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CAPTURING THE UNEARNED CITY: AN EVIDENCE BASED FRAMEWORK FOR LAND VALUE CAPTURE AROUND METRO CORRIDORS IN INDIA

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ABSTRACT

India's urban infrastructure financing problem is usually framed as a shortage of debt, grants, budgetary transfers or private investment. This paper approaches the issue from a different public finance perspective by examining land value capture as a nonconventional but institutionally relevant financing mechanism for Indian cities. Land value capture is based on the principle that when public investment in infrastructure increases private land and property values, a part of the publicly created and privately appropriated gain may be recovered by the public authority and reinvested in urban infrastructure. Metro rail corridors provide a particularly suitable setting for such an analysis because station accessibility can alter land values, redevelopment incentives, commercial intensity and municipal revenue potential within defined influence zones. Focusing on the post 2017 policy context in India, after the adoption of the Value Capture Finance Policy Framework, National Transit Oriented Development Policy and Metro Rail Policy, this paper develops an evidence based methodological framework for estimating land value gains around metro corridors. The proposed design uses a quasi-experimental difference-indifferences and event study approach to compare property value and municipal revenue changes in station influence zones with comparable non-station areas before and after metro opening. The article does not provide unsubstantiated estimates. Instead, it specifies the required variables, spatial units, treatment control structure, empirical equations, identification assumptions, robustness checks and policy translation logic. It claims that land value capture cannot be seen as an arbitrary extra tax but rather as a proportional recovery of quantifiable publicly created value. The paper concludes that Indian cities need an evidence based land value capture model where charges are pegged on the observed land value gains, backed by GIS based valuation systems, clear revenue utilization and equity protection of tenants, small businesses and low income households.

KEYWORDS: Land value capture, metro rail, value capture finance, transit oriented development, urban infrastructure finance, difference-indifferences, event study, India.

1. INTRODUCTION

There is a chronic infrastructure financing gap in Indian cities. Long term capital is needed in Metro

rail, arterial roads, drainage, water supply, sewerage, affordable housing, public spaces and climate resilient urban assets, whereas the traditional financing base of most urban local bodies is limited. The instruments required are grants, state transfers, bank borrowing, public private partnerships and municipal bonds, but not only these. Sustainable urban finance strategy must have mechanisms that relate infrastructure investment to the economic value it generates. Such a mechanism is offered by land value capture. It has a simple logic. Accessibility, service quality, connectivity and development potential are enhanced by public infrastructure. These can enhance the surrounding land values, property prices, rental values and redevelopment opportunities. When the increase in value is generated through a largescale effort by the government, and not through the individual work of the landowner, then this is an unearned increment. Land value capture enables a local government to take a portion of this increment and reuse it in the provision of infrastructure.

This paper examines at land value capture in India around metro rail corridors. Metro systems are analytically convenient due to the fact that the stations produce distinct spatial influence areas. The proximity of the property to a station can be an advantage with a reduced travel time, greater access to employment centers, and more foot traffic and redevelopment opportunities. Meanwhile, the impact is not automatic and homogenous. The land value effect of a station in a high density commercial node can be different to that of a station in a low density or poorly connected location. Similarly, the gains may vary between residential and commercial parcels, between owner occupied and rental properties, and between formal and informal settlements.

The paper's central argument is that land value capture in India should move from assumption-based charging to evidence based charging. Many Indian cities use or discuss instruments such as betterment levies, development charges, premium FSI/FAR, impact fees, land pooling, transferable development rights and transit oriented development charges. However, these instruments often operate without a transparent empirical estimate of the value increment caused by public infrastructure. This weakens fiscal efficiency as well as public legitimacy. If charges are too low, cities fail to recover public value. If they are too high or poorly targeted, they may appear arbitrary and politically unacceptable.

The contribution of this paper is methodological and policy oriented. Instead of claiming that metro corridors necessarily raise land values, the paper proposes a quasi-experimental framework to test whether such gains are measurable, where they occur, when they occur and how they may be translated into a fair value capture design. The proposed framework uses difference indifferences and event study models to compare station influence zones with comparable control areas before and after metro opening. The design also incorporates buffer sensitivity, pretend testing, matching, zoning controls and social safeguard indicators.

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The paper is organized into six sections. After the introduction, Section 2 presents the conceptual and literature background. Section 3 develops the data and methodological framework. Section 4 explains how measured land value gains can be translated into value capture instruments. Section 5 discusses political economy, equity and implementation challenges in India. Section 6 concludes with policy implications and limitations.

2. CONCEPTUAL AND LITERATURE FRAMEWORK

Land value capture is grounded in the distinction between privately created value and publicly created value. When a landowner enhances a building by making a personal investment, the resultant profit can be considered a personal profit. When land value increases due to the construction of a metro station by a government agency, improvement of road access, zoning or trunk infrastructure, at least part of the growth is produced by the state. The process of recovering a part of this publicly created value to be used by the people is called land value capture.

George (1879) believed that land rent increases not only because of the individual effort but because of the social progress and development of the community. In modern urban finance literature, this principle is used in the context of infrastructure finance, particularly where cities require substantial capital spending but have poor own source revenues. Peterson (2009) demonstrated that urban infrastructure finance can be supported by land values in the presence of clear land rights, transparent valuation systems and credible institutions. Suzuki et al. (2015) associated land value based financing with transit oriented development and proved its applicability to urban transport systems. Alterman (2012) has pointed out that value capture is largely dependent on legal design and institutional capacity.

Land value capture is appealing in the context of urban finance in developing countries since it is a payment capacity infrastructure benefit nexus. Nonetheless, it is also administratively and politically challenging as demonstrated in the literature. It needs new land registers, realistic valuation, enforceable property tax, interagency coordination, and visible reinvestment of revenues. Such instruments were found by Bahl and Linn (1992) in the larger context of urban public finance in developing countries, where the demands of expenditure tend to outweigh the fiscal power and administrative capacity of local governments.

Land value capture was explicitly addressed in policy in the Indian context following the Value Capture Finance Policy Framework, National Transit Oriented Development Policy and Metro Rail Policy of the Government of India in 2017. These policy documents established a more solid foundation of the connection between infrastructure provision, land use planning and urban finance. Some of the related instruments are already in use in Indian cities, such as betterment charges,

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development charges, premium FSI/FAR, land pooling, transferable development rights and transit oriented development fees. It is not the lack of instruments, but the lack of systematic measurement and clear calibration.

Metro corridors are of special interest as they involve a combination of public investment, change of accessibility and land market reaction. Hedonic pricing, spatial econometric models and quasi-experimental techniques are widely used in international studies of transport accessibility and property values. The overall conclusion of the literature is that transit effects are nonhomogeneous. Accessibility may increase the value of land, but the extent varies depending on land use, proximity to station, quality of service, zoning, neighborhood conditions and local market forces. Thus, the presence of a metro station cannot be considered a sufficient reason to have a consistent value capture charge. The increment has to be estimated. The economic logic can be expressed simply. Let (V_{it}) denote the assessed or market value of land or property in spatial unit (i) at time (t). The observed change in value is:

$$\Delta V_{it} = V_{it} - V_{i,t-1}$$

However, not all of (ΔV_{it}) can be attributed to metro investment. The value of property can increase due to inflation in the city, macroeconomic development, redevelopment by individuals, change in zoning or demand in the neighborhood. The incremental gain attributable to public action is the relevant value to land value capture:

$$\Delta V_{it}^{public} = \Delta V_{it}^{treated} - \Delta V_{it}^{counterfactual}$$

Where $(\Delta V_{it}^{counterfactual})$ is the change that would have occurred in the absence of the metro intervention. The main empirical problem is to credibly estimate this counterfactual.
The potential value capture amount may be expressed as:

$$LVC_{it} = \tau \times \max\left(\Delta V_{it}^{public}, 0\right)$$

Where (LVC_{it}) is the value capture amount for unit (i) in period (t), and (τ) is the policy determined capture rate. This expression is not a recommendation for a uniform rate. It merely explains that a fair value capture charge must be associated with a positive measured increment and must not be charged where no measurable benefit is present.

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Table 1: Land Value Capture Instruments and Analytical Requirements

Instrument	Revenue base	Economic logic	Data required for defensible use	Main caution
Betterment levy	Benefited properties	Recovery of part of land value gain due to public infrastructure	Pre and post project property values, station distance, ownership records	May appear arbitrary if benefit is not measured
Development charge	New development or redevelopment	Developers contribute to infrastructure burden created by development	Building permissions, land use, project size, infrastructure cost	May increase project cost if poorly calibrated
Impact fee	High growth development areas	Charge linked to additional infrastructure demand	Development intensity, infrastructure capacity, local service deficit	Requires clear cost benefit linkage
Premium FSI/FAR	Additional building rights	Public authority monetizes higher permitted density	Base FSI, premium FSI used, zone level development demand	Can favor high end redevelopment if safeguards are absent
Land pooling	Land contribution and redistribution	Landowners share land for infrastructure and receive serviced plots	Land ownership, plot size, infrastructure layout, redistribution formula	Requires strong land records and consent based implementation
Tax increment financing	Future increase in tax revenue	Incremental municipal revenue supports infrastructure finance	Baseline tax revenue, post project tax increment, defined district	Risky if revenue projections are weak
Transferable development rights	Development rights	Compensation or planning tool	Sending and receiving zones,	Can distort receiving area

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		without direct cash payment	development right valuation	density if unplanned

The analytical gap in India lies between policy recognition and empirical calibration. Existing policy frameworks support the idea of value capture, but city level implementation often lacks a transparent estimate of the benefit zone, timing of gain, beneficiary group and revenue potential. This paper addresses that gap by proposing a research design that treats land value capture as an empirical question before it becomes a fiscal instrument.

3. DATA AND METHODOLOGICAL FRAMEWORK

This paper is designed as a methodological policy study. It does not fabricate coefficients, price effects or revenue estimates. Instead, it specifies a replicable empirical framework that can be implemented with publicly available or administratively obtainable data from Indian cities. The proposed design is suitable for metro corridors opened or expanded after the 2017 policy framework, although the same structure can be adapted to other infrastructure projects.

The preferred unit of analysis is a small spatial unit such as a property parcel, building permission plot, ward subzone, census enumeration block, polling booth area or uniform GIS grid cell. A smaller unit is analytically preferable because metro effects are spatially concentrated and may weaken with distance. However, the final unit depends on data availability. If parcel level transaction data are not available, ward level or zone level data may be used with appropriate caution.

The treatment group consists of spatial units located within a defined metro station influence zone. Common influence zones may include 0–500 meters, 500–800 meters and 800 meters–2 kilometers from a station. The control group consists of comparable areas that are not within the immediate station influence zone but are similar in pre-project characteristics. Control areas may include locations farther from the station, locations near planned but not yet opened stations, or comparable corridors without metro access during the study period. The study period must include both preopening and post opening years. If a corridor opens in year (T_0), the data should ideally cover several years before and after (T_0). This permits trend comparison and allows the researcher to distinguish between preexisting property market growth, anticipation effects, construction period disruption and post opening accessibility effects.

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Table 2: Proposed Variables, Measurement and Use in the Study

Variable group	Variable notation	Possible measure	Expected use in empirical design	Possible source
Property value	$(V_{\{it\}})$	Registered sale value, ready reckoner value, circle rate, assessed value	Main outcome for estimating land value change	State registration and valuation departments
Municipal revenue	$(R_{\{it\}})$	Property tax, development charge, premium FSI/FAR revenue	Fiscal outcome for estimating revenue response	Municipal budgets and ward records
Built environment	$(B_{\{it\}})$	Building permits, redevelopment permissions, FSI consumed	Measures development response to metro accessibility	Municipal planning department
Transit access	(D_i)	Distance to nearest metro station; station buffer category	Defines treatment intensity	Metro rail corporation, GIS layers
Treatment timing	$(Post_{\{it\}})$	Indicator for post opening period	Identifies before after exposure	Metro opening dates
Local controls	$(X_{\{it\}})$	Density, land use, road access, distance from CBD, ward type	Controls for observable local characteristics	Census, city plans, GIS data
Economic activity	$(E_{\{it\}})$	Commercial registrations, nighttime lights, business licences	Supplementary outcome for local activity	Municipal data, satellite data

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Social safeguards	$(S_{\{it\}})$	Slum share, rental housing, informal vending, low income population	Assesses displacement and equity risk	Census, municipal surveys, field data

The main empirical method is difference indifferences. The model compares changes in the outcome variable in treated station areas before and after metro opening with changes in comparable control areas over the same period. The baseline specification is:

$$\ln(Y_{it}) = \alpha_i + \lambda_t + \beta(Treated_i \times Post_t) + \gamma X_{it} + \varepsilon_{it}$$

Where (Y_{it}) is the outcome variable for spatial unit (i) in year (t). It may represent property value, property tax collection, building permission activity or development charge revenue. (α_i) denotes area fixed effects, which control for time in variant differences across spatial units. (λ_t) denotes year fixed effects, which absorb citywide shocks such as general property market growth or inflation. $(Treated_i)$ is an indicator equal to one for station influence zones. $(Post_t)$ is an indicator equal to one after metro opening. (X_{it}) is a vector of local controls. (ε_{it}) is the error term. In a log linear model, $(\beta$ can be interpreted approximately as the percentage change in the outcome associated with metro exposure, after netting out fixed location characteristics and common time effects. A more exact interpretation is

$$\%\Delta Y = 100 \times [\exp(\beta) - 1]$$

This interpretation should be used only after actual estimation. The present paper specifies the interpretation rule but does not report coefficients. The difference indifferences design is more robust than a simple before after comparison since it acknowledges that property values can increase even in neighborhoods that are not served by the metro. The counterfactual trend is approximated by the control group. The design, however, relies on the parallel trends assumption: without the metro intervention, the treated and control areas would have had similar trends.

To test the plausibility of this assumption, the study should estimate an event study model:

$$\ln(Y_{it}) = \alpha_i + \lambda_t + \sum_{k \neq -1} \beta_k \, (Treated_i \times EventYear_{kt}) + \gamma X_{it} + \varepsilon_{it}$$

Where $(EventYear_{kt})$ represents time relative to metro opening. For example, $(k = -3)$ denotes three years before opening and $(k = +2)$ denotes two years after opening. The year immediately before opening, $(k = -1)$, may be omitted as the reference category. The coefficients (β_k) trace the timing of the treatment effect. When the preopening coefficients are statistically and economically near to

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zero, the parallel trends assumption is more plausible. The estimated post opening effect should be interpreted with caution in case the treated areas were already growing faster prior to metro opening. The event study design is also significant since the effects of the metro can be preopening. The price of land can react to announcement, acquisition of land, construction or anticipated future accessibility. Thus, the treatment cannot be interpreted as the opening date. A more detailed specification can further subdivide the project cycle into announcement, construction and operation phases:

$$\ln(Y_{it}) = \alpha_i + \lambda_t + \beta_1 Announcement_{it} + \beta_2 Construction_{it} + \beta_3 Operation_{it} + \gamma X_{it} + \varepsilon_{it}$$

This enables the study to determine whether there are changes of values in the process of speculation, temporary disruption or actual service operation.

Since the location of the stations is not random, matching or weighting must be performed prior to estimation. The treated station areas can vary with control areas in terms of pre-project land values, density, commercial activity or proximity to the central business district. Matching can be used to match treated areas with similar control areas based on preopening characteristics. This is not aimed at asserting perfect randomization but minimizing apparent imbalance.

Table 3: Empirical Protocol for Evidence Based Land Value Capture

Stage	Analytical task	Purpose
Spatial mapping	Define station buffers such as 0–500 meters, 500–800 meters and 800 meters–2 kilometers	Identifies possible benefit zones
Baseline construction	Record preopening land values, land use, density and revenue indicators	Establishes the counterfactual starting point
Control selection	Select comparable non-station or not yet opened station areas	Avoids weak before after inference
Difference indifferences estimation	Estimate average post opening change in treated areas relative to controls	Measures incremental effect
Event study estimation	Estimate yearly effects before and after opening	Tests pre-trends and timing
Robustness testing	Vary buffers, outcomes, controls and sample restrictions	Checks sensitivity of findings
Fiscal translation	Convert measured gain into potential value capture base	Links empirical evidence to policy design

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Equity screening	Examine rental, slum, small business and informal worker indicators	Prevents purely revenue driven interpretation

There should also be robustness checks in the proposed design. These tests do not imply causality, but they render the empirical statement more plausible.

Table 4: Identification Risks and Robustness Checks

Identification risk	Why it matters	Suggested robustness check
Nonrandom station placement	Stations may be located in already growing areas	Pre-trend test; matched controls; ward specific trends
Anticipation effect	Land values may rise before opening	Include announcement and construction phases
Construction disruption	Nearby areas may face temporary negative effects	Estimate separate construction period coefficients
Spillover to control areas	Control areas may also benefit from metro access	Test alternative buffer distances
Zoning change	Higher FSI/FAR may independently raise values	Control for planning and land use changes
Citywide property boom	General market growth may be mistaken for metro effect	Include year fixed effects
Outlier transactions	A few high value transactions may distort averages	Use median values or winsorized values
Administrative undervaluation	Registered values may understate market prices	Compare with circle rates, ready reckoner values or assessed values
Displacement risk	Value increase may harm vulnerable groups	Add rental, slum and informal economy indicators

The methodological strength of the framework lies in its transparency. It does not presume that investment in metro will necessarily generate a recoverable value increment. It poses the question of whether there is such an increment, controlling out general trends, local characteristics and timing effects.

4. From Measurement to Finance: Translating Evidence into Value Capture

The empirical design is not purely aimed at academic estimation. It can directly guide value capture policy. After estimating the incremental land value effect, the city is able to determine where to charge, who to charge, when to charge and how to charge. Let $(\exp(\hat{\beta}))$ represent the estimated metro effect

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from the differenceindifferences model. For a log outcome, the estimated percentage effect is:

$$\hat{g} = 100 \times \left[\exp\left(\hat{\beta}\right) - 1\right]$$

Where ($\hat{g}$) is the estimated percentage increment in value attributable to metro exposure. The monetary value increment for a spatial unit can then be approximated as:

$$\widehat{\Delta V}_i^{public} = \frac{\hat{g}}{100} \times V_i^{base}$$

Where ($\widehat{\Delta V}_i^{public}$) is the baseline assessed or market value. The potential value capture amount is:

$$\widehat{LVC}_i = \tau_i \times \widehat{\Delta V}_i^{public}$$

Where (τ_i) is the policy capture rate, which may vary by land use, property type, ownership category, redevelopment status or socialsafeguard classification. This term illustrates the concept of proportionality: a value capture fee must be associated with quantifiable good, rather than levied as a fixed fiscal cost that is not tied to real gain.

The empirical findings are also able to assist in the choice of the right instrument. When the gain is estimated to be concentrated over a short walking distance to stations, a station area betterment levy can be more justifiable than a city-wide charge. When the gains are concentrated in the areas where higher density is allowed, premium FSI/FAR might be the more appropriate tool. In case the fiscal impact is manifested in the form of an increase in municipal tax revenues in the long run, a tax increment financing plan can be taken into consideration. When the effect is weak or statistically doubtful, heavy value capture charges need not be used.

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Table 5: Linking Empirical Findings with Policy Instruments

Empirical finding	Policy interpretation	Suitable value capture response
Measurable value gain in immediate station buffer	Benefit is spatially concentrated	Betterment levy or station area development charge
Larger gains for commercial parcels	Accessibility benefit is stronger for business use	Differentiated commercial impact fee or premium FSI/FAR
Gains linked to higher permitted density	Public planning permission creates additional value	Premium FSI/FAR charge
Gains concentrated in redevelopment parcels	Value arises through redevelopment potential	Redevelopment contribution or land readjustment
Broad corridor wide municipal revenue increase	Fiscal gain is spread over a larger district	Tax increment financing district
Weak or uncertain gain	Public benefit is not clearly measurable	Avoid heavy value capture charge
Gain accompanied by displacement risk	Financial gain has adverse social effects	Combine value capture with affordable housing, vending zones and tenant safeguards

Fiscal indicators should also be part of a defensible value capture framework. These indicators enable the policy makers to not only determine whether land value has gone up, but also whether capture is economically significant and administratively effective.

The first indicator is the value capture realization ratio:

$$VCR_t = \frac{LVC\ Revenue_t}{Estimated\ Publicly\ Created\ Land\ Value_t}$$

This ratio is used to determine the percentage of the estimated publicly created increment that is recovered. A very low ratio could be a sign of under capture whereas a very high ratio could be a sign of excessive fiscal extraction. The second indicator is the infrastructure reinvestment ratio:

$$IRR_t = \frac{LVC\ Revenue\ Reinvested\ in\ Local\ Infrastructure_t}{Total\ LVC\ Revenue_t}$$

This ratio is important for public trust. When value capture revenue is reinvested in station area improvements visibly, citizens will tend to view the charge as legitimate.

The third indicator is the administrative efficiency ratio:

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$$AER_t = \frac{Cost\ of\ Collection_t}{LVC\ Revenue_t}$$

An instrument of value capture that is costly to administer might not be cost effective despite being conceptually sound.
The fourth indicator is the equity safeguard share:

$$ESS_t = \frac{LVC\ Revenue\ Allocated\ to\ Social\ Safeguards_t}{Total\ LVC\ Revenue_t}$$

This indicator is particularly applicable in Indian cities where metro corridors tend to go through mixed income, rental, informal and small business districts. A revenue maximizing land value capture model can increase pressures on displacement unless a portion of the benefit is used to provide affordable housing, rental protection, public vending space, pedestrian access and feeder connectivity. The translation of evidence to finance thus involves three interconnected steps. First, measure the value increment. Second, choose the instrument based on the spatial and economic pattern of gain. Third, publish and repatriate the revenue in a manner that safeguards the social good of infrastructure.

5. Political Economy, Equity and Implementation in India

Land value capture is not only a technical finance tool. It is also a political economy tool since it impacts on landowners, developers, tenants, small businesses, municipal entities, metro agencies and state governments. Its success will hinge on whether the charge is perceived as fair, quantifiable and associated with observable social good.

The first implementation challenge is valuation. Many Indian cities have uneven land records, outdated property assessment systems and differences between registered values, circle rates and actual market values. If the valuation base is weak, the charge may be contested. A defensible land value capture system therefore requires a baseline valuation before project construction, followed by annual monitoring of assessed values, transaction values, building permissions and municipal revenue. The second challenge is institutional fragmentation. The agency that builds the metro may not be the same agency that controls land use, collects property tax or approves development permissions. Metro rail corporations, municipal corporations, development authorities, state urban development departments and registration departments may hold different parts of the relevant data. Without interagency coordination, publicly created value may remain administratively uncaptured. A practical solution is to create project level value capture cells that integrate GIS data, valuation records, planning permissions and revenue information.

The third challenge is timing. Value capture is most effective when designed early. If a city waits until

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after speculation and redevelopment have occurred, a large share of the land value gain may already be capitalized into private transactions. The policy sequence should therefore be: baseline mapping, announcement disclosure, influence zone definition, instrument notification, post opening monitoring and periodic recalibration.

The fourth obstacle is political acceptability. The developers and landowners might oppose the extra charges unless they are convinced that the metro has brought about a quantifiable advantage. This is the reason why the empirical framework is important. A fee associated with an open estimate of value addition is more justifiable than a fee charged by a general administrative announcement. The defined benefit zone, the valuation basis, rate structure, exemptions, where revenue is to be used should be publicly disclosed.

The fifth obstacle is equity. The increase in land value led by Metro can increase rents and redevelopment pressure. Small shops and low income households, tenants, informal workers might not get the capital gain that landowners get, but they might have to pay more to occupy. When the value capture is formulated as a revenue instrument, it can inadvertently contribute to exclusionary redevelopment. Hence, the capture of land value in the vicinity of metro corridors must be inclusive. Part of the revenue collected must be allocated to affordable housing, footways, feeder buses, vending areas, toilets, lighting, universal accessibility and safety of the station area.

The sixth challenge is instrument selection. A uniform instrument is unlikely to work across all cities and corridors. In a high density commercial corridor, premium FSI/FAR and development charges may generate revenue. In a low income corridor, a heavy betterment levy may be socially and politically inappropriate. In an emerging redevelopment corridor, land pooling or redevelopment contributions may be more suitable. In a fiscally stronger municipal system, tax increment financing may be considered. The appropriate instrument depends on the measured pattern of gain.

The Indian policy framework should therefore move from generic value capture endorsement to corridor specific empirical design. Each major metro project should prepare a land value impact statement before construction, update it during construction and revise it after opening. The statement should include baseline values, station buffers, land use categories, vulnerable settlements, potential revenue instruments and proposed social safeguards. A possible implementation sequence is presented below.

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Table 6: Implementation Sequence for Evidence Based Land Value Capture

Phase	Action	Output
Preconstruction	Map station buffers, land use, ownership, property values and vulnerable groups	Land value baseline
Announcement and planning	Notify potential value capture zones and disclose proposed instruments	Predictable policy environment
Construction	Track transaction values, building permissions and displacement risk	Early warning monitoring
Opening and operation	Estimate post opening value changes using treatment control comparison	Measured value increment
Fiscal design	Calibrate charges according to location, land use and measured gain	Proportional value capture instrument
Revenue use	Reinvest in station area infrastructure and social safeguards	Public legitimacy
Review	Re-estimate periodically and adjust instruments if required	Adaptive policy design

This approach treats land value capture as a governance system rather than a onetime charge. It requires data discipline, institutional coordination and transparent reinvestment. In the absence of these, value capture can either be underutilized or politically disputed.

The larger public finance claim is that Indian cities are not to continue to be financially feeble as urban land is increasingly valuable due to public investment. In case the metro corridors raise the value of the privately owned land, a reasonable amount of the increment should be given back to the system that has been established by the people. Simultaneously, the recovery should be evidence based, proportional and socially responsible.

6. CONCLUSION AND LIMITATIONS

The infrastructure financing problem of India cannot be solved by further borrowing, grants or private involvement. Cities also need to reclaim some of the economic value that is generated through public

investment. Such a possibility is provided by land value capture. It is founded on a principle of fairness: when the value of privately held land is increased by a publicly created infrastructure, some of the publicly created increase must be given back to the public authority and reinvested in infrastructure. The metro rail corridors were the subject of this paper due to their ability to offer a definite spatial context in which land value change can be analyzed. Metro stations have the potential to enhance accessibility, redevelopment opportunities and change municipal revenue bases. The size and distribution of these effects, however, should not be presumed. They are to be measured. The paper hypothesized a quasi-experimental design based on the difference indifferences and event study designs. The framework compares the station influence zones with similar areas of control prior to and after the opening of the metro. It specifies the pertinent variables, treatment control structure, equations, interpretation rules, robustness checks and policy translation indicators. The strategy aims at avoiding unsubstantiated claims and rendering land value capture empirically defensible. The policy implication is apparent. India needs to shift to evidence based land value capture. Fees must be associated with quantifiable benefits and not charged in a uniform way. The revenue must be clearly invested in the station area improvements. Tenants, small businesses, informal workers and low-income residents should be safeguarded by social safeguards against displacement pressures. The capture of land value must be in favor of mobility, inclusion and urban infrastructure, rather than real estate monetization.

The study has limitations. It is a methodological policy paper and does not report final estimated coefficients. The real implementation will be based on the accessibility and quality of property transaction data, ready reckoner or circle rate data, municipal revenue records, GIS layers and building permission information. Some areas may have actual market prices that are lower than the registered transaction values. Metro effects can vary by city, corridor, type of station and land use situation. Interagency data sharing is also a key aspect of the design, which is a significant administrative limitation to Indian urban governance.

Although these are the limitations, the paper offers a viable research direction. It demonstrates how Indian cities can shift the descriptive discourse of value capture to quantifiable, transparent and equitable action. Land value capture is not a substitute for all other urban finance instruments. It is not a panacea. However, when planned properly, it can transform publicly generated gains in land value into a sustainable and equitable source of infrastructure funding.

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