

2.

LINKING PRINCIPLES TO LAND-FINANCE INSTRUMENTS: DEVELOPED-COUNTRY EXPERIENCE

Many techniques have been employed for tapping land values to help finance urban infrastructure investment. The rationale for these techniques often is confused and sometimes inconsistent. This chapter sorts out the relationship between benefit capitalization and cost recovery of infrastructure investments, describes a variety of land-financing techniques based on such principles, and illustrates how some of the land-based financing methods have been implemented in developed countries. Developed-country experience is pertinent, both because there often is a longer track record of implementation to observe and because developing countries have drawn directly on this experience in framing their own initiatives. The new towns being built in the Arab Republic of Egypt and India are based on the new town movement in Great Britain after World War II. Betterment taxation as applied in Latin America (*contribución de valorización* and *contribución por mejoras*) draws directly on the principles incorporated in Spanish law. Land readjustment schemes in Asia build on the experience of Japan and the Republic of Korea; initiatives to introduce impact fees follow the planning and legal approaches used in the United States.

The second part of the chapter examines another principle that underlies land-based financing of infrastructure investment: *land asset management*. Throughout the world, local governments and public agencies have turned

to underused land assets as a source of revenue for infrastructure investment. They have sold land, or land-leasing rights, in order to strengthen their core mission of providing infrastructure.

Public-private partnerships are critical to the execution of both types of land financing. A wealth of experience has been accumulated regarding the elements that make for successful public-private partnerships in this arena. This experience is as valuable for the design of future programs as the implementation record of different types of land-financing instruments.

Benefit Capitalization and Value Capture

The basic rationale for using land-financing techniques to pay for urban infrastructure investment is the principle of *capitalization of benefits into land values*. Consider a simple, representative investment project: the installation of a water distribution system within a new development subdivision. The physical works are built by one agent—a public or private developer—and then turned over to an operating utility (public or private) that distributes water and charges a tariff that fully covers operating and maintenance costs.

Installation of a water supply system in the subdivision will increase land values there. The benefits that consumers assign to having access to piped water will be capitalized into land values within the access zone. The subdivision developer will be able to capture the land-value gain at the time he sells land parcels or developed lots. If there is a competitive market in land development—that is, a market where developers are free to form new subdivisions and build water distribution systems in response to demand for them—the value of the benefits of water supply that are capitalized into land values will just equal the cost of building the water system. Competition in the development market will ensure that, as long as the gains in land values from building subdivisions and water systems exceed the costs of construction, water supply coverage will be expanded to additional parcels. Community development with water access will continue to the point at which a developer just recovers his costs of infrastructure construction through higher land prices. The same principle applies to other infrastructure improvements that the developer can internalize within the subdivision (see Ingram 2007).

In this baseline case, the land developer (public or private) recovers his infrastructure costs at the time of sale of either land or developed lots. A private developer, operating in an unregulated market, will install infrastructure networks only to the extent he can fully recover his (time-adjusted) costs of investment. Informal land assemblers operating in Latin America and parts of Asia sometimes have found it more profitable to open up land parcels for sale with only the most rudimentary infrastructure, such as a few unpaved

entrance roads and a handful of water sources. The benefits of further infrastructure investment, as reflected in higher land prices, are outweighed by the costs of construction, the delay in project development and land sale, and the risks of intercession by public authorities who will impose a full set of “formal sector” development standards. Public regulation that establishes minimum infrastructure standards for newly developed urban land then becomes necessary in order to protect the public from the health and congestion costs of uncontrolled development.

In the base case, one party (public or private) acts as both land developer and infrastructure investor. As long as the benefits and costs associated with infrastructure investment and land development are internalized within the development area, infrastructure costs can be financed efficiently through land sales. The model becomes more complicated, and different instruments are required for financing, when (a) the developer and infrastructure investor are not the same party, (b) benefits or costs spill over beyond the development zone, or (c) benefits are generated not by infrastructure investment but by planning or density permissions.

Financing Infrastructure through Developer Land Sales

A good deal of privatization of infrastructure investment in Western countries has taken place through the simple expedient of requiring subdivision developers to provide their own common infrastructure and to recover their costs through land sales. As the scale of new development increases, this policy shifts an ever-larger share of total infrastructure investment to private developers. New towns or new cities represent an extreme case of internalizing both land development and infrastructure installation. New towns in the developing world build directly on the experience with new towns in Great Britain (see Schafer 2006). Although the overall impact of the British new town movement is much debated, the track record in infrastructure finance is impressive. The 23 new towns that were built in Great Britain in the 1950s recovered all of their infrastructure investment costs through land and property sales, and, at the time the New Towns Development Corporation was wound up, it held excess land (serviced by infrastructure but not yet developed for housing or other use) worth more than £1 billion (Heim 1990).

New towns introduce an additional challenge for infrastructure financing. They must be connected to the rest of an urban area by major highways, rail connectors, and trunk utility lines. Orestad, a new town built outside of Copenhagen, is the most recent new town built in Western Europe. Box 2.1 recounts the history of Orestad. It involves an innovative partnership between national and local government to form a development corporation charged with land development, infrastructure construction, and land sale.

BOX 2.1

New Town Land Financing in Orestad, Denmark

Orestad is a new town outside of Copenhagen built on the precedent of British new towns. It is connected to central Copenhagen by a 22-kilometer automated metro serving 60 million passengers a year. Both the infrastructure development for the new town and construction of the metro line are being financed primarily through land sales. The metro opened in late 2003.

Orestad was planned, developed, and financed through an unusual joint venture between central and municipal government. Copenhagen originally sought central government financing for development of the new town. Instead, the government provided land amounting to 45 percent of the 310-hectare site. Copenhagen owned and contributed the other 55 percent of land. The two partners share ownership of the developer, Orestad Corporation, in proportion to their contributions of land.

Orestad's development plan called for construction of the metro line and phased development of six town centers within the overall development site. The towns were designed to be centers of education (30,000 university and technical students), corporate and commercial offices (60,000 workers), and residential housing (30,000 permanent residents). Infrastructure and metro investment has been financed by commercial rate borrowing. At the end of fiscal 2006, total debt stood at DKr 13.7 billion, or US\$2.75 billion. The debt is being repaid primarily by land sales, supplemented by property taxes on new construction.

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The new town experience suggests that financing large-scale development infrastructure through land sales remains feasible, as long as the public sector owns the land scheduled for development or can acquire it cheaply. Under the Orestad model, infrastructure installation is originally financed through debt, and the debt is repaid over 20 years or more, primarily through land sales. Under different conditions, the costs of infrastructure can be recovered much more quickly. Chapter 3 shows that in Egypt, Tunisia, and other countries of North Africa and the Middle East, publicly owned land supplied with public infrastructure in new development areas can be sold to private developers at prices that far exceed the costs of infrastructure installation. This is due, on the one hand, to high demand resulting from rapid urbanization and, on the other, to bureaucratic constraints on the supply of land, which have

BOX 2.1

New Town Land Financing in Orestad, Denmark (*continued*)

In the planning stage, it was projected that land values would double on completion of the metro line. Actual market development was slower. Metro construction was delayed, and the final cost, at €1.5 billion, was double the original estimate. Land prices initially rose 10–15 percent, rather than the predicted 100 percent. However, both land prices and land sales accelerated rapidly as development proceeded and commercial occupancy began. In 2005 land approved for 224,000 square meters of gross floor space was sold; in 2006 land approved for 630,000 square meters of gross floor space was sold. Sales revenues totaled Dkr 4.6 billion through the end of fiscal 2006. The Orestad Corporation now projects that all borrowing will be repaid ahead of schedule and that all infrastructure and metro construction will be financed, as planned, without government subsidy beyond the land contributions. The metro line is operated by a private company that fully recovers operating costs through fares.

Sources: Orestad Web site at the Ministry of Transportation, Denmark, <http://www.trm.dk>; Orestad Corporation (2005, 2006, 2007); “The Tale of Orestad and the Metro,” at <http://www.orestad.dk>; Mikkelsen (2007).

limited the amount of land in desirable locations that is supplied with infrastructure services and made available to the market.

Capturing Land-Value Gains from Private Landholders

Typically in Western countries, the landowners benefiting from public infrastructure projects are private landholders. This is true of subdivisions, when basic infrastructure is provided “free” by public authorities. It is also true of major infrastructure projects, such as the construction of expressways, metro lines, and airports. On a smaller scale, upgrading projects like road paving or the extension of water supply into unserved areas generate localized benefits that are capitalized into land prices. “Value capture” refers to techniques for capturing all or part of the increment in private land values caused by public investment. In this way, landowners who are direct beneficiaries of a project pay for part of project costs rather than taxpayers at-large.

A robust empirical literature has corroborated the land-value gains associated with urban infrastructure investment, particularly transportation projects (for a selection of this literature, see Gihring and Smith 2006; Hass-Klau

2006). For limited-access highways or rail transit systems, studies show that land-value capitalization is strongest for locations near the access points and much weaker or even negative for locations along the transportation route but distant from access points. It is typical to observe a land-price gradient, in which capitalized land-value gains fall quite steeply from the access point. For example, land-value gains associated with city metro (subway) systems have been found to be highly concentrated within a 500-meter radius of metro rail stations and largely exhausted within a 1,000-meter radius.

It is a relatively straightforward step from the observation of land-value gains due to public infrastructure investment to a recommendation that the public sector should “capture” all or part of the land-value gain caused by its investment and use the proceeds to pay for project construction. The first Habitat Conference on Human Settlements drew the following conclusion: “The rise in land values resulting from ... public investment ... must be subject to appropriate recapture by public bodies (United Nations 1976: rec. D.3[b]).

Many land economists have argued that almost all urban infrastructure could be paid for by value capture of this kind. The so-called Shoup Anomaly, attributed to Carl S. Shoup, asks, “Why is it so difficult to finance public infrastructure given that the increase in urban land value is much greater than the cost of the infrastructure?”

Betterment Levies

Betterment levies may seem to be the most direct form of value capture. These are charges levied directly on the increments in land value created by public investment. Most countries in the world have at one time or another experimented with variants of betterment levies. Great Britain for a period imposed a betterment levy equal to 40 percent of the land-value gain attributable to public investment. Several nations in the British Commonwealth adopted a version of this approach to land financing. Betterment levies, known as *contribución de valorización* or *contribución por mejoras*, long have been an element of infrastructure finance in Spain and were carried over to Latin America.¹

¹The Spanish system uses several instruments for capturing gains in land value. The *contribución por mejoras* taps gains resulting from public improvements. *Cuotas de urbanización* require land donations and infrastructure cost sharing for private developers of land receiving public planning approval for urban use. A special tax, separate from the property tax, is levied on the *increase* in land and property values; this is intended to capture part of the benefit from publicly supported urban growth. As elsewhere, revenue collection from these versions of betterment levies has been falling. See Henao González (2005).

In their basic form, betterment levies are a one-time, up-front charge on land-value gain caused by public works. In the United States, a variant in the form of special assessment districts or benefit assessment districts has been employed. These districts levy an annual charge (similar to a property tax rate) against the *increment* in land values caused by a publicly financed infrastructure project. The annual revenue flow is used to repay debt incurred to finance initial construction. During earlier periods of rapid urbanization in the United States, it was common for special assessment revenues to constitute 15 percent or more of total municipal revenues (Hagman and Misczynski 1978).

Although the concept of betterment levies is straightforward, implementation under modern conditions has been unexpectedly difficult. A closer look at the empirical studies supporting benefit capitalization reveals some of the difficulties. Empirical analyses, even when conducted in retrospect after market price changes can be observed and in countries where data on land and property sales are regularly and consistently recorded, generally account for two-thirds or less of the observed variation in prices of land parcels. The portion of this change that can be ascribed to public infrastructure investment, though typically statistically significant, can vary between large and modest, with the exact estimate subject to a considerable range of uncertainty. Different studies of the same infrastructure project by different authors can report drastically different results. At the area level, the estimated land-value impact of an infrastructure project may differ by as much as 300 percent or even more. Variations between studies in the way aggregate land-value changes are distributed among individual parcels possessing different access and other characteristics can be still greater. If ex post empirical studies by academics are subject to such variation, it is easy to understand why administrative attempts by government to identify the land-value impacts of infrastructure projects on specific parcels of land, and to tax away 40 to 60 percent of the imputed gain from the private landowner, have been subject to challenge.

The Jubilee Line Extension (JLE) of London's underground system is a good example of the difficulty of pinpointing land-value gains. No recent infrastructure project has received more attention, in terms of potential for financing through betterment levies, than the Jubilee Line Extension. The JLE was built in the 1990s and completed shortly before Christmas 1999 at a cost of £3.5 billion (US\$7 billion). Shortly after the project's completion, Don Riley published a book calling attention to the large rise in land values caused by the JLE and arguing that the project could have been financed in its entirety by betterment taxes on the land-value gains that accrued to private landowners (Riley 2002). The book commanded a good deal of notice, especially as applied to options for financing the next generation of rail projects in London.

Transport for London (the official transport agency) commissioned two large, independent studies aimed at empirically identifying the uplift in land values attributable to JLE, with the policy goal of determining whether betterment levies on land-value gains could play an important part in financing future transport initiatives. Several academic studies of JLE's land-value impacts also were launched.

The empirical results illustrate the difficulty of using betterment taxation to finance a substantial part of major infrastructure projects. One of the formally commissioned studies concluded that it was impossible to estimate land-value impacts from available data (Atisreal and Geofutures 2005). The second commissioned study warned that land-value impacts were highly uncertain and estimated that the impact on land values in Canary Wharf (the presumed primary beneficiary of the JLE) could range anywhere between £300 million and £2.7 billion (Jones Lang Lasalle 2004). A third study, carried out under the auspices of the Lincoln Institute for Land Policy, using a different methodology, estimated the land-value gain for Canary Wharf at only £40 million (Mitchell and Vickers 2003).

The uncertainty surrounding estimates of land-value gains has carried over to practical attempts to implement betterment levies. Box 2.2 summarizes efforts to introduce betterment levies in two places: Poland and Sydney, Australia.

Betterment levies have been caught in a dilemma. It has proved too ambitious in practice to try to identify with precision, parcel by parcel, the land-value gains resulting from public works projects. However, the “tax” rates imposed by betterment levies—30 to 60 percent of the gain in parcel value attributed to public investment—are so high that both public opinion and the courts have rejected this form of infrastructure finance unless there can be greater certainty about the underlying land-value gains. For this reason, betterment levies have fallen out of favor as a significant source of revenue. Practical measures to revive the use of betterment levies, discussed in chapter 3, have relaxed the strict interpretation of “value capture” and turned the betterment levy into a general infrastructure tax, more broadly tied to land-value gains.

Negotiations and Voluntary Contributions

One way of dealing with the uncertainty of price impacts, and therefore the apparent arbitrariness of the rules apportioning betterment tax burdens, is to have landowners agree on the rules for allocating costs before a project is started. This works best for small-scale projects where collective agreement is feasible. In the United States, many cities have operated systems where neighborhoods can have their streets paved whenever landowners agree to pay a

BOX 2.2

Implementation of Betterment Levies in Poland and in Sydney, Australia

Poland in 1997 passed a Land Management Act that allowed local authorities to impose “adjacency levies” on landowners, based on the market value increase of land due to installation of local public infrastructure, including roads, sewers, water supply, electricity, gas, and telecommunications. The law permitted local authorities to set betterment levy rates up to 50 percent of project costs. A majority of local governments adopted the adjacency levy at some point.

In practice, it proved extremely difficult to assess the incremental land value created by public improvements. Special appraisers were hired to estimate before-and-after land values, parcel by parcel, within improvement districts designated by the local government. However, the Supreme Administration Court set aside many of the appraisers’ decisions, finding wrongful determination of land-value gains. Administrative costs were high, running as much as 30 percent of revenue collections.

A case study of Szczecin, a mid-size city of 415,000 that imposed an adjacency fee at the maximum rate of 50 percent in 2004, found that only 26 land parcels were assessed for land-value gains and that the total amount of revenue collected was equal to 0.6 percent of public infrastructure investment in the areas designated as improvement districts. The betterment statute was annulled after less than a year, primarily because the controversy over land-value determination outweighed the revenue generated.

Sydney, Australia, is one of the British Commonwealth locations that experimented with betterment levies following the example of Great Britain. Sydney’s betterment levy was a variant that imposed a 30 percent tax rate on land-value gains resulting from planning authorization to convert land to urban use. Land-value gains were measured from a baseline of August 1969 to the point at which land was rezoned for urban use. All revenues generated from the betterment levy were to be used to finance infrastructure investment required for urban use, with priority given to water supply, wastewater removal, and drainage.

The New South Wales valuer-general was charged with determining the land-value gain for different parcels. Assessment was facilitated by the fact that New South Wales already had a land-value tax that required assessment of land values.

(continued)

BOX 2.2

Implementation of Betterment Levies in Poland and in Sydney, Australia (continued)

Sydney's experiment with the betterment levy lasted a little less than five years. It generated about \$A3.4 million a year on average, compared to planned annual investment in water and sewerage of \$A62 million. Administrative costs averaged some 10 percent of revenue collections at the height of implementation. The betterment levy was abolished in part because landowners mounted intense political opposition and in part because the levy was generally perceived to be driving up land prices, as landowners withheld land from development in anticipation that the tax would be abolished. Revenues were viewed as modest relative to infrastructure costs and were complicated by the fact that Sydney's legislation called for revenues to go into a revolving fund that made loans (at 2 percent interest) to the public agencies responsible for investment. Sydney's version of the betterment levy further fueled controversy because it assigned all of the land-value gains between 1969 and the date of rezoning authorization to urban development planning approval, without taking into account other factors affecting land values.

Sources: Archer (1976); Gdesz (2005).

front footage rate that covers the full costs of the improvement. This approach leaves it up to landowners to determine whether their benefits exceed the costs of capital improvement. The same principle is applied in business improvement districts, where business owners agree beforehand on rules for allocating the costs of an improvement like street lighting that is in the interests of all, as long as aggregate benefits are perceived to exceed aggregate costs. The same approach is followed in countries at the other end of the income scale. Kebeles—neighborhood communities—and business districts in Ethiopia, for example, use almost exactly the same methods of reaching community agreement on the desirability of street paving or street lighting. They agree on a formula for allocating costs, which typically incorporates land size or land value as an indicator of benefit received, and then collectively pay for the community's share of the public work. In Tigray Province of Ethiopia the kebele share of street paving costs typically is set at 50 percent (see Peterson 2005).

The principle of negotiated agreement can be extended to larger works. One of the conclusions to flow from the analyses of the Jubilee Line Extension in London is that it is impractical to finance major rail investments through betterment taxation. The next large project, Crossrail, which estab-

lishes an east-west rail link across the British capital connecting outlying towns, Canary Wharf, the City of London, and Heathrow Airport, was finally approved for go-ahead in November 2007 after many years of debate over financing. The financing solution involves a capital contribution from national government, a capital contribution from the City of London, a supplement on the property tax from business property owners, and “voluntary,” negotiated contributions from the two major landholders and project beneficiaries. The developers of Canary Wharf and the British Airport Authority (a private company that operates Heathrow Airport) reportedly have agreed to contribute a combined £1 billion (US\$2 billion) to capital financing of the project. Although the payments are relatively modest compared to total project cost, they were necessary to finalize the cost-sharing agreement. Similarly, the real estate developer, DLF, has agreed with the Delhi (India) metro authority to finance on its own a 4-kilometer extension of the metro line to serve its Mall of India project, at an estimated cost of US\$100 million.

Public Land Acquisition and Resale

Another method of avoiding arbitrary imputation of land-value gains is for the public sector to own the land around an infrastructure project and then sell it on completion of the project. If the land is sold at competitive, arm’s-length terms, the sale will capture for the public sector the full value of the land, including the increment created by the construction of infrastructure. In one version of this model, the public sector acquires from the private sector the land to be used for an infrastructure project as well as surrounding land that will benefit from the increase in value caused by the public works. The difference in land values between the acquisition price and the sale price represents the value created by the infrastructure project and is captured by public authorities when the land parcels are sold on project completion.

Sale of publicly acquired land “solves” the problem of land valuation at the project completion stage. However, it introduces three other problems. First, how should land be valued at the point at which public authorities acquire it? Legal rules typically give public authorities the right to condemn land and acquire it from private parties in order to execute infrastructure projects. However, the price that should be paid is subject to varying legal rules. In most advanced countries with private freehold ownership, public authorities now must pay “market value” for land that is acquired from private parties through condemnation. Legal rules specify the procedures for determining market value. Conceptually, the primary issue is how much, if any, of the incremental value anticipated from future public infrastructure development should be capitalized into the acquisition price that public authorities pay. In other words, does the land-value gain belong to private

landowners, the government, or both? This issue has been hotly contested in developed nations. As chapter 3 makes clear, an even greater range of law and practice governs the pricing of public land acquisition in developing countries.

A second issue concerns the amount of land that public authorities can acquire through condemnation. At one end of the spectrum, public authorities may be allowed to acquire only the land specifically required for construction of public works. At the other end of the spectrum, public authorities may have the latitude to acquire, at favorable prices, large amounts of surrounding land whose value will appreciate due to infrastructure construction. Most Western nations now tightly restrict the “excess” land that public authorities can acquire through condemnation. However, the law was more flexible during the periods of rapid urbanization in the nineteenth century.

Finally, how should the profits from the sale of public land be allocated? Should some of the profits realized go back to the original landowners, if they were forced to sell their holdings at current-use value or administrative prices? Should the profits from public land transactions be dedicated to financing the infrastructure projects that generated them, or should they be available for broader public use? Various allocation rules have been devised for splitting the land-value increments resulting from the installation of infrastructure. In Japan and Korea, these rules resulted in formal land readjustment schemes, in which public authorities acquired undeveloped land at current-use value, installed infrastructure systems, and then returned well-defined proportions of the finished land to the original developers, in effect splitting the land-value gains between the public and private sectors (for a recent review of international experience with land readjustment, see Hong and Needham 2007). These arrangements have fallen out of favor, as landowners today are unwilling to entrust land to government for the long periods required for urban development, and government is reluctant to pay the high prices now necessary to acquire land ready for urbanization. Land readjustment has left its mark on developing-country practice, however, especially in Asia.

Box 2.3 summarizes the classic case of public land acquisition and infrastructure finance in Haussmann’s Paris. The case captures many of the key recurring issues, from land acquisition rules to financing strategies and from inventive public-private partnerships to off-budget manipulation designed to avoid fiscal limits.

The public sector’s ability to use land acquisition and resale as an infrastructure financing tool depends on (a) its ability to “buy low and sell high”—

BOX 2.3

Land Finance and the Reconstruction of Paris

Baron Haussmann's reconstruction of Paris was one of the largest urban redevelopment programs ever undertaken. Although the effort is best known for its impact on urban design and architecture, it also involved massive investment in infrastructure. The new avenues and boulevards that were built came fully equipped with water and sewer lines, drainage, and utilities. A new aqueduct system brought clean water into the city, including one aqueduct that eventually delivered water from sources 600 kilometers distant.

Financing strategy. The state financed one-third of the costs of reconstruction through grants. The remaining costs were borne by the municipal government, via budgetary contributions, land sales, and borrowing. Land sales were critical to the financing strategy. Haussmann acquired huge swaths of land through condemnation and expropriation at current-use value or less. In all, more than 20,000 buildings and a large part of the Ile de la Cité were demolished to clear the way for public works and new buildings. Excess land adjoining the new avenues was sold to private promoters, after works were completed, at prices enhanced greatly by public investment. Land retained by the municipality indirectly backed the borrowing used to finance construction. The financing strategy also identified the *octroi*—a tax on goods entering the city—as the most buoyant source of current revenue that would help to repay debt. Its revenues were expected to boom as the materials needed for rebuilding were imported into the city.

Legal underpinnings. The land transactions central to financing were made possible by a decree issued in 1852, just before Haussmann assumed his role as prefect of Paris. The decree changed the rules for land expropriation. Previously, only the specific land to be used for public works could be expropriated by public action. The new decree stated that “for purposes of public interest” public authorities could acquire all the buildings and other property along avenues to be constructed. This “excess” land was able to capture for the city the land-value gains resulting from public investment. The eventual unraveling of Haussmann's financing strategy resulted from courts' later rulings, starting in the 1860s, in favor of landowners, holding that (a) landowners were entitled to higher compensation for land expropriated than had been granted by the city and that (b) excess land held by the city, but not used for actual public works, had to be returned to the original owners at the acquisition price rather than at current market value as enhanced by public investment.

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Land Finance and the Reconstruction of Paris (continued)

Public-private partnership and borrowing. The entire enterprise involved a new form of public-private partnership. The reconstruction project was devised and organized in detail by the state. However, private entrepreneurs carried out the investments in public as well as private facilities. They were financed off budget by a newly created municipal public works fund (*caisse de travaux*). The *caisse de travaux* was originally established as a fund to smooth over cash flows during the long period required to build infrastructure. However, it soon became a source of direct debt financing for private contractors on behalf of the city, periodically augmented by the proceeds of land sales.

Off-budget financing. The *caisse de travaux* was operated off budget and without public oversight. Haussmann was able to make financial arrangements on his own. At times, off-budget annual investment expenditures via the public works fund were more than twice total expenditures under the city's formal public budget. Haussmann also arranged other off-budget forms of borrowing to avoid council review and fiscal limits. David Harvey writes that in 1869, shortly before Haussmann resigned and the *caisse de travaux* was terminated, total outstanding debt incurred for public works stood at ₣2.5 billion, or 44 times the annual on-budget expenditure of the city in 1851, the year before construction started. Resentment of Haussmann's handling of financial affairs is said to have influenced the courts' decisions in favor of landowner compensation.

Sources: Pinkney (1957); Massa-Gille (1973); Marchand (1993); and Harvey (2003).

that is, to acquire land at its current-use value or at administrative prices set below market value and to sell land at full market value as enhanced by public investment, (b) its ability to buy on these terms more land than is needed for actual public works, and (c) the existence of rules that dedicate a significant portion of public land profits to infrastructure investment. Political, legal, and bureaucratic disputes over each of these elements are found wherever public land has been acquired and resold on a large scale. The story of land financing of this type is the story of public-private interaction—sometimes in partnership, sometimes in conflict.

Developer Exactions and Impact Fees

Developer exactions and impact fees, unlike value capture, approach land financing from the cost side. They are one-time, up-front charges designed to recover the infrastructure costs associated with growth. Although the terms are not distinguished consistently, developer exactions here refer to the requirement that developers either install at their own expense the internal infrastructure required to meet development standards or pay for infrastructure elements provided by public authorities. Impact fees are designed to cover the costs of the *external* infrastructure caused by new development. Growth generates demand for systemwide expansions in infrastructure capacity for roads, water supply, wastewater removal, parks, and other facilities. Impact fees and developer exactions are designed to make growth “pay its way” by requiring developers to pay for the expansion in infrastructure capacity that growth necessitates.

Developer exactions for internal infrastructure are now standard throughout most developed countries, although often they recover only part of the infrastructure costs.² Impact fees covering external infrastructure are limited primarily to the United States, where they have become an important part of the overall urban infrastructure financing picture. They first became popular in the 1970s in response to the tax revolt against rapidly rising local property taxes. The opposition to property taxes eventually succeeded in capping property tax rates for existing homeowners in many states, forcing authorities to find other ways to pay for the infrastructure investments required by growth. Impact fees were first introduced in states with high rates of urban expansion and voter resistance to property taxes, like Arizona, California, and Florida (see Bowles and Nelson 2007 for a recent review of the use of impact fees in the United States and their political and legal background).

The initial versions of impact fees were challenged by developers in courts. From the various court cases, basic rules have emerged about the standards that impact fees must meet to withstand legal scrutiny. These include the following:

- There must be a “rational nexus” between the impact fee charged to developers and the capital expenditure it finances. That is, the government must demonstrate that investment is required to provide services to a growing population, not merely to upgrade services provided to existing residents.

² In the United Kingdom, section 106 payments and in-kind contributions are negotiated between developers and towns for new development areas. It is estimated that, on average, these cover one-third of total infrastructure costs. See United Kingdom, Her Majesty’s Treasury (2006).

- Impact fees must be limited to a “proportionate share” of infrastructure costs. The costs of infrastructure expansion that benefit both existing and new residents must be shared between tax and revenue sources so that new developments are charged, via impact fees, only their proportionate share of the costs, as measured by usage or benefits.
- All revenues from impact fees must be used exclusively for the capital investment purpose cited to justify the fee. They cannot be used to finance other parts of the local capital budget or to contribute to the operating budget.
- States must expressly authorize local governments to impose impact fees, and local governments must follow the procedures specified in the state’s authorizing legislation. As of late 2006, 26 states had passed authorizing legislation, including all of the rapidly growing states.

Well-designed impact fee systems now analyze carefully the actual incremental capital costs caused by different types and sizes of development at different locations. Cost calculations are differentiated for each type of infrastructure. Impact fees are differentiated by residential, commercial, and industrial use, by house and lot size as proxies for water and wastewater demand and automobile trips, and by location relative to existing infrastructure systems and their unused capacity. The result is a highly differentiated matrix of impact fees that helps to steer development to locations where it can be accommodated most efficiently. Brueckner has demonstrated that financing growth-related infrastructure through impact fees is more economically efficient, as measured by total urban land value, than financing growth through a general property tax or other measures that spread costs over both the existing population and new development (Brueckner 1997, 2001).

Impact fees have become an important component of municipal infrastructure finance in growth areas of the United States. A recent survey of impact fee levels found that the average impact fee in 2006 for a standard 2,000 square foot house on a standard-size lot in communities responding to the survey was US\$10,496. Impact fees for this standard dwelling exceeded US\$50,000 in several California communities (Duncan Associates 2007). All revenues must be used to finance infrastructure requirements.

Developers’ resistance to impact fees has diminished as the practice has become more standardized. The impact fee system replaces case-by-case negotiation between municipalities and developers over the financial “contributions” they must make to obtain approval to develop an area. They also provide clear rules that reduce uncertainty and delay, while ensuring that payments are used for infrastructure provision. Phoenix, Arizona, is representative of the new generation of impact fees that differentiates fee levels according to a careful analytical underpinning (see box 2.4). Phoenix’s impact fee sys-

BOX 2.4

Impact Fee System in Phoenix, Arizona

Phoenix is required by state law to prepare a long-term infrastructure investment plan as the basis for its impact fees. It conducts analyses of the impacts of additional usage and costs caused by growth at different locations. Cost estimates are made separately for nine types of infrastructure and public open space, taking into account such factors as type of land use, building and lot size, water meter size, distance from infrastructure trunk lines, and other locational features. Phoenix is restricted by law to imposing impact fees only for infrastructure that must be built within the same planning district as a subdivision. A recent modification of the law requires that the incremental cost estimates be conducted by independent, third-party experts and that the methodology and results be published for public review.

The result of this analysis is a highly differentiated matrix of impact fees. Many parts of the urban area are exempted from impact fees, on the grounds that the incremental capital costs caused by growth are modest. Impact fees are concentrated on what are planned to be the fastest-growing areas, north and south of the city. The largest impact fees are for roads, water, parks, and sewer lines, in that order. The impact fee, as in other cities, must be paid at the time a construction permit is issued. Total impact fees per equivalent dwelling unit (EDU), a standardized measure that converts different types and sizes of buildings into a standardized residential equivalent, range from US\$11,349 to US\$31,622, depending on the location of the planning district.

Phoenix's impact fee system specifically charges new growth for a proportionate share of major repairs to existing facilities that serve new subdivisions. State law prohibits the imposition of impact fees to finance school construction, as do laws in all but eight states. Where school impact fees are permitted, as in California, they typically are the largest component of the total fee.

The significance of impact fees for local capital spending can be judged from Phoenix's investment planning. The infrastructure investment plan estimates that 336,000 equivalent dwelling units will be built over the next 25 years within the current impact fee districts. At an average impact fee of about \$25,000 per EDU, impact fees in these districts will yield a total of some US\$8.4 billion over the period, all of which must be invested in growth-related infrastructure. Receipts are expected to fluctuate dramatically in the short run, as a result of the boom and bust cycle in new housing.

Source: City of Phoenix, Arizona (2006).

tem is less aggressive than that found in many other high-growth cities, in that it recovers only the costs of incremental infrastructure required within a particular planning district, not the costs of citywide expansions of trunk capacity.

A well-designed impact fee system requires a strong analytical base, as well as a long-term infrastructure investment plan, to differentiate accurately the impact of new development on infrastructure costs by location, land use, lot, and building size. The technical demands are likely to strain the planning capacity of municipal governments in developing countries. An impact fee system that bypasses this kind of differentiation can be a good revenue producer, but it runs the risk of becoming a mere revenue-raising device, one that skirts property tax limits and shifts infrastructure costs to new residents (see Altschuler and Gómez-Ibáñez 1993). Courts in the United States have established the broad rules of “rational nexus” and “proportionate cost sharing” to protect against fiscal exploitation of growth. However, state courts have varied widely in the type of impact fee systems they have found to meet these standards. When impact fees are applied uniformly to new housing, without differentiation by size or location, they can add significantly to the cost of affordable housing and become an instrument of fiscal exclusion of moderate-income households.

Widespread application of impact fees in developing countries is likely to require the same kind of simplification of administration that has made betterment fees feasible. Development fees have been discussed, for example, as a way of helping to finance growth infrastructure in Greater Mumbai. A development fee levied on construction permits could be differentiated broadly by development zone, so that outlying developments, which will necessitate major investment in new infrastructure to provide basic public services, would pay more than developments close to existing infrastructure that has adequate capacity.

Land Asset Management and Land Sales

The land-financing techniques considered thus far link land revenues to specific infrastructure projects that either increase land values (value capture) or are necessitated by urban land development (cost recovery through developer exactions and impact fees).

A third form of land financing involves land asset management. For a variety of historical and legal reasons, public authorities frequently have valuable landholdings on the asset side of their balance sheets. Often, these land parcels are not being used or are not being used efficiently. Strategic asset management involves inventorying public assets and making economic decisions as

to how to extract maximum value from them, including land and developed property. Often, a strategic assessment of this kind reveals that municipalities or other public agencies are overloaded with land and property assets; at the same time, they face acute infrastructure shortages. It then becomes reasonable to consider selling or leasing publicly held land in order to raise revenues to finance additional infrastructure investment (Peterson 2006).

From the perspective of the capital budget, shown in table 1.1, land sales represent a special form of capital revenue, which can be used to help finance general capital expenditures. From the perspective of the *balance sheet* of a municipality or special public authority, the net effect of selling land and investing in infrastructure is a portfolio adjustment that changes the composition of public assets. Publicly owned land is exchanged for public infrastructure. A transaction of this kind may be motivated in equal parts by the desire to increase infrastructure investment and by the conviction that land and property development can be implemented more effectively by the private sector.

Table 2.1 shows the composition of the asset side of the balance sheet of Dallas, Texas. As in most U.S. municipalities, land constitutes a relatively modest part of the municipal government's assets. Most of this land lies under public infrastructure and public buildings or is devoted to public open space. Elsewhere in the world, however, municipal governments own large amounts of undeveloped land or even possess the property rights to all land within

Table 2.1 Composition of Municipal Assets in Dallas, Texas
(US\$ millions)

Asset	Assets used for government-type activities	Assets used for business-type activities	All government assets
Land	300.0	213.8	513.8
Water rights	0	283.8	203.8
Buildings	345.7	727.7	1,073.4
Other improvements	76.5	117.9	194.4
Infrastructure	774.9	278.6	1,053.5
Equipment and artwork	162.2	198.6	360.8
Utility property	0	1,113.2	1,113.2
Construction in progress	271.9	533.0	804.9
Total	1,931.3	3,466.7	5,398.1

Source: Peterson (2006, 149).

their boundaries. This land is potentially available for sale or lease. In such cases, “land” will account for a much larger share of the assets on the municipal balance sheet and take on greater financial importance relative to current revenue. Chapter 4 shows, for example, that in Changsha, a representative provincial capital city in China, municipal land available for leasing in 2002 had an estimated net market value 14 times greater than the municipality’s total revenue in that year. In Dallas, by contrast, total municipal assets were only 4.1 times annual municipal revenues, and municipally owned land was valued at only 0.38 times annual municipal revenues. In other words, in China, assets on the balance sheet, and land in particular, loom much larger in the overall municipal financial picture relative to revenues from taxes or user fees. Although China is an exceptional case, the importance of land assets relative to municipalities’ recurring, own-source revenues is characteristic of much of the developing world.

Even in advanced nations, where most land is held by private property owners, municipal and state development authorities often hold valuable parcels of urban land that could be converted into infrastructure. Some of these agencies are charged specifically with infrastructure investment functions that have been neglected as a result of the emphasis on other economic development activities. Box 2.5 recounts the history of the Port Authority of New York and New Jersey and its recent return to its roots as an urban infrastructure investor rather than property developer.

Lessons for Land Asset Management

The Port Authority’s experience in returning to its infrastructure roots foreshadows that of many urban development authorities in the developing world. Infrastructure investment agencies often also serve as development authorities and are the principal holders of public land in cities. Political and economic forces have combined to pressure these agencies to separate their commercial development functions from their infrastructure investment functions. In the process, they have begun divesting valuable parcels of land and developed property, using the financial proceeds to strengthen their infrastructure investment capacity. Often, as in the case of the Port Authority, the infrastructure investment responsibilities most closely intermingled with economic development involve major investments in transportation. Revenues generated by land sales therefore have been tilted toward large-scale transportation initiatives.

BOX 2.5

World Trade Center and Infrastructure Investment, Port Authority of New York and New Jersey

The tragic events of September 11, 2001, have overshadowed the development history of Manhattan's World Trade Center. However, the World Trade Center is a landmark illustration of critical land development by an infrastructure agency, which extracted profits from the sale of property to reinforce its primary mission of urban infrastructure investment. The following table summarizes the project.

Summary of World Trade Center Project in New York

Executing authority	Port Authority of New York and New Jersey
Scope of project	Developed 16 acres of land in lower Manhattan into the World Trade Center, consisting of seven office buildings containing 1.24 million square meters of office space
Sale agreement and proceeds	Sold to Silverstein Properties in 2001 in the form of a 99-year lease, for a present value of US\$3.2 billion
Use of funds	To finance urban transportation projects throughout the New York metropolitan area. Sale proceeds of US\$3.2 billion compare to US\$1.3 billion of total infrastructure capital spending by the Port Authority in 2005 and total infrastructure assets held at year-end 2004 of US\$12 billion

Source: Author.

Project background. The Port Authority of New York and New Jersey was created in 1921. It was the first interstate government agency created in the United States, established under the constitutional powers granted to the states to create interstate compacts. Interstate cooperation was necessary to plan and implement development of New York harbor, which is bounded by the two states of New York and New Jersey. The Port Authority covers a regional territory of approximately 1,500 square miles, defined as a radius of 25 miles from the Statue of Liberty.

(continued)

BOX 2.5

World Trade Center and Infrastructure Investment, Port Authority of New York and New Jersey (*continued*)

Over the years, the Port Authority's responsibilities for owning and managing transportation facilities in the New York metropolitan region expanded greatly. In the 1930s, the Port Authority took over the recently built Holland Tunnel, the first interstate connection between New Jersey and Manhattan, and built the George Washington Bridge, Lincoln Tunnel, and other connectors. In the 1940s, the Port Authority took over ownership and operation of the region's principal airports, including what is now John F. Kennedy International Airport, LaGuardia Airport, and Newark International Airport. Facilities at the airports were expanded and modernized to accommodate world trade.

In the 1950s and 1960s, the Port Authority built the Port Authority Bus Terminal in Manhattan, the largest bus terminal in the United States, constructed a second deck to the George Washington Bridge, built the world's first containership ports at Newark and Elizabeth, New Jersey, and established the PATH commuter rail system, which now carries 71 million people annually from New Jersey to Manhattan.

The Port Authority is a self-financing infrastructure agency. It has no taxing powers and receives no dedicated tax revenues. It does not receive operating subsidies from state government. It finances itself through fees and charges levied on users of transportation services and rents charged to commercial and retail occupants at airports. Historically, the Port Authority has received only small capital contributions from New York and New Jersey for specific capital projects and occasional capital grants from the federal government. It has consistently generated a positive net revenue stream, which it has borrowed against to finance its capital investment. At the end of fiscal 2006, the Port Authority had US\$9.1 billion of bonds and other long-term debt outstanding, backed by its operating revenue stream, without state guarantees or tax support.

Development project history. During the 1970s, the Port Authority turned to the World Trade Center as its primary investment program. The Port Authority's mission always had called for it to manage transportation infrastructure for the benefit of economic development of the region. In the 1970s and 1980s, economic development became the principal investment objective. The development goal behind the World Trade Center was to revitalize lower

(continued)

BOX 2.5

World Trade Center and Infrastructure Investment, Port Authority of New York and New Jersey (*continued*)

Manhattan, which had lagged behind the midtown area in development as a financial center. The Port Authority also invested in a variety of other development projects, including the Teleport, special industrial development zones, and major commercial and retail projects.

Construction of the World Trade Center was carried out over more than a decade, primarily on land previously occupied by the terminal of a bankrupt railroad. The Port Authority built seven large commercial office buildings on the site, including the iconic Twin Towers, the tallest buildings in New York City, at a total investment cost (including infrastructure) of US\$900 million. In early 2001 the World Trade Center accounted for roughly 4 percent of all the office space in Manhattan.

In 1998, the decision was made to privatize the World Trade Center in order to focus the Port Authority's management and capital investment program on core transportation infrastructure, much of which had significantly deteriorated due to lack of repair and reinvestment. After vigorous competitive bidding, a contract was signed with Silverstein Properties involving a 99-year lease for US\$3.2 billion. The final contract documents were signed in July 2001, just seven weeks before the attack that destroyed all of the World Trade Center. This case study examines the property sale as it was intended to take effect, absent the 9/11 tragedy.

Institutional context and evolution leading to property sale. The decision to sell the World Trade Center was the direct result of pressure for the Port Authority to return its focus to transportation infrastructure. As stated in the Port Authority's long-range capital plan, prepared in 2005, and in its recent annual reports, the priorities now are to "return the agency to its roots: making landmark investments in transportation infrastructure [and] meeting commitments to rebuild and improve facilities." The updated 10-year capital plan for the period 2007–16 reflects these priorities. Total investment over the decade by the Port Authority is projected at US\$29.55 billion. Less than 0.5 percent of this amount is targeted for economic development. Most is targeted either for a program—State of Good Repair—intended to keep existing infrastructure facilities in good operating and capital condition or for specific new infrastructure projects, such as new tunnel access to Manhattan, airport expansion, and seaport modernization via ship-to-rail connections.

(continued)

BOX 2.5

World Trade Center and Infrastructure Investment, Port Authority of New York and New Jersey (*continued*)

Returning the focus of the Port Authority to transportation investment was very much a result of political pressure. Divestment of the World Trade Center was at the core of this effort. During the mid-1990s, the governors of both New York and New Jersey pushed for the Port Authority to narrow its mission. At the time the sale of the World Trade Center was announced, Governor Pataki of New York issued a statement, saying, in part, "From my first day in office, I have pushed hard to privatize the management and operation of the World Trade Center because I believe government is at its best when it focuses on its core mission ... By sharpening the agency's focus on our airports, seaports, bridges, and tunnels, the Port Authority can become a stronger economic engine for the entire region." Despite the 9/11 tragedy, the Port Authority has successfully moved forward with its refocused plan for investment in transportation infrastructure.

Sources: Doig (2001); Port Authority of New York and New Jersey (2005, 2006, 2007a, 2007b).