Available Online: 17 November 2026 DOI: 10.54254/2977-5701/2026.39144

Promotion incentives for local officials and high quality urban economic development

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Abstract. Promotion incentives influence local policy choices, but their relationship with multidimensional urban development remains insufficiently understood. Using 3,552 city-year observations for 296 Chinese cities during 2012-2023, this study constructs a promotion incentive index from relative growth, fiscal surplus, and employment performance. High-quality development is measured across innovation, coordination, openness, green development, and shared development. Two-way fixed-effects estimates yield a positive coefficient of 0.0705, significant at the 1% level. This association persists under alternative outcome measures, samples, and controls. Government policy attention, firm entry, and factor allocation efficiency are positively associated with promotion incentives, consistent with the proposed channels. Positive estimates also appear across regional and temporal subsamples and all five development dimensions. City-level wild bootstrap tests support two development thresholds, with the incremental second-threshold test significant at 5%. The incentive coefficients decline from 0.0979 to 0.0676 and 0.0461 across increasing income regimes. These findings indicate that the relationship between promotion incentives and urban development quality varies with cities' economic development levels.

Keywords: promotion incentives, high-quality development, government policy attention, firm entry, economic development

1. Introduction

High-quality urban economic development requires innovation and efficient resource allocation alongside structural upgrading, openness, environmental improvement, and better living standards. These objectives often involve long investment horizons, delayed benefits, and coordination across government departments. Local officials face relative performance assessments of growth, fiscal balances, and employment while also providing public services and supporting long-term development. Whether promotion competition encourages better governance or short-term resource mobilization therefore matters for the quality of urban growth.

Promotion tournament theory links officials' relative performance to policy choices and resource allocation [1, 2]. Previous studies examine city commercial bank lending [3] and corporate technological innovation [4]. However, similar competitive pressures can produce different policy responses. Governments may improve business conditions and administrative coordination, or pursue investment expansion through administrative

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allocation. Evidence on individual outcomes cannot establish whether these incentives are associated with broader improvements in development quality.

Existing multidimensional assessment frameworks [5] and studies of urban governance [6] provide a basis for examining this question. Less is known about the joint roles of policy attention, firm entry, and factor allocation, or how the relationship varies with development stages. This study uses a city panel for 2012-2023 to examine these channels and estimate income-dependent thresholds. Regional, temporal, and dimension-specific analyses assess the scope of the central relationship.

2. Theoretical analysis and hypotheses

2.1. Direct relationship

When growth, fiscal, or employment performance falls behind comparable cities, officials have stronger incentives to improve their rankings. Local leaders can coordinate infrastructure, industrial services, and administrative reform through agenda setting and implementation oversight. Better public services and market institutions may reduce business costs and improve the conditions for investment and innovation. Environmental governance can also reduce external costs associated with production [7].

These benefits are conditional on how officials respond to competitive pressure. Investment expansion and administrative intervention can intensify short-term behavior and misallocation. The expected positive relationship therefore rests on converting performance incentives into institutional improvements and more effective governance.

Hypothesis 1. Promotion incentives for local officials promote high-quality urban economic development.

2.2. Potential channels

Government policy attention determines which objectives receive scarce fiscal resources, administrative capacity, and implementation effort. Promotion pressure may increase attention to innovation, green transformation, and public services. Translating these priorities into budgets, departmental responsibilities, and monitoring may improve the use of public resources.

Firm entry can strengthen competition, technological diffusion, and industrial renewal [8-10]. Officials seeking better relative performance may simplify business registration, improve financing services, and reduce administrative entry barriers [11]. New firms expand employment and output while encouraging incumbent firms to upgrade through competition and knowledge spillovers.

Factor allocation provides a third channel. Differences in the marginal products of capital and labor create scope for productivity gains through reallocation [12]. Promotion incentives may encourage governments to reduce inefficient projects, administrative fragmentation, and barriers to factor mobility. Movement toward more productive firms and sectors can improve allocation efficiency and support innovation and green development.

Hypothesis 2. Promotion incentives promote high-quality development through greater government policy attention, stronger firm entry, and higher factor allocation efficiency.

2.3. Development thresholds

Less developed cities have greater scope to improve transport infrastructure, basic services, and market institutions. Administrative coordination and public investment may therefore relieve substantial constraints on business activity. At higher development levels, growth depends more on technological progress,

knowledge accumulation, and institutional quality. The marginal benefits of infrastructure expansion and administrative resource mobilization may consequently diminish.

Hypothesis 3. The positive relationship between promotion incentives and high-quality development weakens as economic development crosses successive thresholds.

3. Research design

3.1. Empirical specifications

The baseline specification includes city and year fixed effects (Equation (1)):

$$HQD_{it} = \alpha_0 + \alpha_1 PS_{it} + \gamma' X_{it} + \mu_i + \lambda_t + \varepsilon_{it} \tag{1}$$

HQD is the development quality index, PS is the promotion incentive index, and X contains city-level controls. Subscripts i and t denote cities and years. City effects capture time-invariant characteristics, and year effects capture common annual shocks. The coefficient on PS measures the conditional within-city association with HQD.

Each potential channel M is examined separately using (Equation (2)):

$$M_{it} = \beta_0 + \beta_1 PS_{it} + \beta' X_{it} + \mu_i + \lambda_t + \upsilon_{it} \tag{2}$$

$$HQD_{it} = \delta_0 + \delta_1 PS_{it} + \delta_2 M_{it} + \delta' X_{it} + \mu_i + \lambda_t + \xi_{it} \tag{3}$$

Equation (2) relates promotion incentives to the channel variable. Equation (3) adds that variable to the development equation. These specifications assess patterns consistent with the proposed channels rather than independently identifying causal mediation.

Following the panel threshold framework [13], the double-threshold specification is (Equation (3)):

$$\begin{aligned} HQD_{it} = \theta_0 + PS_{it}[\theta_1 I(q_{it} \le \kappa_1) + \theta_2 I(\kappa_1 < q_{it} \le \kappa_2) + \theta_3 I(q_{it} > \kappa_2)] \\ +\theta' X_{it} + \mu_i + \lambda_t + \varepsilon_{it} \end{aligned} \tag{4}$$

The threshold variable q is the natural logarithm of real GDP per capita (lnPGDP). The parameters κ_1 and κ_2 divide the sample into three regimes, and the author denotes an indicator function. The model also controls for the linear term in lnPGDP. Threshold tests use an 81-point search grid, 10% trimming, and 500 city-level wild bootstrap replications.

3.2. Variables and measurement

The HQD index combines direction-adjusted, standardized indicators using entropy weights. Innovation comprises invention patents granted per 10,000 residents and technology contract turnover relative to GDP. Coordination comprises the tertiary-to-secondary value-added ratio, the employment-output Theil index across three industries, and the urban-rural disposable income ratio. The latter two indicators enter negatively. Openness comprises international tourism foreign exchange receipts relative to GDP and inbound visitors relative to the resident population.

Green development includes three negative indicators: industrial wastewater, sulfur dioxide, and smoke or dust emissions per unit of industrial value added. Positive indicators are industrial solid waste utilization, centralized sewage treatment, and harmless domestic waste treatment rates. Shared development comprises real average wages of employees in urban units, green coverage in built-up areas, and retail sales relative to GDP. These indicators provide a multidimensional measure rather than a growth-rate proxy.

PS sums three binary measures of relative performance pressure and ranges from zero to three. Ordinary prefecture-level cities are compared within their province; the 15 subprovincial cities and four municipalities form separate peer groups. Growth pressure equals one when local GDP growth is below the GDP-weighted peer mean. Fiscal surplus is budget revenue minus expenditure, divided by revenue; pressure equals one below the weighted peer mean. Employment pressure equals one when the registered unemployment ratio exceeds the peer mean. Its denominator comprises employees in work units, private and individual employment, and registered unemployed persons. Higher PS represents stronger relative performance pressure.

Controls include lnPGDP, the resident Urbanization rate (Urban), Log Population Density (lnDensity), and Road area per capita (Road). They also include broadband subscriptions per 100 residents (Internet) and land conveyance revenue relative to budget revenue (LandFin). Policy attention (AttHQ) is the share of words concerning high-quality development, innovation-driven development, and green transformation in government work reports. Firm entry (Enter) is the logarithm of one plus newly registered firms per 10,000 residents. Allocation efficiency (AllocEff) equals one minus the standardized capital and labor misallocation index.

3.3. Data and descriptive statistics

The balanced panel covers 296 Chinese cities during 2012-2023, yielding 3,552 observations. Economic and population data come primarily from the *China City Statistical Yearbook* and city statistical bulletins. Urban construction, environmental, and fiscal measures draw on the corresponding national yearbooks. Patent, technology, and tourism measures also use city bulletins and specialized statistical sources. Government work reports and business registration records provide policy attention and firm entry measures. Continuous variables are winsorized at the first and 99th percentiles. Local statistical sources are consulted to check definitions where control series contain intermittent gaps. Table 1 summarizes the main variables.

Table 1. Descriptive statistics

Variable	Mean	SD	Minimum	Maximum
HQD	0.2036	0.1503	0.0000	1.0000
PS	1.5428	0.8999	0.0000	3.0000
lnPGDP	10.6610	0.5191	9.4523	11.8869
Urban	0.5722	0.1498	0.2503	0.9529
lnDensity	5.6136	1.1618	1.4529	8.1193
Road	19.0690	7.5335	4.9877	42.2100
Internet	27.1886	13.6849	5.1600	72.3077
LandFin	0.6641	0.4986	0.0495	2.3262
AttHQ	0.0829	0.0803	0.0000	0.3359
Enter	4.8020	0.5193	3.6484	6.1264
AllocEff	0.8873	0.0889	0.3387	1.0000

Note: N = 3,552 for every variable; 296 cities, 2012-2023. SD denotes standard deviation.

4. Empirical results

4.1. Baseline estimates

Table 2 compares pooled Ordinary Least Squares (OLS) with two-way fixed-effects models. PS is positive and significant at 1% in all four specifications. In the preferred model, column (4), a one-unit increase in PS is associated with a 0.0705 increase in HQD. This equals approximately 34.6% of the sample mean, 0.2036. Urbanization is positively associated with HQD, whereas population density has a negative coefficient. Both are significant at 5%, consistent with potential public-service economies and congestion constraints, respectively.

Table 2. Baseline estimates of urban development quality

Variable	(1) OLS	(2) FE	(3) OLS	(4) FE
PS	0.0240***	0.0713***	0.0404***	0.0705***
	(0.0065)	(0.0070)	(0.0056)	(0.0070)
lnPGDP	-	-	0.0278**	-0.0135
			(0.0138)	(0.0203)
Urban	-	-	0.1843***	0.1875**
			(0.0496)	(0.0812)
lnDensity	-	-	0.0108**	-0.0904**
			(0.0051)	(0.0438)
Road	-	-	-0.0008	0.0000
			(0.0007)	(0.0008)
Internet	-	-	0.0003	0.0003
			(0.0003)	(0.0004)
LandFin	-	-	0.0122	0.0129
			(0.0100)	(0.0098)
Constant	0.1666***	0.0936***	-0.3226**	0.6228**
	(0.0120)	(0.0108)	(0.1279)	(0.3152)
R^2	0.0207	0.4556	0.1158	0.4597

Note: City and year Fixed Effects (FE) enter (2) and (4); controls enter (3) and (4). All columns use 3,552 observations from 296 cities. City-clustered standard errors appear in parentheses. *, **, and *** denote significance at 10%, 5%, and 1%, respectively.

4.2. Robustness and instrumental variable estimates

The positive association persists with a Principal Component analysis (PCA) outcome index, exclusion of the four municipalities, and alternative controls (Table 3). The PCA index has a different scale, so its coefficient is not directly comparable with the baseline estimate. The other estimates remain close to the preferred specification.

Table 3. Robustness checks and subgroup estimates

Specification or group	PS coefficient	*N*	Cities	R^2
PCA outcome	0.3035*** (0.0413)	3,552	296	0.8463
Municipalities excluded	0.0711*** (0.0071)	3,504	292	0.4422
Alternative controls	0.0708*** (0.0070)	3,552	296	0.4584
Eastern cities	0.0593*** (0.0113)	1,044	87	0.5254
Other cities	0.0741*** (0.0087)	2,508	209	0.3996
2012-2019	0.0727*** (0.0086)	2,368	296	0.5895
2020-2023	0.0623*** (0.0115)	1,184	296	0.5521

Note: All models include city and year fixed effects and controls. Alternative controls retain Urban and Road and replace the other controls with GDP volatility, population flows, resource dependence, and debt burden. Other cities include northeastern cities. City-clustered standard errors are in parentheses; *** denotes significance at 1%.

Two-stage least squares uses year-end mobile telephone subscriptions, measured in 10,000 subscriptions, as an instrument. The first-stage coefficient is 0.00139445 (city-clustered standard error 0.00005466), with a Kleibergen-Paap rk Wald F statistic of 651.1354. The second-stage PS coefficient is 0.241364 (0.015780), significant at 1%, using 3,552 observations. The model is exactly identified. Instrument relevance does not by itself establish exclusion, so this estimate remains conditional on the instrument affecting HQD only through PS.

4.3. Regional and temporal subsamples

The subgroup estimates in Table 3 are positive and significant at 1%. Coefficients are 0.0593 for eastern cities and 0.0741 elsewhere, including northeastern cities. Estimates for 2012-2019 and 2020-2023 are 0.0727 and 0.0623. These point estimates describe variation across subsamples; they do not constitute formal tests of differences between coefficients.

4.4. Evidence on potential channels

Table 4 reports the channel regressions. PS is positively associated with policy attention, firm entry, and allocation efficiency. Each channel variable also has a positive coefficient when entered separately in the HQD equation. The corresponding PS coefficients decline relative to the baseline while remaining positive. These patterns are consistent with the theoretical channels, although contemporaneous channel regressions do not establish their causal ordering.

Table 4. Estimates for the three potential channels

Channel M	PS inM model	PS inHQD model	M inHQD model	R^2 M / HQD
AttHQ	0.0133***	0.0619***	0.6453***	0.6464 /0.5017
	(0.0021)	(0.0059)	(0.0664)	
Enter	0.0859***	0.0565***	0.1629***	0.7687 /0.5329
	(0.0121)	(0.0052)	(0.0150)	
AllocEff	0.0140***	0.0607***	0.6955***	0.8112 /0.4916
	(0.0026)	(0.0062)	(0.0778)	

Note: Each channel is entered separately. All six models include controls and city and year fixed effects; N = 3,552. City-clustered standard errors are in parentheses; *** denotes significance at 1%.

4.5. Economic development thresholds

The no-threshold versus single-threshold test yields F = 73.603507 and a wild bootstrap p value of 0.001996. Adding a second threshold yields F = 25.320833 and p = 0.047904. The latter test supports the additional threshold at 5%. Estimated cutoffs in lnPGDP are 10.453922 and 10.857602. The PS coefficient declines across the three regimes, from 0.0979 to 0.0676 and 0.0461 (Table 5). All three are significant at 1%, consistent with a diminishing association at higher development levels.

Table 5. Development regimes and threshold estimates

Development regime	PS coefficient	t statistic
lnPGDP ≤ 10.453922	0.0979***	10.333
10.453922 < lnPGDP ≤ 10.857602	0.0676***	9.403
lnPGDP > 10.857602	0.0461***	6.291

Note: N = 3,552; 296 cities; R^2 = 0.4758. Controls, city and year fixed effects, and the linear lnPGDP term are included. Constant = 0.0855 (t = 0.283). t statistics use city-clustered standard errors. Threshold tests use 500 city-level wild bootstrap replications; *** denotes significance at 1%.

4.6. Development dimensions

Table 6 reports positive PS coefficients for innovation, coordination, openness, green development, and shared development. All are significant at 1%. The association therefore appears across the five component indices, rather than only in the aggregate outcome.

Table 6. Estimates across development dimensions

Dimension	PS coefficient	R^2
Innovation	0.0260***	0.8839
	(0.0032)	
Coordination	0.0215***	0.8607
	(0.0026)	
Openness	0.0243***	0.6901
	(0.0036)	
Green development	0.0204***	0.7504
	(0.0033)	
Shared development	0.0228***	0.8577
	(0.0025)	

Note: All models include controls and city and year fixed effects; N = 3,552. City-clustered standard errors are in parentheses; *** denotes significance at 1%. Each index uses its corresponding standardized indicators.

5. Conclusion and policy implication

Promotion incentives are positively associated with multidimensional development quality in the 296-city panel. The association survives alternative measures, samples, and controls and is consistent with government attention, firm entry, and allocation efficiency channels. Threshold estimates indicate that its magnitude diminishes with economic development. The findings concern relative performance pressure as a proxy for incentives; causal interpretation remains subject to the identification assumptions.

Performance assessment can therefore give greater weight to innovation, industrial upgrading, environmental governance, public services, and employment quality alongside economic growth. Continuity across assessment years and official terms is particularly relevant for projects with delayed returns. Aligning incentives with budgets, departmental responsibilities, and market reforms may strengthen implementation. Reducing entry costs and barriers to factor mobility can support firm entry and reallocation. In less developed cities, basic public services and market institutions warrant particular attention, given the greater scope for improvement identified by the threshold results.

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