Abstract
It is frequently asserted that many developing country cities are characterized by substantial public land assets which appear to be sub-optimally managed, thereby leading to land supply constraints and price distortions. This paper elaborates a conceptual framework through which public land ownership and management may affect land supply. The key influences explored are: withholding of land from the market; high transaction costs; limited functional decentralization; and unfair competition with private sector developers.

After highlighting typical ways in which public land management effectiveness has been evaluated in the literature, the paper uses data from a recent survey to attempt some tentative profiling of public land management features across cities in the developing world. The key features highlighted are: organizational arrangements and human resource capacity; land information management; and land management practices. Data from approximately 50 cities worldwide both with and without large public land holdings are examined.

The potential roles of various features of public land management as well as the extent of public land ownership are then gauged against a number of land market outcome indicators. These include estimates of house price to income ratios and shelter price inflation; a measure of the contiguity of recent spatial expansion; an estimate of the extent to which encroachment affects public rather than private land; and the percentage of firms citing access to land as a major constraint to their business.

The analyses suggest tentative positive relationships between less dominant public sector involvement in land development activity and better land market outcomes. This result was supported by other findings that better and more conservative public land management practices (limited or no land banking; auctioning of land; and patrol of sites to detect encroachment) as well as decentralization are also correlated with better land market outcomes. These correlations were observed for indicators of affordability, encroachment and access and not for the indicator.

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of spatial form. Across the spectrum of indicators, extent of public land ownership did not generally feature as a reliable predictor of land market outcomes.

The context of the paper is the exercise of public land management functions in developing countries - an environment often characterized by rapid urbanization, evolving institutions; information deficiencies and considerable resource constraints.
Introduction: Economic Rationale for State Intervention in Land and Housing Markets

It is frequently asserted that many developing country cities are characterized by substantial public land assets which appear to be sub-optimally managed. Garba & Al-Mubaiyedh (1999) for example contend that public ownership and management of land may result in land market failure, using Kano, Nigeria as an example. Deininger (2003) argues that to the extent that publicly owned land is sub-optimally used, the transfer of ownership or use rights to the private sector could improve land use, increase government revenue and minimize a potential source of corruption. Buckley & Kalarickal (2006) report how land markets in Mumbai, India and Dhaka, Bangladesh are irresponsible to the demand, due to a significant amount of land held by the public.

The net effect of public land ownership and management is purported to be an artificial shortage of land supply on the market giving rise to prices that are generally out of the reach of most. As such, deficiencies in public land management are often blamed in part for prevalent informality particularly in shelter solutions and small scale commercial undertakings. However no literature to our knowledge has as yet empirically examined cross-country relationships between public landownership and management and land market outcomes including land prices in the developing world. Angel (2000) comes closest and encouragingly found that an ‘enabling index’ is a statistically significant contributor to various land market outcome indicators (house price to income ratio; rent to income ratio; and down-market penetration). Although the public housing stock and land registration are encompassed in his enabling index; public land management was not explicitly included.

The irony is that many State interventions in land markets are motivated by a desire to alleviate the plight of the poor by compensating for market deficiencies. Quite apart from being characterized by a range of peculiarities derived from the heterogeneous nature of land and housing commodities, many researchers recognize the existence of imperfections in land and housing markets. On the demand side these include information asymmetries, tenant immobility and weighty transactions costs. On the supply side, spatial fixity and market indivisibilities of the housing good, together with neighbourhood externalities are seen as relevant (Robinson, 1979).

Whitehead (1983) identifies other important problems with urban land markets including: the need to provide certain land with goods that are at least partially ‘public goods’ in nature (such as primary and secondary infrastructure), which cannot be effectively produced through the private market; unequal division of market power among economic agents, particularly in the case of monopolistic supply; and differences between how individuals and the community value future and current benefits. Mindful of the massive income disparities within most developing countries, she discusses the temptation and relative feasibility to intervene to achieve redistribution in kind given that extra cash may inflate prices.

The net result of these market imperfections is often a failure of land markets to produce formal land and shelter solutions for the urban masses at a price they can afford. In this scenario, a well-intentioned State often intervenes and is tempted to use publicly owned land to foster land market outcomes that are more welfare-inducing. In Rothenberg’s (1972) cost-benefit analysis of urban renewal in the USA he contends that while high land assembly costs are a significant deterrent to private enterprise considering large scale residential redevelopment, the right of
eminent domain significantly reduces these costs when government undertakes the process. The same argument can be made when land assembly is not even necessary because of pre-existing large scale ownership of lands by the State in some cities. Equally in scenarios where private enterprise is constrained either because capital markets are incipient or severe credit rationing occurs; large scale land development by the State is often a feature of public policy. But as Stafford (1978) argues, even if an externality exists, there is no apriori case for government ownership and intervention. Dahlman (1979) takes the argument a step further by asserting that state intervention can only be justified if it can be shown that governments can do better at internalizing externalities, than private market forces themselves.

**Focus and Structure of this Paper**

Of course there are a great variety of ways in which State’s intervene in the operation of land markets including taxation, regulation and direct participation. This paper focuses on the last of these and even so does not cover the less controversial roles of the State in providing primary and secondary infrastructure and in land acquisition in these contexts. Instead the focus is more narrowly on the way public land is managed and even then the emphasis is on urban and peri-urban contexts. This management includes the institutional arrangements that govern: the alienation and development of public land; the protection of such land from encroachment; and the regularization of established informal settlements on public lands.

In looking at public land management, this paper sets out to address two primary research questions: ‘What are the appropriate institutional structures for managing public land?’ and ‘Is land supply in cities with large public land assets more constrained than in cities with predominantly private land ownership?’ These two questions may be summed up by asking the single question ‘Does public land ownership and management matter to land market outcomes?’

For the purpose of this paper, public land includes all land under majority ownership or control of central government; municipalities and para-statal bodies such as State enterprises and statutory bodies, however, spatially the focus of this paper is on urban areas and on the rural-urban periphery. By the term institutional arrangements we imply: organizational arrangements and associated human resource capacity and incentive issues; information and records management; and land management practices.

The first Section of the paper outlines a framework relating public land institutional arrangements with land market outcomes. Some of the literature on country-specific features of public land management is highlighted in the process. Section Two then discusses the ways in which public land management effectiveness has been evaluated in the literature using country cases to illustrate each category of evaluation. The next Section describes the original empirical contribution of this paper. It first presents some cross-country profiling of public land management institutional arrangements and then explores whether there is evidence of empirical relationships between these arrangements as well as the extent of public land ownership and specific land market outcomes. The Final Section offers some reflections and suggestions for future research.
Section 1: Conceptual Framework - Public Land and Land Market Outcomes

In this section we explore conceptually, ways in which public land ownership and management can unintentionally have adverse impacts on land market outcomes. Four main contributors to inefficiency are discussed: withholding of land from the market; high transactions costs; limited functional decentralization; and unfair competition with private sector developers.

(a) Withholding of Land from the Market
One of the most common criticisms of public land management is that the State often fails to strategically interject parcels of land onto the market in a way that could bolster land supply when demand is high. This does not necessarily require the State to function as a developer but can be accomplished through alienation of the land by lease or other tenure instrument or outright privatization such as by auction.

Much of the withholding of public land from the market is the product of the policy ambivalence governing such land. Policy makers face competing demands for maximizing economic returns and redressing societal inequities which are difficult to resolve politically. At the heart of public land management is an ongoing public policy debate on the role and obligations of large land owners and the public and private good aspects of their real-estate assets. Judicial back and forth including the drafting of regulation; its passage into law; and the contestations over its meaning are often the visual handles on this policy debate.

The implication is that even if the State were equipped with perfect information about the location, extent and value of its estate as well as with facilitating institutional arrangements and capacity to efficiently allocate land, it would still act in a less expedient and responsive way than a private actor because of the inherent difficulties of reconciling the various interests and objectives with which it is charged. The end result is again a less than efficient short-run solution whereby land that is needed for settlement or other development today may not be so allocated at that point in time.

Yet the withholding of land has more consequences than the creation of artificial scarcity. It also imposes efficiency costs on cities by increasing commuting distances and costs and by hindering agglomeration economies for commerce and industry. Liu (2005) estimates that the social cost of what he terms ‘interrupted development’ are at least twice the private cost of land. He contends that this is a major source of market failure since private decisions regarding interrupted development are based on returns less than half of social returns and therefore give rise to a city form that has too much interrupted development.

Although his analysis focuses largely on private actions, the argument is valid for interrupted development caused by withholding of public land from development purposes due to managerial inefficiency or other causes giving rises to spatially discontinuous development. Here land prices or rents (private value to the State) are often not even used in making land use decisions and so the ratio of social costs to return on existing use is likely to be even greater. His argument is particularly relevant in contexts where lax management approaches to public land derive few if any compensatory social benefits from the existing use of that land. The net effect of underestimating the social costs of land use decisions manifested as interrupted development
is the under allocation of land for housing and other productive uses with adverse consequences on affordability. Interrupted development would also likely affect the pattern and shape of urban expansion particularly in the form of lesser contiguity of the built area.

This pattern of non-contiguous, interrupted development may be exacerbated if an inefficient public land developer also actively acquires land for future development through the process of land banking. The artificial scarcity of developable land so created as well as the speculation that the practice can fuel, may further push land prices upward. Such a trend was noted in Sweden, Holland and France (Van Meurs,1986). In considering the potential impact of land banking in developing countries Farvacque and McAuslan (1992) expressed this caution:

...where other land use instruments are very weak......land banking is likely to achieve neither efficiency nor equity in the supply of land for urban development, since its operation will be likely to be skewed by the same defects that affect other instruments – weak implementation, over bureaucratisation, abuse of power. (Farvacque and McAuslan,1992 pg. 74)

By contrast public authorities are often advised to expand leasing and privatization of surplus public land with auctions often the preferred route to pursue the latter. As Strong (2003) notes with respect to Ukraine, among the rationales advanced for competitive land auctions was the opportunity they provide to remove the shroud of mystery surrounding land allocation decisions, reducing the scope for improper considerations. Such improper considerations can of course affect land supply for a given purpose and thereby prices. Hong and Bourassa (2003) are however quick to point out that land leasing is often a more flexible instrument for allocating public land when complimentary institutions necessary for the functioning of markets are underdeveloped.

(b) High Transaction Costs of Public Land Management

The next source of impact we consider is the relative inefficiency of the State as a supplier of land. Institutional arrangements for public land management are frequently chided as being complex and convoluted. These institutions directly affect the transaction costs involved in public land management. The contention is that if institutional arrangements for public land management were less tedious, the elasticity of supply of land would be greater.

Convoluted Procedures

The more complicated and lengthy the process and rules for acquiring access to a plot of public land are, the more costly is that access. Faced with those costs both firms and individuals make determinations on whether to pursue that access through formal or informal means. De Soto (1990) documented this choice with illustration from Peru. His regulatory audit became mainstream worldwide in the World Bank’s Doing Business survey that is applied periodically. Sprawling slums in many developing country cities with large public land tracts suggest that to many, public land management transaction costs are too high to make formal occupation of such land a viable option. The high transaction costs of effectively patrolling a large and dispersed public land estate is also seen as contributory to the ease with which encroachment occurs and the scale that it frequently achieves.
Inter-Agency Coordination
Some transaction costs are determined by inter-Agency relationships whereby development and allocation of land as well as regularization of encroachment require information, approvals and participation of various State agencies. These Agencies often do not share each other’s priorities and sometimes have conflicting interests in the proposed development site. Coordination among these Agencies is often weak and unlike private land development firms, there is often no overall management or budget structure that reconciles these differences in priorities and interests. Confusion over responsibilities as well as duplication of work in instituting and enforcing land reforms and procedures leads to inaction and creates tensions at all levels of government (Lincoln Institute of Land Policy, 2002 and UNCHS, 1983). The net result is a slowing down of the land development and allocation process.

Regarding land management tools, Archer (1989, 1992) recommends the establishment of a Central Government Body or Public Agency to oversee law and regulations related to land schemes and help develop procedures; and the formation of an interdepartmental steering committee to guide development of the system and promote interdepartmental cooperation in its operation.

Statutory Provisions Governing Public Expenditure
Other transaction costs arise from statutory provisions governing public expenditure. Procurement of contractors for land development on behalf of the State is often a protracted process that involves centralized arrangements for advertisement, review of tenders and selection of successful bidders. Contractors usually factor in these delays into their bid prices thereby contributing to a less competitive product. Even though the State’s final product may be eventually offered at a competitive price often on account of subsidies on the cost of raw land and in many cases, infrastructure; the lengthier time and higher costs of publicly developed land contribute to the image of the State as a model of inefficiency in land development.

By way of reform, direct control over land development processes and procurement can be a way of reducing these costs. Also having control over key Human Resource decisions such as recruitment can translate into speedier recruitment enhancing functional continuity and staffing responsiveness to fluctuations in workload, leading to reduced transactions costs.

Incentive Framework of Public Land Officials
Public Land Management transactions costs and efficiency are also impeded by the incentive frameworks of public land officials. One of these incentive frameworks relates to employee motivation in public institutions. Certain institutional characteristics in human resource management, such as lack of a competitive compensation plan and internal promotion opportunities, may lead to organizational failure of employees not striving together to meet organizational goals. At the same time, absence of employee motivation in organizations leaves them with unskilled and ill-trained staffs, which are considered a major constraint in facilitating the public management process (Cheema, 2005).

It is not uncommon for public officials charged with State land management to be holders of relatively low office, poorly paid and lack a career path with realistic opportunities for promotion. These factors are thought to lower their productivity and therefore the efficiency of
the public land management process. This in turn affects land supply with adverse consequences on affordability.

Additionally, in this low motivation environment the temptation of abusing office for financial gain is strong especially since the valuable asset of public land is usually allocated administratively and not competitively. Land allocation decisions based on rent seeking behaviours of public officials are also unlikely to assign public land to either its most efficient use or to a use that has strategic welfare objectives for the poor. If this behaviour is widespread, it should manifest as distortions in overall land prices.

Reforms that seek to change the balance between labour division and functional mobility as well as the enhancement of employee compensation, voice and opportunities for internal promotion, all targeted employee motivation. Reforms that facilitate higher compensation and scope for internal promotion encourage the retention of staff and thereby allow for greater functional continuity. Higher compensation additionally allows for the attraction of competent staff in the first instance.

**Public Land Management Capacity**

In many cities it is claimed that large parcels of strategically located land lie vacant or in a use that is in no way consistent with the value of the parcels in question. Many times this behaviour is correlated with lack of real estate management capacity among public officials charged with State land management as well as with widespread deficiencies in data management. It is not uncommon for public officials to be unable to reliably estimate the extent or value of public lands due to incomplete and dysfunctional information systems. Consequently prudent estate management from an efficiency perspective often does not materialize. Neither does strategic interjection of land with a welfare-intent. The purported consequence of this withholding of land is an artificial scarcity of supply leading to price inflation.

Government managerial and administrative capacity can be a severe obstacle to implement land policy instruments and manage urban land. Innovative land policy instruments require skilled negotiations before an agreement acceptable to all stakeholders can be finally reached (Noman, 2004). One constraint that land pooling schemes faced in Nepal was the lack of a set system to document and monitor project progress. Karki (2004) notes that staff were trained to deliver only physical reports not analytical reports and there was an inadequate system in place to access information and for inter-project coordination, cooperation and knowledge sharing. Managers could not dedicate appropriate attention to the project since they were also the Town Controllers. Additionally, they were regularly transferred due to the frequent changes in government set up. Several experiences in land readjustment carried out in Kenya had minimum impact due mainly to administrative and political problems that discouraged planners and administrators and affected their work (UNCHS, 1983).

Dillinger (1992) notes that hiring local professionals and staff combined with experienced on-site project management can contribute towards the success of a program. This is particularly critical in partnerships with informal developers where a local understanding of the place is important. A partnership with private developers requires a pragmatic strategy in the planning, effective monitoring and high-level management effort of the city authorities, as well as appropriate guidance and assistance (Misra and Rarain, 1989).
Summary
Table 1 depicts a schematic of institutional reforms in public land management most of which are aimed at directly reducing transactions costs. Some of these are indirectly targeted focusing on bolstering employee motivation and thereby, service delivery.

<table>
<thead>
<tr>
<th>REFORM DIMENSION</th>
<th>EXAMPLES OF REFORMS</th>
</tr>
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<tbody>
<tr>
<td>Governing Rules</td>
<td>Move toward harmony among governing law, policy and procedures. Move from conventional to incremental instruments/strategies for achieving outputs. Move to a community and site approach to public land management Move toward internal legal validation and execution of instruments of land tenure. Move toward greater organizational responsibility for policy formation. Move to more comprehensive mandate. Move to increase the legal status of public land as a form of property that can be easily alienated Move to require public land transactions to be registered in a cadastre/registrations system</td>
</tr>
<tr>
<td>Human Resource Management</td>
<td>Move toward higher compensation. Move toward enhanced scope for internal promotion. Move toward performance measurement Moves to enhance internal checks and balances</td>
</tr>
<tr>
<td>Autonomy/Bureaucracy</td>
<td>Move toward direct power and responsibility for the procurement process. Move toward direct reporting to line Minister rather than through Permanent Secretary or comparable bureaucrat. Move toward direct power and responsibility for the entire recruitment process. Move toward raising, retention, management and expenditure of revenues through statutory and other sources.</td>
</tr>
<tr>
<td>Information Management</td>
<td>Move towards computerization of land information and standard business processes Move towards reducing protocols for inter-Agency exchange/sharing of land information Attempts to update the inventory and status of public land stocks Attempts to update valuation of public property and to adopt a portfolio management approach</td>
</tr>
<tr>
<td>Delivery Mechanisms</td>
<td>Partnerships with the private or civic sector for land development Partnerships with the private or civic sector for portfolio management and land allocation</td>
</tr>
</tbody>
</table>

Source: Adapted from: Rajack, 2001
Public land management is also often faulted as being management that is too far removed from ground reality. Decentralization of public land management should be understood in a broader context of decentralized forms of government. Elcock and Minogue (2001) contend that decentralization brings two changes in the society. One is the strengthening of participatory mechanisms through localized power structures. Compared to the central government, local governments are closer to the public they serve and are in positions to be more attentive to the real needs of the society. The other is the delegation of different functions within the organizations. Different from the centralized control model, decentralization of institutions sometimes enables local sub-bodies to make decisions on their local policies and distribution of resources.

There are similar implications for public land management when it comes to decentralization. Firstly land is a resource that has various potentials for its future use, and in this respect better knowledge or information on these perspectives can be utilized to serve the needs and desires of the local population. Central government Ministries and Agencies are usually not well poised to capture information on the needs and desires of local population groups and sub-groups. By comparison a decentralised land management approach may hold public hearings, consider petitions and communicate directly with people in the field, better positioning the State to prioritise public land use (Kaganova et al., 2001). Decentralisation places decision makers in closer proximity to the communities they are meant to serve. One outcome of this is the potential for greater voice for the poor and enhanced accountability. Moreover the protection of public land from encroachment is better served by a land management agency with local patrolling capacity that is usually only feasible in a decentralized structure.

Identifying local needs and perspectives will be of little value however if the mechanism for transmitting that knowledge into action is weak or absent. Thus, it is argued that effective decentralization should delegate functional authority to implement land management functions to local authorities. Once the sub-bodies have power to set their own policies on public land within their jurisdiction and have capacity to implement and execute them, management of public land and buildings can be an effective measure in providing local solutions to local problems (Mutale, 2004). However, all too commonly, even when decentralization does exist in one measure or another, higher tiers of government seek to influence lower tier decisions often in the guise of policy, plan approval, legislation or allocation of funding (Farvacque and McAuslan, 1992).

The above arguments imply that when public land management is a centralised State function or where defacto functional and financial decentralization are weak, responsiveness of land supply is likely to be adversely affected by communication gaps; competing and unconnected priorities; and limited opportunities for feedback from the poor. If public land ownership is substantial in these circumstances, the net effect could be a land market out of sync with local reality. It is thought that this is likely to manifest most as sluggishness in the elasticity of supply of land in relation to effective demand, thereby leading to price increases. Experience with decentralised public land management has been a mixed bag as the following examples illustrate.

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2 Decentralization of institutions in general can be defined as “attempts to change the relationships of power and subordination between central and subnational levels and to redefine the functional roles of units at each of these levels” (Elcock & Minogue, 2001).
**Land Boards in Botswana: Accountable to Whom?**

Botswana presents an interesting case in decentralized public land management. Current urban informal settlement in Botswana is proportionately much less significant than in many other rapidly urbanizing African countries. As early as 1970 the Tribal Lands Act created decentralized Land Boards based on a culturally familiar concept associated with the role of tribal Chiefs. Among other functions, these Boards were intended to help ensure that emerging economic opportunities were adequately catered for in Botswana’s land management system. There are currently 12 main and 38 subordinate Land Boards which allocate land for a wide range of land uses including residential, commercial and industrial purposes and allocate rights under both customary and common law (Mathuba, 2003). They are also involved in the demolition of some unauthorized development. A recent review of land policy in Botswana (Natural Resource Services (Pty) Ltd, 2002) stressed the need to specify whether Land Boards should have a clear line of reporting to the Ministry of Land and Environment or be totally decentralized accountable to the citizens - especially important in light of the recent separation of the Ministry of Land and Housing from the Ministry of Local Government.

**Functional Duplication in Indonesia**

Indonesia represents a major attempt at decentralization on many fronts including public land management. Today there is no central authority over State land. The National Land Agency (BPN) registers State land but does not have the power to alienate it. For non urban lands which form the majority of State Land, The Ministry of Forestry is responsible for management. As in many other countries, State land in urban areas is occupied and used by several Ministries including Defense, Health and Education. Since 1998, the Government has enacted several laws and regulations to improve transparency in the use and alienation of public land. Significantly, the local authorities now have the authority to identify land for distribution for settlement and investment with final approval given by BPN. The full gambit of delegated functions includes spatial planning and zoning regulations, land acquisition and compensation (except for national-level projects); settlement of land disputes; issuing of location permits; producing recommendations for disposal and reallocation of State land; reclamation of idle land; and designation of adapt (social function) land.

In reflecting on Indonesian decentralization, Thorburn (2004?) noted that in an effort to bolster local revenues, many Districts interpreted the Decentralisation Law to mean that they were entrusted with all functions of the BPN leading many of them to establish their own Agencies (Dinas) sometimes as parallel structures to the BPN which maintained a local presence after decentralization. This has reportedly contributed to greater confusion in land certification and transactions.

**Decentralisation affected by Capacity and Lack of Central Guidance**

Several other developing countries have gone forward with decentralizing its public land management function. For example, Mongolia has delegated authority to allocate land use rights to local municipalities (McEwen, 2004). In Malaysia, two states, Sabah and Srawak, have their own land policies and planning instruments regardless of national ones (Singh, 1994). Meanwhile, many former Soviet countries have decentralized land management in order to facilitate land privatization process. However, there is much divergence among different
countries in terms of the form the decentralization that has taken place. As Kaganova et al. (2001) observe:

until now, the legal framework for local government management remains ambiguous and unclear, and a decision-making ability of city governments varies substantially from city to city depending on politics and power structure within a region of the country (Kaganova et al, 2001 pg ??).

Limited capacity in terms of both human and financial resources also often constrains decentralized public land management. Many local institutions lack staff skilled and proficient in the field. Professionals who are equipped with real estate management expertise are almost non-existent at the local level. Inadequate human resource management compared to the central level, such as uncompetitive salaries or lack of promotion opportunities, is among the many reasons for this phenomenon. Financial and human resource capacities are of course related. That is, local bodies usually do not have sufficient financial resources for the investments that can enhance public land management. These investments may include hiring skilled professionals, setting up information systems, and covering other operating costs that may occur during the decentralization effort.

(d) Unfair Competition between public and private developers
Not only is the State regarded as an inefficient land developer but often it is accused of suppressing private sector participation in the land market through unfair competition. Particularly when Agencies of the State enjoy both regulatory and development powers, they are viewed by private sector competitors as having an unfair advantage. This apparent conflict of interest can allow the state to approve its own project and reject or delay proposals from competitors. Moreover, the State often uses its ownership of public land to subsidise its land development and housing production by charging only nominally if at all for the cost of raw land. In these ways private sector participation can be hamstrung leading to exacerbations in the shortage of supply of developed land.

The Urban Development Authorities of South Asia are trademark examples of the State taking on the role of land developer. Additionally in both India and Pakistan these development authorities also assume the role of regulator. In Karnataka, India the Bangalore Development Authority (BDA) was constituted in 1976. Its development functions include implementation of residential, commercial and civic schemes; infrastructure development and housing construction. Yet as a designated Planning Authority, the BDA also carries out various regulatory functions including preparation of development plans for the city; approval of development plans for group housing and layouts; and approval of building plans. Organisationally, the Authority carries capacity for land acquisition; town planning; engineering; finance; law; and allotment and administration. According to the Bangalore Metropolitan Region Development Authority Act, no other authority or person may undertake development within the Bangalore Metropolitan Region without permission of the Authority. This sets up the Authority as a developer in a very favourable position to its competitors both public and private.

If the experience of the Urban Land Ceiling Act in India is illustrative, then there is little reason to believe that a Public Development Authority is better equipped to provide land at the expense of large scale private land development. In 1976 the Government of India attempted to simultaneously increase the stock of publicly owned land and curb the influence of large land
owners through the Urban Land (Ceiling and Regulation) Act. Seventeen States and three Union Territories passed legislation to this effect amounting to perhaps the largest ever attempt at land banking. Over the decades of application, the Act was severely criticized for being highly expropriatory and for vesting too much discretionary powers in the States/UTs for granting exemptions. It has also been chided for its failure to specify a mechanism for ensuring the entry of ‘excess, vacant land onto the market and for creating many land market distortions.

A recent review (National Institute Of Urban Affairs, 2005) estimated that for the combined States of Karnataka, Punjab, Madhya Pradesh, Uttar Pradesh and Gujarat, approximately 22,000 hectares of excess land was notified to the land owners under the Act of which about 16,000 hectares were vested with the State and only about 1000 hectares of which was utilized for a development purpose including low income settlement. Thirty years after its introduction, the Central Government is now so convinced that this attempt at redistribution that favoured public land development at the expense of private approaches was so ineffective that it included outright repeal of this legislation by State legislatures as one of the reforms for which it financially rewards States under the Urban Reform Incentive Fund (URIF).

Section 2: Existing Reviews of Public Land Management Effectiveness

While there have been a number of attempts to document public land management arrangements in specific countries, these are by and large descriptive and usually highly idiosyncratic. Consequently, documented reviews of the effectiveness of management of urban public land are very sparse. However generally three evaluation approaches are discernible:

(i) Reviews from an Asset Management Perspective;
(ii) Reviews from a Production Function Perspective; and
(iii) Reviews of Comparative Transaction Costs and Development Outputs

This Section briefly describes each of these approaches with illustration from country cases. By no means does it represent a comprehensive review of all such evaluations.

A. Reviews from an Asset Management Perspective

Reviews of public land management from an asset management perspective are premised on the view that public land holdings are potentially valuable and particularly so in the context of otherwise resource-poor central or local government bodies. They advocate that efficient public land management should take into account the opportunity cost of land use and land alienation decisions to maximize the pecuniary return from the holding of those assets.

Reviews from an asset management perspective tend to focus upon of Information Management, Accounting systems and Revenue realisaton. They tend to document the extent to which land information management is streamlined and whether public land assets are placed on the balance sheets of public land and municipal authorities. They typically assess whether roles and responsibilities are clear; policy, regulatory and operational functions are separated; asset management is decentralized; accrual accounting is adopted; and private sector management practices are utilized.
Conway (2006) documents that as part of its asset management reforms, Australia sold or otherwise alienated large surpluses of public land and decentralized responsibilities and accountability for the balance to the actual users. The Department of Finance and Administration (DoFA) now also sets rents at prevailing market levels. He laments however that reforms to improve the efficiency of the use of government owned or government occupied progress has been much less rapid. He summarises progress on the reforms according to three criteria: return on assets; dividends and takings from sale of assets comparing these indicators for three periods (see Table 2) and characterises this results as impressive.

| Table 2: DoFA Domestic Portfolio, Summary Results, 1999-2002 |
|---------------------------------|----------------|----------------|----------------|
| Return on assets               | 9%             | 6.6%           | 5.5%           |
| Dividends                       | $72 million    | $117 million   | $60 million    |
| Sale of Assets                 | $285 million   | $198 million   | $150 million   |

Source: Conway, 2006

In reflecting on leasing of public land as a source of infrastructure finance, Peterson (2007) notes that this land management practice which was long established in Hong Kong and later adopted in mass in mainland China is gaining ground elsewhere in places as diverse as India and Ethiopia. In this scenario, local authorities often finance infrastructure through the sale of publicly owned adjacent land and interim borrowing against the appreciating value of the land parcels. His assessment of its impact focuses on revenues raised and particularly as a fraction of local capital spending. He does however warn against the fiscal risk associated with undue dependence of such leasing and sales to finance local capital budgets citing the topsy-turvy experience of Hong Kong before and after the Asian financial crisis of the late 1990s.

In documenting the Canadian experience, McKellar (2006) relies upon direct and indirect pecuniary impacts. In particular he notes that the Canada Lands Company Limited (CLC) has achieved over $266 million in distributions to the federal government, $3.3 billion in private sector investment expenditures, $35.7 million in environmental remediation investments and $70 million increase in annual municipal taxes among other things. In a similar vein Bertaud and Buckley (2005) estimate that Mumbai foregoes approximately $1 billion annually in rents from public land that is currently held off market – an amount more or less equivalent to the city’s current annual budget.

B. Reviews from a Production Function Perspective

There is a second related approach to evaluating public land management effectiveness that focuses on the production function aspect of public land development agencies as outlined by Van Meurs (1986). This data intensive model appraises inventory control, production, sales, management systems and operational areas such as land acquisition.

It emphasizes that inventory policy should account for the agency’s cost of capital relative to the rate of appreciation of the land stock in inventory. Particularly relevant to the line of inquiry being pursued in this paper, it contends that inventory policy should consider the impact on land prices of removing land from the market re the potential for creating artificial scarcity.
The model uses conventional risk analysis in analyzing production with particular attention to two risks: the risk of capital being frozen as large outlays for land acquired for immediate production are immobilized by regulatory or other delays; and project related risks; particularly the double edged sword of project delays that increase cost while also decreasing output. The model also considers the extent to which market demand is effectively assessed to allow for accurate projections of timely receipt of sales revenue.

Finally, attention is paid to management systems. The extent to which administrative costs are minimized is assessed in the context of the need to maintain a lean and decentralized project management workforce. With respect to financial management focus is placed on the Agency’s sources of working capital with heightened focus when those sources are internal. It also examines the extent to which a public land development agency minimises its land development costs by effective application of land acquisition.

In applying the model to the Agence Fonciere d’Habitation (AFH) in Tunisia and the Korea Land Development CORPORATION (KLDC) in South Korea, Van Meurs (1986) found that at the time of evaluation neither Agency had explicitly addressed inventory policy. The Inventory in KLDC was found to be double what is needed to maintain the agency’s production level. The ratio of the cost of capital to the rate of appreciation in land stock in KLDC was satisfactory although an unlikely benchmark to miss given the general inflation in Korean land prices at the time.

The Korean approach to capital exposure risk was to program acquisition and development volumes according to a formula such that 80% of new project land was acquired during the first year and the rest the following year. The new project volume for the current year would be equal to 20% of the development volume for the current year, 50% of the development volume for the next year, and 30% of the development volume in the year after. No such systematic approach was observed in AFH.

At the time, KLDC was in the process of streamlining and standardizing construction management routines whereas AFH’s approach was found to be much more ad hoc. AFH was also noted to be vulnerable to considerable project risk exposure on account if its dependence on public utilities. The ability of both Agencies to assess market demand was found to be weak as reflected by mismatches between the nature and volume of products in relation to unmet demands for other products. Both KLDC and AFH substantially expanded staffing during the late 1970s and early 1980s adversely affecting performance ratios particularly when sales plummeted later on.

C. Reviews of Comparative Transaction Costs and Development Outputs
A further way in which public land management effectiveness is evaluated is by comparison of transaction costs or development outputs either before and after reforms or across different institutional arrangements. This approach is widespread in evaluating progress of land registration projects involving business process re-engineering and computerization of land records. It is also mainstreamed in the World Bank’s Doing Business and Investment Climate Surveys which periodically rank countries on a wide variety of indicators a few of which relate
to land access. The underlying notion of such evaluations is that a reduction in transaction costs for key procedures (e.g. number of procedures to register a property or time to complete allocation of a parcel of public land) and an increase in developmental outputs are evidences of success. A few examples are highlighted:

**Reforms at the Bangalore Development Authority (BDA), India**

A 1998 World Bank Policy Research Working paper reporting on the use of Citizen Scorecards noted that general household satisfaction with the BDA was by far the lowest of all public Agencies surveyed. Only 1% of BDA customers were satisfied with their experience and some 65% were explicitly dissatisfied. A mere 11% were satisfied with Staff Behaviour; 2% with Quality of Service; and 4% with Information Provided. Moreover, the BDA had the highest proportion of people (33%) paying ‘speed money’ in the hope of expediting service.

To the BDA’s credit, it was the first public Agency in India to respond to the scorecard in a systematic way. Significant changes in customer orientation and operational management were undertaken. By 2004 the BDA had developed and allotted over 76,000 residential plots more than half of which had been developed in a three year period following significant restructuring at the Agency. In the ten years prior to this, fewer than 4000 plots had been developed. During the restructuring the BDA adopted more rigorous accounting of its assets, selling some and leveraging others leading to financial self-sufficiency (McKinsey, 2004?). While the BDA’s performance improvement in recent years has been a source of pride, there is no documented estimation of how the land market may have operated if the BDA was not such a dominant player. Whether the private sector operating on a level playing field would have matched or exceeded the BDA performance is not known.

**Institutional reforms and development Outputs in Trinidad**

Rajack’s 2001 review of State land management in Trinidad documented institutional reforms and reductions in transaction costs under three institutional regimes. Procurement and recruitment were found to be significantly faster in the new institutional framework. The study also attempted to compare pre and post-reform developmental outputs. These outputs included the numbers of households directly benefiting from infrastructure upgrading, tenure regularization and new serviced plots. The review noted that the latest institutional framework, in which the Land Settlement Agency (LSA) was the operational arm, was associated with an enhanced span and speed of delivery of developmental outputs. It was contended that these were likely outcomes of several changes in the ‘rules of the game’ (institutional changes) including the increasing acceptance and use of incremental development standards and incremental tenure upgrading; the increasing implementation of infrastructural works through a self-help methodology; as well as the faster procurement, decision-making and implementation in the LSA. (Rajack and Barhate, 2004).

**Land Privitisation in the Russian Federation**

Kisunko and Coolidge (2007) provide a rare example of application of econometric analyses to the evaluation of urban public land management reforms in the Russian Federation. They use OLS regression analysis on a number of transaction cost and development output variables. They find some statistically reliable correlations between time to complete certain procedures and aspects of public land management such as number of stages by law and number of stages with
unofficial payments. They also find a reliable contribution of duration of certain procedures in determining land lease transactions in the total number of land transactions.

**Better Implementation of Land Pooling at Local Level in Nepal**

In the case of Nepal, where the urban development process is highly structured, land pooling projects are implemented and monitored mainly by the Kathmandu Valley Town Development Committee consisting of three Town Development Committees. Only two out of eleven projects were implemented and managed by municipalities (although following central government procedures). By comparison, two projects were implemented relatively faster than the ones implemented by the central office, and one of them yielded the highest financial internal rate of return (Karki, 2004).

**Section 3: Public Land Management and Land Market Outcomes – Global Empirical Insights**

While each of the above approaches to assessing public land management effectiveness offers useful insights, they stop short of assessing whether the management structures, production models or reforms are associated with broader land market impacts that one might reasonably associate with public land ownership and management. Econometric methods are seldom utilized to estimate if changes in developmental outputs let alone impacts are reliably associated with the structures and reforms or may be explained by other intervening variables. This is understandable given the somewhat tenuous theoretical linkages and the grave deficiencies in land market data for developing country cities. Moreover, the ability to conduct cross-country analysis has been hindered by the absence of standardized profiling of public land management features across cities.

In this section we begin to address this knowledge gap. We use some data of admittedly variable quality firstly to profile public land management across cities in the developing world. The key features highlighted are: organizational arrangements and human resource capacity; land information management; and land management practices. Then we explore whether there is evidence of empirical relationships between each of these features as well as the extent of public land ownership and a number of land market outcome indicators. These indicators include tentative estimates of house price to income ratios and shelter price inflation over the period 2000 to 2005; a more rigorous measure of the contiguity of recent spatial expansion; an estimate of the extent to which encroachment affects public rather than private land; and the percentage of firms citing access to land as a major constraint to their business.

**Data sources**

Our main data sources are as follows:

(i) First round data from the World Bank supported Urban Growth Management Initiative. Utilising pairs of satellite images taken 10 to 12 years apart, the Initiative produced a series of indicators to measure the level and pattern of urban expansion in 120 representative cities around the world. In particular we look at the Contiguity Index which measures the monocentricity of urban structure by calculating the share of the main built up cluster of the city in the total built up
area of the city. (Angel et al, 2005). The sample of cities was a random sample stratified to be reflective of world regions, population size and GDP variations.

(ii) Partial Second Round data from the Urban Growth Management Initiative which provides us with estimates of various land market outcomes for 60 of the 120 cities in the Study. For the most part, the 60 cities out of the 120 represent those that experience deficiencies in affordable and adequate housing often manifest by incidence of informal settlement. The estimates were generated by field based consultants applying a standardized instrument called the Survey of Secure Tenure in Cities with Irregular Settlements. The Survey comprised a series of field visits. On Visit 1, the consultants collected general housing market information from often incomplete statistical sources and expert opinions of local officials. The indicators which are being used in this paper were:

a. Estimated Inflation in housing prices over the period 2000-2005;
b. Estimated Median Dwelling Unit Price/Median Annual Income/Ratio in 2005; and
c. Estimated proportion of invaded land that is public land.

(iii) Original Data Collection on key parameters of public land management for the same 60 cities investigated in the Second Round of the Urban Growth Management Initiative. The parameters monitored included the following:

a. Relative extent of public land ownership
b. Active public land management functions
c. Degree of decentralization in public land management
d. Degree of functional agglomeration in public land management
e. Whether regulatory and development functions are combined in any State Agencies
f. Status of Land Information Organisation re computerization and reliability
g. Existence of Special Empowered Agencies engaged in the management of public land
h. Existence of a devoted agency for a wide array of public land management functions
i. Reliance upon in house versus outsourced land management capacity
j. Extent of reliance on Land Banking
k. Whether the cadastre and registry are either integrated into one institution or at least enjoy strong coordination
l. Relative level of land development activity of the public sector compared to the private sector.

These data were collected by electronic administration of a questionnaire specifically designed for the study to local subject matter experts. The respondents were a mixture of the following:

(i) city or central/provincial level government officials;
(ii) consultants (often locally based) who worked on Phase 2 of the UGMI in the particular city;
(iii) prominent academics who have worked on the city;
(iv) World Bank urban staff that have a longstanding engagement with the city/country.
In most cases the questionnaire was returned only after some consultation with others knowledgeable about the city and land issues. In about one quarter of cases, more than one local subject matter expert completed the questionnaire for the city.

(iv) The World Bank’s Investment Climate Assessment (ICA) data from which we extract: the percentage of firms citing access to land as a major constraint to their business as another land market outcome indicator. This data was collected in a systematic and standardized way from firms in each country using the Bank’s Investment Climate Assessment tool. The instrument is applied mainly to formal sector firms.

(v) A database of Decentralisation Indices for cities around the world. In this database a composite index of decentralization is generated from sub-indicators of: government structure; method of selection of regional executives; method of selection of local executives; override authority; revenue raising authority; revenue sharing; and authority for education, infrastructure and policing. The overall score is the simple average of the scores on these 9 dimensions.

Public land Management Indices:
Using the primary data collected for this study, three indices of public land management were created. The creation of these indices allowed for more streamlined analysis including fewer degrees of freedom in the regression analysis. They also decreased the sensitivity of the analytical findings to possible inaccuracies in responses to individual questions. Two additional indices which were composites of these first three were also created to allow for further streamlining of analysis.

Table 3 summarises each of these indices.

<table>
<thead>
<tr>
<th>Public Land Index 1</th>
<th>Public Land Information Management</th>
<th>How Derived</th>
<th>Range</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Land Index 1</td>
<td>Public Land Information Management</td>
<td>Sum of: Land Information Records mostly complete and reliable (1,0); and Coordination of Registry and Cadastre (1,0)</td>
<td>0-2</td>
<td>Higher score indicates better land information management.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Public Land Index 2</th>
<th>Public Land Organisational Arrangements and Capacity</th>
<th>How Derived</th>
<th>Range</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Land Index 2</td>
<td>Public Land Organisational Arrangements and Capacity</td>
<td>Sum of: Existence of a Specially Empowered Agency (1,0); and Existence of a single Agency with multiple functions (1,0); and Significant in-house capacity (1,0); and Non-existence of a dual purpose Agency that develops and regulates (1,0)</td>
<td>0-4</td>
<td>Higher score indicates more favourable organizational arrangements and capacity</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Public Land Index 3</th>
<th>Public Land Management Practices</th>
<th>How Derived</th>
<th>Range</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Land Index 3</td>
<td>Public Land Management Practices</td>
<td>Sum of: Land banking not regularly used (1,0) and Public Lands regularly patrolled (1,0); and Land Auctions Used (1,0).</td>
<td>0-3</td>
<td>Higher score represents better public land management practices</td>
</tr>
</tbody>
</table>

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This index was compiled by Christine Kearney and based on a definition of decentralization as the assignment of fiscal, political and administrative responsibilities to lower levels of government (World Bank, 1998)
Results:

(a) Distribution of Public Land Institutional Arrangements in Developing Country Cities

The following series of tables presents the distribution of cities in the sample against scores on each of the indices listed above as well as extent of public land ownership and relative dominance of public land development activity over private sector initiatives.

Table 4: Distribution of cities versus score on Public Land Index 1 (Public Land Information Management)

<table>
<thead>
<tr>
<th></th>
<th>Low (0)</th>
<th>Med (1)</th>
<th>High (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of Cities</td>
<td>28%</td>
<td>35%</td>
<td>37%</td>
</tr>
<tr>
<td>Example Cities</td>
<td>Dhaka, Manila, Caracas, Cairo</td>
<td>Ho Chi Minh City, Istanbul, Warsaw, Coimbatore</td>
<td>Buenos Aires, Hong Kong, Santiago, Seoul</td>
</tr>
</tbody>
</table>

Table 4 shows a fairly even distribution the numbers of cities across the Public Land Information Management Index.

Table 5: Distribution of cities versus score on Public Land Index 2 (Public land Organisational Arrangements) and Capacity

<table>
<thead>
<tr>
<th></th>
<th>Low (0-1)</th>
<th>Moderate (2)</th>
<th>High (3-4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of Cities</td>
<td>35%</td>
<td>28%</td>
<td>37%</td>
</tr>
<tr>
<td>Example Cities</td>
<td>Accra, Bacolod, Rajshahi, Manila</td>
<td>Alexandria, Moscow, Mumbai, Tehran</td>
<td>Bangalore, Algiers, Warsaw, Valledupar</td>
</tr>
</tbody>
</table>
Table 5 shows a fairly even distribution the numbers of cities across the Public Land Organisational Arrangements and Capacity Index.

<table>
<thead>
<tr>
<th>Table 6: Distribution of cities versus score on Public Land Index 3 (Public Land Management Practices)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<tr>
<td>Proportion of Cities</td>
</tr>
<tr>
<td>Example Cities</td>
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<tr>
<td></td>
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<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Table 6 shows a concentration of the numbers of cities in the mid-range of the Public Land Management Practices Index.

<table>
<thead>
<tr>
<th>Table 7: Distribution of cities versus score on Public Land Index 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Proportion of Cities</td>
</tr>
<tr>
<td>Example Cities</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Table 7 shows a concentration of the numbers of cities in the mid-range of the composite Public Land Management Index 4.

<table>
<thead>
<tr>
<th>Table 8: Distribution of cities versus score on Public Land Index 5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Proportion of Cities</td>
</tr>
<tr>
<td>Example Cities</td>
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<tr>
<td></td>
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<tr>
<td></td>
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<tr>
<td></td>
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<tr>
<td></td>
</tr>
</tbody>
</table>

Table 8 shows a fairly even distribution the numbers of cities across the overall composite Public Land Management Index with a slight concentration in the mid ranges.

<table>
<thead>
<tr>
<th>Table 9: Distribution of Cities by Extent of Public Land Ownership</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<tr>
<td>Proportion of Cities</td>
</tr>
<tr>
<td>Example Cities</td>
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<tr>
<td></td>
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<td></td>
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<td></td>
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<tr>
<td></td>
</tr>
</tbody>
</table>
Table 9 shows that the majority of cities (approximately two thirds) own less than one quarter of their land.

Table 10: Distribution of Cities by Relative Extent of Public Sector Dominance of Land Development Activity

<table>
<thead>
<tr>
<th>Proportion of Cities</th>
<th>Low to Moderate (1-3)</th>
<th>High (4-5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example Cities</td>
<td>Guadalajara</td>
<td>Algiers</td>
</tr>
<tr>
<td></td>
<td>Seoul</td>
<td>Cairo</td>
</tr>
<tr>
<td></td>
<td>Vijayawada</td>
<td>Ho Chi Minh City</td>
</tr>
<tr>
<td></td>
<td>Montevideo</td>
<td>Guangzhou</td>
</tr>
<tr>
<td></td>
<td>Manila</td>
<td>Moscow</td>
</tr>
<tr>
<td></td>
<td>Accra</td>
<td></td>
</tr>
</tbody>
</table>

Table 10 shows that the State is dominating private sector land development activity in about a third of the cities.

(b) Estimates of house price to income ratio

The first land market outcome indicator that we look at is a key measure of housing affordability, the house price to income ratio. When we control for the influences of GDP and population, we observe from an OLS regression analysis that the extent of public sector dominance of land development and the Public Land Index 3 are reliable contributors at the 10% level of confidence (see Table 11). The directions of the influences are as predicted in the analytical framework. Cities with a public sector that dominates private developers have less affordable shelter. Also cities which follow relatively prudent public land management practices (limited or no land banking; auctioning of land; and patrol of sites to detect encroachment) have more affordable housing.

Extent of public land ownership was not a reliable predictor although the sign of the coefficient suggested that greater public land ownership was associated with lesser affordability of shelter. The lack of correlation here is somewhat consistent with Pollakowsk and Wachter (1990) who is examining data for Montgomery County in the US, found no significant contribution of the percentage of vacant land in an OLS regression on a House Price Index. Positive but non significant correlations between house price to income ratio and GDP and Population variables were consistent with the findings of Ingram (1982) who found only weak support for the hypothesis that urban land values grow in proportion to the value of urban output and in proportion to the urban population.
Table 11: OLS Regression Results for the Determinants of House Price to Income Index

<table>
<thead>
<tr>
<th>Variable</th>
<th>Log of GDP PPP</th>
<th>Log of total Population</th>
<th>Extent of Public Land</th>
<th>Extent of Public Dominance of Land Development</th>
<th>Public Land Index 3</th>
<th>Public Land Index 4</th>
<th>N</th>
<th>R² and Adj R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>House Price to Income Ratio</td>
<td>0.84</td>
<td>0.39</td>
<td>0.28</td>
<td>3.08*</td>
<td>-1.62*</td>
<td>0.63</td>
<td>34</td>
<td>0.33</td>
</tr>
</tbody>
</table>

* denotes 10% level of confidence

(c) Estimates of shelter price inflation 2000-2005

The second land market outcome indicator that we examine is shelter price inflation over the period 2000-2005. When we control for the influences of GDP and population, we observe from an OLS regression analysis that the Public Land Index 3 is a reliable contributor at the 1% level of confidence (see Table 12). The direction of the influence is as predicted in the analytical framework. Cities which follow relatively prudent public land management practices (limited or no land banking; auctioning of land; and patrol of sites to detect encroachment) have experienced lesser inflation in shelter prices in recent years. Extent of public land ownership was not a reliable predictor although the sign of the coefficient suggested that greater public land ownership was associated with higher inflation in shelter prices.

Table 12: OLS Regression Results for the Determinants of Shelter Price Inflation

<table>
<thead>
<tr>
<th>Variable</th>
<th>Log of GDP PPP</th>
<th>Log of total Population</th>
<th>Extent of Public Land</th>
<th>Extent of Public Dominance of Land Development</th>
<th>Public Land Index 3</th>
<th>Public Land Index 4</th>
<th>N</th>
<th>R² and Adj R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated Shelter Price Inflation</td>
<td>-0.17</td>
<td>0.12</td>
<td>0.28</td>
<td>0.45</td>
<td>-0.61***</td>
<td>-0.05</td>
<td>41</td>
<td>0.26</td>
</tr>
</tbody>
</table>

*** denotes 1% level of confidence.

(d) Contiguity of Built Development

The third land market outcome indicator that we explore is the contiguity index of built development. Figure 1 depicts the variation in this index across cities in the sample. As can be seen the sample cities have widely varying contiguity ranging from very non contiguous cities such as Gorgan and Algiers to highly contiguous cities such as Buenos Aires and Bandung.
A Two Sample T test (assuming equal variances) found no significant difference in the contiguity index of built development for cities with greater than 25% public land when compared to cities with lesser public land ownership ($T\text{ Stat}=-0.57$, Sig. (two-tail)=0.57).

When subject to OLS regression analysis, none of the public land indices nor extent of public land ownership nor extent of public sector dominance of land development were found to be reliable predictors of city contiguity (see Table 13). The overall predictive value of the model with these limited set of regressors was very weak with only population serving as a reliable predictor at the 10% level of confidence.

<table>
<thead>
<tr>
<th>Variable</th>
<th>GDP PPP</th>
<th>Total Population</th>
<th>Slope</th>
<th>Extent of Public Land</th>
<th>Extent of Public Ownership of Land Development</th>
<th>Public Land Index 3</th>
<th>Public Land Index 4</th>
<th>N</th>
<th>$R^2$ and Adj $R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contiguity Index around 2000</td>
<td>-0.00</td>
<td>1.53e-08*</td>
<td>0.00</td>
<td>0.06</td>
<td>-0.05</td>
<td>-0.05</td>
<td>-0.03</td>
<td>42</td>
<td>0.22</td>
</tr>
</tbody>
</table>

* denotes 10% level of confidence.
**Estimated extent to which encroachment affects public rather than private land**

The fourth land market outcome indicator that we probe is the estimated extent to which encroachment affects public rather than private land.

When we look at the relationship between overall decentralization in the country (used here as a proxy of decentralization in public land management) and the proportion of invaded land that is public land, we see a roughly linear relationship ($R^2 = .18$) with a negative gradient (see Figure 2). If this is indicative of a significant relationship, it would imply that greater decentralization is associated with lesser encroachment of public land – perhaps because of better detection on account of a local administrative presence.

**Figure 2: Decentralisation vs Proportion of Invaded Land that is Public Land**

![Graph showing the relationship between decentralisation and proportion of invaded land that is public land.](image)

OLS Regression analysis controlling for GDP and population confirmed the correlation between decentralization and the proportion of invaded land that is public land at the 5% level of confidence (see Table 14). None of the public land management indices, nor extent of public sector dominance nor extent of public land ownership were reliable predictors. The overall predictive value of the model with these limited set of regressors was very weak.
Table 14: OLS Regression Results for the Determinant of the Proportion of Invaded Land that is Public Land

<table>
<thead>
<tr>
<th>Variable</th>
<th>GDP PPP</th>
<th>Total Population</th>
<th>Extent of Public Land</th>
<th>Extent of Public Dominance of Land Development</th>
<th>Public Land Index 3</th>
<th>Public Land Index 4</th>
<th>Decentralisation</th>
<th>N</th>
<th>R² and Adj R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated Proportion of Invaded land that is Public</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>-0.08</td>
<td>-0.06</td>
<td>-0.06</td>
<td>-0.17**</td>
<td>22</td>
<td>0.35</td>
</tr>
<tr>
<td>** denotes 5% level of confidence.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(f) Proportion of firms citing access to land as a major constraint to their business

The final land market outcome indicator that we probe is the proportion of firms citing access to land as a major constraint to their business. Figure 3 shows the distribution of this variable across the countries represented in the sample.

Figure 3: Plot of Proportion of Firms Citing Access to Land as a Major Constraint by Country

Source: Based on World Bank Investment Climate Data - various years (2002-2006)

A Two Sample T test (assuming equal variances) found that in cities where the public sector dominates land development, a higher percentage of firms cite land access as a major constraint to their business than in cities with a less dominant public sector. T Stat=-2.71, Sig. (two-
Another Two Sample T test found that in cities with greater than 25% public land, a higher percentage of firms cite land access as a major constraint to their business than in cities with lesser public land ownership (T Stat=−1.73, Sig. (two-tail)=0.09).

When subject to OLS regression analysis controlling for GDP, population and city contiguity, the earlier T test finding about the extent of public sector dominance of land development activity was confirmed. The predictive value of this regressor as well as the population regressor was reliable at the 10% level of confidence. When the analysis was repeated using the log of the percentage of firms citing land access as a major constraint as the dependant variable, the Public Land Index 5 became a reliable predictor at the 10% level of confidence and city contiguity became reliable at the 5% level. The coefficient signs were such that cities with better public land management (land information, organizations & capacity and practices) provided fewer obstacles to land access for business as did more contiguous cities. The confidence level for the predictive value of extent of public land ownership dropped to 15% (see Table 15).

Table 15: OLS Regression Results for the Determinants of the Percentage of Firms Citing Land Access as a major Constraint

<table>
<thead>
<tr>
<th>Variable</th>
<th>Log of GDP PPP</th>
<th>Log of total Population</th>
<th>Extent of Public Land</th>
<th>Extent of Public Dominance of Land Development</th>
<th>Contiguity Index</th>
<th>Public Land Index 5</th>
<th>N</th>
<th>R² and Adj R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of Firms Citing Land Access as a Major Constraint</td>
<td>-4.22*</td>
<td>-0.28</td>
<td>4.26</td>
<td>7.71*</td>
<td>-8.19</td>
<td>-1.28</td>
<td>36</td>
<td>0.33 0.18</td>
</tr>
<tr>
<td>Log of % of Firms Citing Land Access as a Major Constraint</td>
<td>-0.34</td>
<td>-0.05</td>
<td>0.76</td>
<td>0.21</td>
<td>-2.32**</td>
<td>-0.28*</td>
<td>36</td>
<td>0.29 0.14</td>
</tr>
</tbody>
</table>

**, * denote 5% and 10% levels of confidence respectively

Section 4: Conclusions and Future Research

While considerable work has been undertaken on the effects of various land use regulations on land market outcomes, empirical analyses of the purported linkages among salient features of public land management and land market outcomes are very limited. This exploratory paper was an attempt to shine some light into those empirical gaps. It was subject to many limitations including data deficiencies. Three of the land market outcome indicators were based on estimates by local officials and sketchy statistical sources rather than hard transaction record data generally unavailable in developing countries. At times city data on one variable was plotted or regressed against country data for another (as with decentralization and land access obstacles faced by businesses) and timeframes were not always perfectly coincident. At other times dynamic (change over a period of time) data were plotted against static data (fixed at one point in time). However, on other occasions such as with the contiguity index, the data was much more reliable
being based on analysis of satellite images. Reliability was also stronger with the Investment Climate data on land access obstacles faced by businesses.

The preliminary findings suggest that public land management may matter to certain land market outcomes but not others. The analysis suggests tentative positive relationships between less dominant public sector involvement in land development activity and better land market outcomes. This is potentially important and suggests that significant direct participation by the State to address land market deficiencies on average may not yield better land market outcomes for the poor. This result was supported by other findings that better and more conservative public land management practices (limited or no land banking; auctioning of land; and patrol of sites to detect encroachment) as well as decentralization are also correlated with better land market outcomes. These correlations were observed for indicators of affordability, encroachment and access and not for the indicator of spatial form. Across the spectrum of indicators, extent of public land ownership did not generally feature as a reliable predictor of land market outcomes. The potential effect of more idiosyncratic organizational and capacity arrangements was difficult to trace and in no instance was it found to be an independently reliable predictor of land market outcomes.

The results are very tentative as the models presented typically explained less than 20% of variation in the land market outcome indicators as quantified by the Adjusted $R^2$ values. This suggests that there may well be several other unmonitored variables that could explain away any effects that we observed. Some of these other explanatory variables we were aware of but simply did not have the cross-country data available. However, the frequency with which public land management variables featured as reliable predictors of a variety of land market outcome indicators suggests that we should also be cautious about dismissing their relevance to hastily. Even so, correlation between public land management and land price growth does not lend to straightforward interpretation as higher land prices can be due to capitalization effects (a ‘good’ as in the hedonic literature focusing on demand) or land scarcity (a ‘bad’ due to land supply constraints – a supply side problem).

As is often the experience when shining light into dark places, sometimes we discover more unknowns. This was our experience leading us to highlight the following as areas for future research:

- The political economy of public land management and reform needs to be much better understood. The asymmetric bargaining process that surrounds public land decisions together with the sense of entitlement and historic deprivation are key aspects of public land management that affect the choices the State makes with an asset that is usually defined as ‘held in trust for the people’. Such analyses would be particularly relevant in countries where public land ownership is substantial. Rent seeking and corruption are an important aspect of this line of research but the needed breadth is wider than these issues normally suggest.

- The social and environmental benefits that may be derived from vacant public land are generally not factored into analyses favouring intensive, revenue maximizing uses of urban public land. Research that strikes a balance in the way these decisions are
evaluated would be welcomed. This is linked to a long run analysis of various land uses which given the typical durability of property rights may sometimes justify holding prime land off market in the short to medium term. Associated with this is an assessment of whether decisions by private actors that are typically profit maximizing would be less or more conducive to the types of long term land market objectives the society may wish to achieve.

- It would also be useful to research whether particular public land management institutional configurations are better suited to specific public land intervention instruments. This is a more sophisticated analysis that was not feasible to undertake at this stage given the general absence of more basic empirical work in the field.

- An understanding of the scope for pursuing specific land management practices and other institutional arrangements under widely varying land tenure systems is also useful for building operationally on research of the nature undertaken in this paper.

- Detailed country specific studies that utilize econometric tools to study comparative development outputs and impacts under evolving institutional structures would also allow for much greater depth of diagnosis and prescription.

- Wherever feasible, the type of analysis undertaken in this paper should be repeated using actual land market transaction data rather than expert opinions. Such analysis would be bolstered by simultaneous consideration of data on other likely influences on land market outcomes.
References


