

4.2. Regional Perspective

Trade has also been a crucial factor impacting the rural-urban consumption disparity from the standpoint of the following three regions: Shi, Visas, Ul-Haq, Abbas, and Khanum (2022) and Dou, Ul-Haq, Visas, Aslam, and Khanum (2023), i.e., eastern, central and western. In terms of DIEs by location, the coefficient DTO_L shows that the overall, eastern, and central regions of China exhibit a decrease in RCD, whereas the western region shows a rise in RCD but is statistically insignificant. The coefficients of DTO_L for overall, eastern, and central China show that a 1 percentage point rise in trade openness causes a 0.354, 0.012, and 3.985 percentage point decrease in RCD in China, respectively. But a 1% increase in trade openness is associated with a 0.12 percent point rise in RCD in the western region; however, the coefficient is insignificant. Results are shown in Table 6.

Table 6. Regional disparity in consumption and trade openness in Chinese regions.

Variables	Overall	Eastern	Central	Western
DTO_L	-0.354***	-0.011	-3.958***	0.118
	(0.083)	(0.093)	(0.660)	(0.653)
LGDP	-0.329***	-0.123*	-0.209***	-0.291***
	(0.047)	(0.061)	(0.049)	(0.066)
IS	0.006*	0.014***	0.0184**	-0.019*
	(0.003)	(0.004)	(0.006)	(0.008)
F-stat	65.30	12.01	62.58	7.83
P-val	0.000	0.000	0.000	0.004

Note: The dependent is the regional consumption disparity (RCD) in all FE-DSKE models. Parentheses indicate standard errors. *** indicates 10%, ** indicates 5%, * indicates 1% significance level.

In terms of FTO, China's eastern, central, and western regions all show a decrease in consumption disparity between urban and rural areas. A 1% rise in trade openness is associated with a 0.1 percent point (0.0413) decrease in regional inequality in the east, a 1.3 percent point (1.323) decrease in the center, and a 0.6 percent point (0.642) decrease in urban-rural consumption disparity in the west. Results are shown in Table 7.

Table 7. Regional disparity in consumption and trade openness in Chinese regions.

Variables	Overall	Eastern	Central	Western
FTO	-0.523***	-0.0413	-1.323	-0.642
	(0.115)	(0.099)	(0.733)	(2.525)
LGDP	-0.345***	-0.124**	-0.208***	-0.285***
	(0.041)	(0.052)	(0.055)	(0.069)
IS	0.0106***	0.015***	0.015**	-0.019**
	(0.002)	(0.002)	(0.006)	(0.008)
F-stat	55.73	16.05	10.61	8.82
P-val	0.000	0.000	0.000	0.002

Note: The dependent is the regional consumption disparity (RCD) in all FE-DSKE models. Parentheses indicate standard errors. *** indicates 1%, ** indicates 5%, significance level.

The results for DIEs by registration and the results for FIEs by trade openness are the same, but for eastern and western regions. In terms of DTO_R, China's eastern and western regions show an increase in RCD; however, the coefficients are insignificant. While the central regions show a considerable decrease in disparity. A 1% rise in trade openness is associated with a 0.1 percent point (0.0597) increase in regional inequality in the east, a 0.8 percent point (0.894) increase in the west, and a 3.6 percent point (3.671) decrease in RCD in the west. Results are

shown in Table 8. However, in all of these instances, DTO_L, DTO_R, and FTO reduce China's urban-rural consumption gap.

Table 8. Regional disparity in consumption and trade openness in Chinese regions.

Variables	Overall	Eastern	Central	Western
DTO_R	-0.302***	0.059	-3.671***	0.894
	(0.093)	(0.087)	(0.956)	(0.667)
LGDP	-0.346***	-0.127**	-0.266***	-0.297***
	(0.041)	(0.054)	(0.042)	(0.066)
IS	0.010***	0.014***	0.023**	-0.019**
	(0.003)	(0.003)	(0.007)	(0.008)
F-Stat	51.79	9.51	21.17	7.91
P-val	0.000	0.002	0.000	0.004

Note: The dependent is the regional consumption disparity (RCD) in all FE-DSKE models. Parentheses indicate standard errors. *** indicates 1%, ** indicates 5%, significance level.

Table 9 presents the results of the estimation of models 1–3 using FGLS and models 4–6 using PCSE. The fact that FGLS and PCSE give fairly similar estimates demonstrates that our results are robust in terms of different econometric techniques.

Table 9. Regional disparity in consumption and trade openness in Chinese regions.

Variables	FGLS	FGLS	FGLS	PCSE	PCSE	PCSE
DTO_L	-0.351***			-0.354***		
	(0.011)			(0.086)		
DTO_R		-0.295***			-0.302***	
		(0.027)			(0.102)	
FTO			-0.518***			-0.523***
			(0.019)			(0.130)
LGDP	-0.331***	-0.345***	-0.345***	-0.329***	-0.346***	-0.345***
	(0.007)	(0.009)	(0.006)	(0.030)	(0.030)	(0.030)
IS	0.006***	0.010***	0.010***	0.006*	0.010***	0.010***
	(0.000)	(0.000)	(0.000)	(0.003)	(0.003)	(0.003)
Wald-Stat	7775.63	1331.02	6213.28	172.41	157.48	162.81
P-val	0.000	0.000	0.000	0.000	0.000	0.000

Note: The dependent is the regional consumption disparity (RCD) in all FE-DSKE models. Parentheses indicate standard errors. *** indicates 1%, * indicates 10% significance level.

To sum up, the empirical analysis suggests that globalization plays a significant role in China's regional inequality; in regions where globalization has expanded, the urban-rural discrepancy in consumption has tended to narrow rather than widen. Our findings are consistent with those of Wei and Wu (2001) and contradict those of (Wan et al., 2007; Wei et al., 2012). From the standpoint of three regions, the eastern and central regions of China exhibit a decrease in consumption disparity in RCD, whereas the western regions show a significant rise in disparity in DTO_L. In the case of FTO, all three regions of China show a decrease in RCD. In the case of DTO_R, China's eastern and western regions show an increase in RCD, while the central regions show a considerable decrease in disparity.

5. CONCLUSION

Globalization is highly favorable to the economy's growth rate, but its impact varies widely across regions. A country's international trade has a distribution impact on its urban and rural residents. Globalization has reduced RCD in China, and our findings are insensitive to the type of trade disaggregation. The impact of FIEs trade openness on RCD is comparatively higher than that of DIEs trade openness, which is a reflection of the fact that FIEs are mostly labor intensive. The urban-rural consumption imbalance in China is negatively related to economic growth, whereas the industrial structure is positively related. This shows that industries dominate urban regions and that improving the industrial structure will boost urban consumption while reducing rural consumption. Our

results are robust and are insensitive to different econometric techniques (i.e., FGLS and PCSE). The findings of this paper demonstrate that FIEs trade has consistently lessened the rural-urban consumption gap in all three regions, but the result is statistically insignificant. DIE's trade, for its part, has a mixed impact on RCD in three regions. DIEs has significantly reduced RCD in the central region, while it has mixed results in the eastern and western regions but is statistically insignificant. The impact of economic growth and industrial structure on RCD in all regions is similar to the overall case and statistically significant. Therefore, in order for the government to achieve its goals of economic development and reducing the consumption gap between rural and urban areas, it must pay particular attention to the consumption-distribution effect of FIEs trade and DIEs trade separately and implement a variety of measures to reinforce its strengths and mitigate its weaknesses.

Funding: This study received no specific financial support.
Institutional Review Board Statement: Not applicable.
Transparency: The authors state that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.
Data Availability Statement: Upon a reasonable request, the supporting data of this study can be provided by the corresponding author.
Competing Interests: The authors declare that they have no competing interests.
Authors' Contributions: All authors contributed equally to the conception and design of the study. All authors have read and agreed to the published version of the manuscript.

REFERENCES

Al-Malki, A. M., Hassan, M.-U., & Ul-Haq, J. (2022). Nexus between remittance outflows and economic growth in GCC countries: The mediating role of financial development. *Applied Economics*, 1-13. https://doi.org/10.1080/00036846.2022.2139812

Atkinson, A. B. (1970). On the measurement of inequality. *Journal of Economic Theory*, *2*(3), 244-263.

Bhagwati, J. (1964). The pure theory of international trade: A survey. *The Economic Journal*, *74*(293), 1-84.

Bin, P., & Fracasso, A. (2017). Regional consumption inequality in China: An oaxaca-blinder decomposition at the prefectural level. *Growth and Change*, *48*(3), 459-486. https://doi.org/10.1111/grow.12167

Blundell, R., & Preston, I. (1998). Consumption inequality and income uncertainty. *The Quarterly Journal of Economics*, *113*(2), 603-640.

Chen, C., LeGates, R., Zhao, M., & Fang, C. (2018). The changing rural-urban divide in China's megacities. *Cities*, *81*, 81-90. https://doi.org/10.1016/j.cities.2018.03.017

CSY. (2012). *China statistical yearbook 2012*. Retrieved from http://www.stats.gov.cn

Cutler, D. M., & Katz, L. F. (1992). Rising inequality? Changes in the distribution of income and consumption in the 1980's. *The American Economic Review*, *82*(2), 546-551.

Dix-Carneiro, R., & Kovak, B. K. (2017). Trade liberalization and regional dynamics. *American Economic Review*, *107*(10), 2908-2946.

Dollar, D. (2005). Globalization, poverty, and inequality since 1980. *The World Bank Research Observer*, *20*(2), 145-175. https://doi.org/10.1093/wbro/lki008

Dou, S., Ul-Haq, J., Visas, H., Aslam, B., & Khanum, S. (2023). Does export product diversification reduce sulfur dioxide emissions in China? A regional analysis. *International Journal of Environmental Science and Technology*, *20*(6), 6247-6258. https://doi.org/10.1007/s13762-022-04353-y

Driscoll, J. C., & Kraay, A. C. (1998). Consistent covariance matrix estimation with spatially dependent panel data. *Review of Economics and Statistics*, *80*(4), 549-560. https://doi.org/10.1162/003465398557825

Elmarzougui, E., Larue, B., & Tamini, L. D. (2016). Trade openness, domestic and foreign investments, and the environment. *Modern Economy*, *7*(05), 591. https://doi.org/10.4236/me.2016.75065

Fischer, S. (2003). Globalization and its challenges. *American Economic Review*, *93*(2), 1-30.

Hoechle, D. (2007). Robust standard errors for panel regressions with cross-sectional dependence. *The Stata Journal*, *7*(3), 281-312. https://doi.org/10.1177/1536867x0700700301

Kovak, B. K. (2013). Regional effects of trade reform: What is the correct measure of liberalization? *American Economic Review*, *103*(5), 1960-1976. https://doi.org/10.1257/aer.103.5.1960

Mazur, J. (2000). Labor's new internationalism. *Foreign Affairs*, *79*, 79-93.

Morrison, W. M. (2019). China's economic rise: History, trends, challenges, and implications for the United States. *Current Politics and Economics of Northern and Western Asia*, *28*(2/3), 189-242.

Pendakur, K. (1998). Changes in Canadian family income and family consumption inequality between 1978 and 1992. *Review of Income and Wealth*, *44*(2), 259-282. https://doi.org/10.1111/j.1475-4991.1998.tb00272.x

Pesaran, M. H. (2004). *General Diagnostic tests for cross section dependence in panels*. IZA Discussion Paper No. 1240.

Pesaran, M. H. (2015). Testing weak cross-sectional dependence in large panels. *Econometric Reviews*, *34*(6-10), 1089-1117. https://doi.org/10.1080/07474938.2014.956623

Poncet, S. (2003). Measuring Chinese domestic and international integration. *China Economic Review*, *14*(1), 1-21. https://doi.org/10.1016/s1043-951x(02)00083-4

Shi, J., Visas, H., Ul-Haq, J., Abbas, S., & Khanum, S. (2022). Investigating the impact of export product diversification on environmental degradation: Evidence from Chinese provinces. *Environment, Development and Sustainability*, 1-32. https://doi.org/10.1007/s10668-022-02536-8

Topalova, P. (2007). Trade liberalization, poverty and inequality: Evidence from Indian districts Globalization and poverty. In (pp. 291-336). Chicago: University of Chicago Press.

Topalova, P. (2010). Factor immobility and regional impacts of trade liberalization: Evidence on poverty from India. *American Economic Journal: Applied Economics*, *2*(4), 1-41. https://doi.org/10.1257/app.2.4.1

Ullah, A., Zhao, X., Abdul Kamal, M., & Zheng, J. (2022). Environmental regulations and inward FDI in China: Fresh evidence from the asymmetric autoregressive distributed lag approach. *International Journal of Finance & Economics*, *27*(1), 1340-1356. https://doi.org/10.1002/ijfe.2218

Visas, H., Ul-Haq, J., & Khanum, S. (2022). The impact of domestic and foreign-invested enterprises trade on life expectancy in China. *Global Regional Review*, *7*(1), 158-172.

Wan, G., Lu, M., & Chen, Z. (2007). Globalization and regional income inequality: Empirical evidence from within China. *Review of Income and Wealth*, *53*(1), 35-59. https://doi.org/10.1111/j.1475-4991.2007.00217.x

Wei, H., Li, H., & Guo, Y. (2013). Trade structure, trade mode and the urban-rural income gap in China. *South African Journal of Economic and Management Sciences*, *16*(2), 96-114. https://doi.org/10.4102/sajems.v16i2.210

Wei, H., Yang, S., & Huang, H. (2012). Trade and rural-urban income inequality: Evidence from China. *Frontiers of Economics in China*, *7*(4), 519-543.

Wei, S. J., & Wu, Y. (2001). *Globalization and inequality: Evidence from within China (No. 8611)*. National Bureau of Economic Research, Inc.

Wooldridge, J. M. (2002). Econometric analysis of cross section and panel data MIT press. *Cambridge, ma*, *108*(2), 245-254.

Xie, L., Wang, S., & Wang, X. (2017). The effect of domestic and foreign trade coordination on technological innovation: Complements or substitutes? *Frontiers of Business Research in China*, *11*(1), 1-21. https://doi.org/10.1186/s11782-017-0014-6

Yang, B., Brosig, S., & Chen, J. (2013). Environmental impact of foreign vs. domestic capital investment in China. *Journal of Agricultural Economics*, *64*(1), 245-271. https://doi.org/10.1111/j.1477-9552.2012.00370.x