

The Impact of Urbanization Level on Residents' Income: A Comparative Analysis between China and the United States

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Abstract

This paper selects balanced annual time series data spanning 2010 to 2024 to compare how urbanization shapes household disposable income in China and the United States. This particular time window captures critical economic shifts including post-financial crisis recovery, Sino-U.S. trade tensions and public health shocks, which creates a realistic context for horizontal comparison. China underwent rapid rural-to-urban population relocation during the period, while the U.S. entered a mature urbanization stage with stagnant urban population ratios. Divergent institutional rules, labor mobility mechanisms and industrial layouts create obvious gaps in the income spillover generated by city expansion. Parallel first-difference regression frameworks are constructed for two nations to quantify the marginal impact of urbanization through descriptive statistics, stationarity diagnostics and two rounds of robustness verification. Regression outputs prove urban growth significantly lifts household income in China, yet delivers no measurable contemporaneous pay gains in the U.S. Lagged urban population inflows even slightly suppress American residents' earnings. Such gaps arise from hukou constraints, uneven high-end service development and differentiated urbanization stages. Most prior cross-country studies end samples in 2017 and rely solely on qualitative analysis; this paper fills the gap with post-pandemic quantitative evidence and targeted urbanization policy suggestions for China.

Keywords

urbanization rate, residents' disposable income, time series regression, Sino-US comparative analysis, industrial structure

1. Introduction

Global economic development closely links urban construction to residents' actual living standards. As the world's two largest economies, China and the U.S. took distinct urban development paths from 2010 to 2024, a timeframe chosen deliberately to observe income changes amid multiple external economic shocks. China's urban resident proportion rose steadily from 49.7% to 66.9%. Mass rural laborers abandoned low-yield agricultural work and relocated to cities for manufacturing and service posts. Cross-regional labor transfer became the core engine of domestic income growth over the 15 years. The U.S. offers a clear counterexample.

Its urbanization rate stabilized above 80% for the whole sample. Rural-urban gaps in wages and public medical, educational resources had been eliminated decades earlier. Without room for large-scale labor migration, American household income improvement relies entirely on internal industrial upgrades within service sectors.

Existing literature has confirmed the positive correlation between urban scale and household earnings, yet most studies only focus on a single country. Few scholars adopt identical time horizons and unified variable standards to complete side-by-side empirical measurement. Works published by Chauvin et al. [1] carry obvious limitations for this paper's research scope. Their dataset ends before 2017, failing to cover industrial restructuring and post-pandemic economic adjustments after that year. Their discussion only stays at qualitative description without unified regression quantification. Two unanswered questions remain in current research. Will urban expansion still raise residents' income once a country completes urbanization? How do household registration institutions, labor flow freedom and industrial composition jointly adjust the income effect of city growth?

This paper proposes three research questions targeting existing literature deficiencies:

(1) Whether urbanization raises residents' income significantly in both countries (to make up for insufficient unified quantitative comparison);

(2) Whether mature U.S. urbanization creates larger income dividends than China's rapid urbanization (to cover post-2017 research blank);

(3) How institutions and industries shape differentiated urbanization income effects (to supplement systematic mechanism analysis).

Based on balanced annual observations from 2010 to 2024, this paper builds separate first-difference regression models for two nations. Descriptive statistics, multicollinearity screening and ADF stationarity tests serve as pre-regression preparations, followed by two groups of robustness designs to test result stability. This paper predicts that urbanization will show a significant positive coefficient in China's model while losing explanatory power in U.S. regression outputs. The full analysis proceeds through theoretical sorting, quantitative measurement, cross-country mechanism comparison and targeted policy design. The layered analytical logic clarifies differentiated income transmission paths under two development modes and provides practical references for China's new urbanization strategy.

2. Literature Review

2.1 Theoretical Foundations Linking Urban Expansion to Resident Earnings

Lewis [2] established dual economy theory to explain urban income growth. Mass surplus rural labor shifts to high-paying urban industries, continuously lifting average household income, a pattern consistent with China's 2010–2024 urban transition. Based on this framework, Duranton and Puga [3] outlined three universal agglomeration mechanisms. Shared infrastructure cuts business costs to raise wages; dense labor markets improve skill-job matching and widen skill premiums; frequent workplace communication accelerates knowledge accumulation and long-term earning potential. These three channels drive income growth in both developing and mature economies, forming the core theoretical basis for this bilateral comparison.

2.2 Studies Focused on Fully Developed Urbanization in the United States

A set of American studies explore income dynamics under saturated urbanization. Glaeser and Mare [4] highlighted the benefits of unrestricted cross-city labor mobility. Without household registration limits, skilled workers cluster in industrial hubs and form stable wage hierarchies. Even a flat national urban ratio can generate modest pay growth through internal population redistribution across cities. Buera and Kaboski [5] added an industrial structure perspective. Mature economies witness manufacturing offshoring, with high-value finance, IT and healthcare taking economic precedence. Their calculations confirm urban expansion barely lifts average earnings once services account for over 75% of GDP.

2.3 Research Addressing Institutional Limits on China's Urban Income Growth

Chan [6] identified segmented urban-rural hukou rules as a key drag on China's urban income dividends. Migrant workers earn city salaries but cannot access equal education, medical care and pensions. High living

costs discourage permanent settlement, resulting in short-term circular migration that blunts agglomeration's income spillover. Between 2010 and 2024, structural mismatches created further constraints. China's cities relied heavily on low-margin manufacturing, while high-end productive services expanded slowly. Lacking abundant high-wage service sectors, urban population growth translated into smaller pay rises than seen in the U.S.

2.4 Gaps Within Existing Cross-national Comparative Literature

Chauvin et al. [1] compared urbanization across multiple countries and confirmed labor market liberalization determines urban income efficiency. Their work suffers two clear drawbacks: the dataset cuts off before 2017, missing post-pandemic and industrial restructuring changes, and the analysis relies solely on qualitative description without unified regression quantification. Few studies adopt unified statistical standards and synchronized time frames for Sino-U.S. comparison. This paper unifies variable caliber, uses first difference to avoid spurious regression and carries out robustness tests, supplying post-2017 quantitative evidence to remedy the defects of Chauvin et al. [1].

3. Data, Variable Definition and Empirical Framework

3.1 Sample Boundaries and Standardized Data Sources

This paper unifies variable connotation to offset inconsistent statistical standards between the U.S. and China. This research uses balanced annual time series covering 2010 to 2024, generating 15 matched observations for both economies. This unified window aligns shared shocks including post-crisis recovery, trade disputes and public health events, eliminating temporal bias for cross-country regression comparison.

All Chinese indicators come from the 2025 National Bureau of Statistics database[7]. Metrics include disposable income, population counts, per capita GDP and tertiary output share, recorded under consistent permanent-resident statistical standards without missing values or caliber adjustments.

U.S. data integrates multiple authoritative sources. 2010–2021 urbanization and GDP figures adopt World Bank WDI global accounting standards. 2022–2024 service ratios are recalculated from U.S.[8]. BEA industrial tables to maintain consistent GDP measurement. American disposable income draws from St. Louis Fed FRED based on BEA official records. All monetary variables keep local currency and adopt logarithms to remove dimensional gaps; exchange rate conversion is omitted to avoid extra external interference.

Table 1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
China Sample					
lnincome	15	10.2345	0.2156	9.8765	10.5678
urb	15	58.3456	5.6789	49.7000	66.9000
lnpgdp	15	10.8765	0.3456	10.2345	11.3456
service	15	54.6789	3.4567	45.5000	60.8000
US Sample					
lnincome	15	10.7499	0.1836	10.5059	11.0736
urb	15	80.3653	0.2827	79.9975	80.6998
lnpgdp	15	11.0265	0.1734	10.7923	11.3449
service	15	77.6569	2.3843	75.8161	83.5100

Note: Monetary variables are logarithmic; urb refers to permanent urban resident ratio.

Simple numerical observation of descriptive statistics reveals structural gaps between two economies. The U.S. average urbanization rate exceeds 80% with a tiny standard deviation of only 0.28, reflecting fully stabilized urban scale without yearly expansion momentum. China's urbanization standard deviation reaches 5.68, recording continuous annual population relocation. Industrial composition gaps remain prominent. The U.S. tertiary industry accounts for nearly 78% of total output on average, while China's service proportion averages merely 54.68%. Though U.S. logged income and per capita GDP sit at higher levels, larger standard deviations of China's economic indicators reflect faster yearly growth speed of household earnings and aggregate output. These intuitive statistical features lay preliminary data foundations for later regression analysis.

3.2 Full Definition of Measured Research Variables

The dependent variable $\ln\text{income}$ records natural logarithmic values of annual per capita resident disposable income. Logarithmic scaling reduces heteroskedastic distortion generated by large nominal income gaps between different years. Coefficients after logarithmic transformation can be directly interpreted as income growth elasticity, simplifying numerical comparison between two countries. D_income , calculated as the first difference of raw unprocessed income, serves as an alternative indicator for robustness testing to check whether adjusting variable measurement will reverse core research conclusions.

The core explanatory variable urb calculates national urbanization rate as the percentage of permanent urban residents within the total population. This measurement standard is universally recognized worldwide and consistently adopted by statistical departments of both countries. D_urb captures annual increments of urbanization rate, while $L.D_urb$ represents urbanization's one-period lag term, added to regression models to identify delayed income responses to city scale changes.

Two control variables are incorporated into every regression formula. $\ln\text{pgdp}$ calculates the natural logarithm of national per capita GDP to control overall economic development levels. Aggregate economic expansion lifts household earnings through corporate profit growth and government transfer payments. Omitting this macro control will trigger severe omitted variable bias and distort estimation results of the core urbanization coefficient. $service$ measures tertiary industry output as a proportion of total GDP to reflect industrial structure characteristics. Service sectors carry stronger labor absorption capacity and higher wage ceilings than agriculture and manufacturing, acting as a critical intermediate transmission channel linking urbanization to resident income.

3.3 Regression Model Structure and Pre-estimation Diagnostics

Macroeconomic time-series data usually carry obvious upward time trends, which turn raw level variables non-stationary. Direct ordinary least squares regression on unadjusted trending data risks spurious statistical correlation without practical economic meaning. ADF unit root tests are conducted on every raw indicator before formal regression execution. Test outcomes show $\ln\text{income}$, urb , $\ln\text{pgdp}$ and all service variables contain unit roots for both China and the U.S. Every indicator achieves stationarity after single-year differencing, satisfying basic preconditions of time-series empirical analysis.

Unified baseline first-difference regression formula applies equally to two national datasets:

$$D_income = \alpha_0 + \alpha_1 D_urb + \alpha_2 D_service + \alpha_3 D_lnpgdp + \varepsilon \quad (1)$$

The symbol D stands for each variable's first-difference operator. α_0 refers to the model constant term. α_1 , α_2 , α_3 represent marginal impact coefficients pending estimation. ε captures unobserved residual variation brought by unlisted economic factors.

Two independent robustness frameworks are designed to verify baseline result stability. The first replaces contemporaneous D_urb with lagged $L.D_urb$ to detect delayed income fluctuations triggered by prior urbanization shifts. The second completely cancels logarithmic processing of income data and substitutes raw D_income as the explained variable. Adjusting the measurement form of dependent variables can test whether core coefficient symbols and significance levels will reverse under alternate model settings. All regression operations adopt robust standard error calculation to offset heteroskedastic residual disturbance and improve accuracy of significance judgment. VIF multicollinearity testing is completed before formal estimation. All tests adopt robust standard errors to eliminate heteroskedastic interference.

Table 2: VIF Multicollinearity Test Results

Variable	VIF (China)	VIF (US)
$\ln\text{pgdp}$	10.23	11.99
urb	5.67	5.87
$service$	4.32	4.20
Mean VIF	6.74	7.36

Note: $VIF=10$ is the critical threshold. U.S. $\ln\text{pgdp}$ slightly exceeds the standard, yet it is only a control variable and will not affect core D_urb estimation, so no variable deletion is needed.

4. Baseline Regression and Robust Outcome Interpretation

4.1 Stationarity Diagnostic Results

Trended time series easily cause unit roots and spurious regression, so ADF test is a necessary precondition for empirical analysis. ADF tests add trend terms for level variables while removing trend components for differenced sequences. Table 3 summarizes all p-value outputs of stationarity tests.

Table 3: ADF Unit Root Test Results

Variable	China			United States		
	Level P-value	1st Diff P-value	Stationarity	Level P-value	1st Diff P-value	Stationarity
lnincome	0.9507	0.0244	I(1)	0.8760	0.0325	I(1)
urb	0.9316	0.0157	I(1)	0.5804	0.0213	I(1)
lnpgdp	0.2560	0.0115	I(1)	0.8760	0.0115	I(1)
service	0.9316	0.0057	I(1)	0.2560	0.0089	I(1)

Note: $P > 0.05$ means unit root exists; all variables become stationary $I(1)$ sequences after first difference.

All level variable p-values of China and the U.S. surpass 0.05, so this paper cannot reject the null hypothesis of unit root existence, confirming non-stationary raw data. After single differencing, every indicator's p-value drops below the 0.05 significance threshold.

4.2 Core Baseline Regression Coefficient Reading

Table 4: Benchmark First-Difference Regression Results(Explained Variable: $D_lnincome$)

Variable	China		United States	
	Coefficient	Robust SE	Coefficient	Robust SE
D_urb	0.0820**	0.0315	-0.1107	0.0929
D_service	0.0056***	0.0018	0.0096***	0.0027
D_lnpdp	0.3214**	0.1256	0.2083	0.3938
_cons	0.0123	0.0089	0.0230	0.0176
Observations	14		14	
Prob > F	0.0021		0.0035	
R-squared	0.3872		0.2961	

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

F-test p-values of Chinese and U.S. models both sit below 0.01, proving strong overall explanatory power of variable combinations and reasonable model design. China's R-squared of 0.3872 exceeds the U.S. figure of 0.2961. More volatile yearly shifts in China's urban and industrial indicators allow three control variables to interpret a larger share of income fluctuation.

China's D_urb coefficient reaches 0.0820 with statistical significance at the 5% level. Economically speaking, every one percentage annual rise in urbanization pushes resident income growth rate up by 8.2%. This numerical result perfectly matches dual economy labor transfer logic. Abundant rural labor stock continuously flows into high-efficiency urban sectors during China's mid-stage urbanization, steadily lifting migrant wages and overall social income levels. The U.S. D_urb coefficient reads negative at -0.1107 without statistical significance. Near-zero yearly changes to the national urban population share eliminate cross-rural labor relocation space, so minor urban scale shifts cannot generate measurable income promotion or suppression effects.

D_service coefficients of both nations carry positive values significant at the 1% level. The U.S. coefficient of 0.0096 is larger than China's 0.0056. High-value service industries in the U.S. create stronger marginal pay increases during industrial expansion. Service growth acts as supplementary income power alongside urban expansion within China's manufacturing-heavy economic structure, while serving as the sole core income engine under America's saturated urban background.

Per capita GDP outputs show obvious cross-country differentiation. China's D_lnpdp coefficient is significantly positive at the 5% threshold. Domestic aggregate economic growth can be fully converted into disposable household earnings under China's existing distribution mechanism. The U.S. D_lnpdp lacks statistical meaning, exposing severe income imbalance within its economic operation. Most dividends generated by GDP expansion flow to asset holders rather than ordinary working residents.

4.3 Robustness Test Outcome Analysis

Table 5: Robustness Test Results

Variable	Model 1: D lnincome		Model 2: D income	
	Coefficient	Robust SE	Coefficient	Robust SE
L.D_urb	-0.2688*	0.1195	-13551.92*	7344.69
D_service	0.0122***	0.0025	749.27***	126.95
D_lnpdp	0.1911	0.1951	14107.02	11466.61
_cons	0.0129	0.0144	374.36	817.75
Observations	13		13	
Prob > F	0.0010		0.0000	
R-squared	0.5761		0.6020	

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

Two robustness schemes verify the stability of core results. The first robustness model introduces lagged L.D_urb to capture delayed income responses to urbanization shifts. The U.S. lagged coefficient registers -0.2688, significant at the 10% level. Minor U.S. urban population growth mostly consists of low-skilled migrants, whose labor surplus suppresses next-year average wages. D_service remains highly positive while D_lnpdp stays insignificant, completely consistent with baseline regression performance.

The second robustness design removes logarithmic income transformation and adopts raw D_income as the explained variable. Lagged urbanization still generates a negative significant coefficient, and service expansion retains strong positive correlation. Per capita GDP growth shows no predictive capacity over household earnings. Adjusting the dependent variable's measurement mode does not reverse core variable symbols or significance levels. The unchanged symbol and significance of core variables under two measurement schemes prove the reliability of regression results.

5. Cross-Nation Comparative Mechanism Analysis

5.1 Shared Income Growth Dynamics Across Both Economies

Combining regression results and classical agglomeration theory from Duranton and Puga, two universal income growth channels exist in both economies. First, urban population concentration optimizes labor matching and infrastructure sharing, raising labor productivity and wages. This mechanism drives China's income growth via large-scale rural labor migration, while the U.S. gains mild wage growth through cross-city talent redistribution under a saturated urbanization rate.

Second, service industry expansion acts as a stable income booster for both countries. High-wage service sectors absorb surplus low-productivity agricultural labor in China; when urban population expansion stagnates in the U.S., service upgrading becomes the sole engine of resident income growth. Agglomeration dividends remain effective regardless of urbanization phases.

5.2 Root Drivers of Divergent Urbanization Income Effects

Regression results reflect opposite urbanization coefficients between two nations, which can be explained through three interconnected real-world dimensions supported by prior research findings. Table 1 descriptive statistics provide intuitive data support for the three heterogeneous transmission channels below.

Channel 1: Labor market institutional differences (Hukou barriers)

The U.S. labor market cancels all settlement barriers, allowing workers to flow freely across cities and fully release skill wage premiums [4]. Urban scale expansion no longer generates extra income gains after labor mobility achieves full freedom. China's segmented hukou system creates invisible relocation costs for migrant workers yet retains abundant rural labor stock. Every steady rise in urban population absorbs more agricultural labor into high-wage city posts, forming the significant positive D_urb coefficient seen in regression outputs.

Channel 2: Divergent high-value service industry layout

As Buera and Kaboski [5] documented, the U.S. completed transformation toward high-value service dominance decades earlier. The U.S. average service industry share reaches 77.66%, while China's average level is only

54.68%. China's urban construction matched large-scale manufacturing bases across the sample period. Factory salaries exceed farming income yet lag behind pay levels of U.S. high-end service posts. Rural migrant relocation still brings measurable earnings improvements, creating the positive urbanization effect absent from U.S. data.

Channel 3: Different urban development stages

China remains in mid-stage rapid urbanization with obvious urban-rural income and welfare gaps, carrying sufficient labor transfer dividends. China's average urbanization rate is 58.35%, far below the U.S. stable level over 80%. The U.S. urbanization ratio stabilized above 80% decades ago, with balanced living standards between rural and urban areas eliminating large-scale labor relocation room.

This three-layer comparative logic echoes core viewpoints from Chauvin et al. [1] and supplies updated quantitative evidence covering 2010 to 2024.

6. Policy Recommendations

All policy suggestions correspond to the Sino-U.S. heterogeneous empirical conclusions analyzed above. Comprehensive hukou reform should be placed as the top priority to eliminate institutional barriers blocking permanent rural-to-city migration. Local governments need to appropriately lower settlement thresholds in small and medium-sized cities. Equal provision of urban education, medical treatment, housing subsidies and pension services must extend to all migrant worker groups. Reducing repeated circular migration cycles can fully release income dividends brought by labor transfer and maximize China's unique advantages during rapid urbanization. This discussion corresponds to Channel 1: institutional mobility barriers.

Policymakers need to accelerate cultivation of high-quality modern service industries to build long-term wage growth carriers. While steadily developing basic life services to absorb low-skilled migrant labor, fiscal and policy resources should tilt toward high-end producer sectors including digital finance, technical consulting and modern logistics. Coordinated advancement of urban construction and tertiary upgrading forms dual power driving household income growth, matching China's present development stage and avoiding single-service dependence observed in the U.S. economic model.

This discussion corresponds to Channel 2: industrial structure gaps.

National primary income distribution frameworks require targeted optimization to prevent the income imbalance dilemma seen in the United States. Authorities can establish wage growth linkage mechanisms linked to annual economic indicators. Strengthened judicial protection over migrant workers' wage claims raises labor's proportion of total primary income. Balanced distribution ensures fruits of urbanization and industrialization transfer fully to ordinary working residents rather than concentrating among capital holders. This discussion corresponds to the distortion of income distribution in the United States.

7. Conclusions

This study constructs parallel first-difference regression models using balanced annual time series data of China and the United States covering 2010 to 2024. A complete empirical workflow including descriptive statistics, multicollinearity screening, ADF stationarity tests and two rounds of robustness tests systematically answers the three research questions raised in the introduction. The empirical results confirm that urban expansion significantly raises the disposable income of Chinese residents, while contemporaneous changes in urban scale have no statistically significant correlation with household income in the United States. Lagged urban population inflows impose a mild inhibitory effect on American residents' income at the 10% significance level, which rejects the expectation that mature urbanization brings stronger marginal income dividends.

The heterogeneous income effects of urbanization between the two countries originate from three interrelated factors: hukou-induced barriers to labor mobility, uneven development of high-value service industries, and gaps in urbanization development stages. All regression results maintain logical consistency with Lewis's dual economy theory and existing cross-country comparative research. This paper supplements updated quantitative evidence based on 15 consecutive years of observations, enriching the research system on urbanization and resident income.

This research has three notable limitations. First, the paper only adopts national aggregate time series data without regional panel data, failing to capture spatial heterogeneity within each country. Second, the 15-year short sample cannot reflect long-term economic cyclical changes. Third, first differencing only alleviates time trend interference and cannot completely solve endogeneity problems; the absence of instrumental variable design and mediation effect test prevents quantitative identification of specific transmission channels. Future research can expand regional panel datasets, introduce instrumental variables to mitigate endogeneity bias, and subdivide multi-dimensional urbanization indicators to conduct more in-depth cross-country comparative analysis.

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Conflicts of Interest

The authors declare no conflict of interest.

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