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MUNICIPAL REVENUES AND LAND POLICIES

Edited by Gregory K. Ingram and Yu-Hung Hong

Municipal Revenues and Land Policies

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Gregory K. Ingram and Yu-Hung Hong

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Complex Debt for Financing Infrastructure

Jeffrey I. Chapman

Infrastucture finance has long been an important issue in the United States. Exacerbated by population growth and population movement among areas of the country, tax limits, and a variety of political constraints, obtaining funds for the maintenance and provision of infrastructure has often been difficult. In a time of fiscal stress, innovations in infrastructure finance have appeared throughout the country. This chapter examines three methods of debt finance that fiscally constrained jurisdictions can use: certificates of participation, community facilities district debt, and tax credit bonds. These methods are relatively new (the oldest started in the 1980s), do not need approval from the residents of the jurisdiction, are not usually constrained by state debt limits, and contain elements of risk that exceed those present in general obligation bonds. Because the methods are often arcane as well as less than mainstream, there has been little analysis of the techniques in the mainstream economics literature.¹

History of Public Infrastructure Provision —————

Before the Revolutionary War, George Washington envisioned connecting the Potomac River to the Ohio River Valley. After the war, Washington was able to convince the Maryland and Virginia legislatures to charter the Patowmack Company (with Washington as its president) and grant it a perpetual monopoly

Jung-wook Seo provided marvelous research assistance for this chapter.

1. There are a myriad of instruments for financing infrastructure, many of which have been analyzed elsewhere (e.g., Chapman 2008). Some, such as development impact fees and tax increment financing, are addressed in this volume (see chapters 7 and 11).

on water traffic along the Potomac, along with considerable land acquisition power. However, because of unanticipated difficulties of construction and limited credit markets, the company collapsed in the mid-1820s (Glaeser and Gottlieb 2008).

This lack of credit foreshadowed an ongoing debate on the role of government in infrastructure finance. Some early presidents—for example, John Quincy Adams—envisioned basic public works (“internal improvements”) as a means of aiding commerce and commercially uniting the colonies. Other founders—for example, Alexander Hamilton—favored deficit spending. Until Andrew Jackson, who opposed national public works projects, became president, the national government took an interest in the provision of infrastructure (Leighninger 2007).

The states had fewer doubts about the efficacy of public works. For example, DeWitt Clinton, upon becoming governor of New York in 1817, quickly began construction of the canal that connected the Hudson River to Lake Erie with an initial appropriation of \$7 million. After a huge amount of government spending and remarkable feats of engineering, the canal was completed in 1825. It became an enormous success; transportation costs fell from 30 cents to 10 cents per ton-mile (Glaeser and Gottlieb 2008). State legislatures financed infrastructure projects with bonds, often with inadequate backing. The Panic of 1837 forced the default of much of this debt, and state legislatures soon insisted on constitutional limits to state borrowing power (Leighninger 2007).

Cities then began to borrow for a variety of infrastructure projects: waterworks, sewers, parks, schools, health facilities, and sanitation. These projects were also debt financed, often with little security. The depression of 1870 forced many cities to default. In response, state legislatures placed debt ceilings, typically based on a percentage of the city’s assessed value, on local governments and required them to obtain voter approval in referenda.

With urban growth continuing and infrastructure needs increasing, cities had to discover additional methods of financing new public works. They found three ways around the restraints. The first was the revenue bond, the collateral for which was income from the project being financed. This debt was not counted against the limit on the city’s ability to borrow. While not generally accepted until the late 1920s, the first revenue bond was used in 1895 (Leighninger 2007). A second invention was the public authority, a quasi-governmental unit created to administer a particular facility and governed by a city-appointed board. Public authorities lack taxing authority, but they often have the power of eminent domain and can issue revenue-based debt. Public authorities were encouraged by the federal government, which offered them grant and loan options on a preferred basis (Pagano and Perry 2008). The third invention was the special district. Like a public authority, a special district exists separately from the general purpose municipal government and often has the power to issue debt and collect revenues. One purpose of public authorities and special districts is to use non-guaranteed debt unconstrained by state debt limits and referenda (Pagano and Perry 2008).

Infrastructure finance is still an important concern. As a result of the federal stimulus package and other measures passed by Congress in 2008 and 2009, federal investments in infrastructure and science could reach as much as \$120 billion, and investments in energy infrastructure are expected to be almost \$40 billion (Congressional Budget Office 2008). State and local governments are currently proposing “shovel ready” projects ranging from buying Harley-Davidson motorcycles for police (Levitz and Shishkin 2009) to building water treatment plants (Bui 2009).² In addition to these direct grants, the stimulus package has dramatically expanded the use of tax credit bonds to finance infrastructure.

Why Infrastructure Is Important

In the early 1980s, reports suggested that lack of public attention to government-owned and managed infrastructure had led to a crisis. Studies argued that infrastructure deterioration might have been avoided if governments had more effectively managed infrastructure (Pagano and Perry 2008). Such criticism may have been one of the reasons behind serious studies of the relationships between infrastructure spending and economic productivity in the late 1980s. In 1989 David Aschauer found that declining infrastructure spending resulted in less economic growth. This piece generated dozens of additional studies of infrastructure and its relationship to economic activity (see Straub 2008 for a summary). In general, most researchers found that, under certain conditions, accumulation of infrastructure is important for productivity gains (for example, Bougheas, Demetriades, and Manuneas [2000] and Agenor and Moreno-Dodson [2006]). In her literature survey, Straub found that rates of return on infrastructure investment ranged from 25 to 50 percent in the United States, although the rates differed by geographic area and time period. Bom and Lighthart (2008) used meta-regression analysis and concluded that the marginal productivity of public capital is roughly 17 percent, although they also noted that different econometric specifications, different time periods, and different measurements can all lead to different results. Holtz-Eakin (1993), however, argued that maintenance of existing infrastructure may be at least as important as new infrastructure spending, and Boarnet (1997) considered efficient pricing for infrastructure use as important as its actual provision. Haughwout (2001) believed that infrastructure investment may have an effect on firm productivity and consumer welfare through its location impacts, and he concluded that regional well-being would increase if there were more investment in central cities and less in surrounding suburbs.³

2. According to the mayor of Shreveport, Louisiana, buying motorcycles for police “would produce little local hiring . . . but Harley-Davidson is a great American company” (Levitz and Shishkin 2009, A1).

3. It is possible that more efficient use of the stock of infrastructure could mitigate the need for new infrastructure. For example, schools are still not fully utilized during the summer, and universities often have reduced classes on Fridays. It may be that better maintenance can

Why Are There Infrastructure Financing Problems? _____

TAX AND SPENDING LIMITS

The United States has a history of citizen protest of perceived excess taxation. Property tax limits existed in the late nineteenth century to restrain public-sector spending on privately owned roads and canals. The rate limits that appeared during the Great Depression of the 1930s were intended to reduce both property tax burdens and the possibility of tax-related foreclosures. The 1970s saw new limits on property taxes, principally because of increasing state and local tax burdens. In 1978 Proposition 13, a severe property tax limit, passed in California, setting the stage for tax limits to be either passed or seriously considered in nearly all the other states.⁴

These limits affected new development in rapidly growing states. When a new large-scale household development was planned before the imposition of the limits, it was assumed that the sales, property, and income taxes paid by the new inhabitants would offset (or perhaps even exceed) the public costs of the development, including debt service for infrastructure. Thus, jurisdictions were not averse to funding the infrastructures of new developments. With property tax limits, it was unlikely that new housing would pay its way. Infrastructure finance moved from a community responsibility to the responsibility of the new development.

ADMINISTRATIVE CONSTRAINTS

Budgeting for infrastructure is not done in a unified manner. Typically, construction and large repair or renovation projects are funded through the jurisdiction's capital budget. The jurisdiction's operating budget finances maintenance and operations. This leads to a disconnect. Maintenance and operations are politically decided in budget negotiations, while capital projects are ranked, at times even using economic criteria, in the capital budget. Because these budgets are completed at different times, the relationships between construction and maintenance are often unclear.

As a result of such practices, decision makers often relegate maintenance and repair to the "political backburner" (Pagano and Perry 2008). The effects of inadequate maintenance in any one year are not always apparent, and much of the maintenance is invisible because it is underground. There is evidence that

stretch the lifetime of the stock of infrastructure. And, with congestion charges and greater use of peak-time pricing, infrastructure use will slow. The Congressional Budget Office (2008) estimated that up to \$30 billion of highway construction costs could be saved annually by the use of congestion pricing.

4. To illustrate the power of Proposition 13, in 2008 real per capita property taxes in California were about 80 percent of their original 1978 benchmark level (Kogan and McCubbins 2008).

state and local governments tend to reduce maintenance spending in response to difficult fiscal times.

POLITICAL CONSTRAINTS

Major infrastructure projects have a political dimension. Upon analysis of several major projects, Altshuler and Luberoff (2003) concluded that major public investment proposals should meet the following criteria:

- They should generate net benefits for society as a whole rather than just . . . a narrow but mobilized group of claimants.
- Where specific private beneficiaries . . . do seem likely to reap large benefits, they should bear a proportionate share of project costs and risks.
- Projects should not significantly harm individuals, communities, or the natural environment—at least not when viewed with efforts to mitigate and compensate for such harm. . . .
- Decisions to proceed should be arrived at democratically. . . .
- Access to the courts for review of significant issues . . . should be relatively liberal, but the judicial process should not be available . . . [for] delaying actions or . . . to extract costly benefits having little to do with the project. (289)

Their analysis indicates that these criteria are often violated, generating a distrust of large-project decision making. Even beneficial projects become innovative in their funding, and this innovation decreases the level of public trust in developers, creating a vicious circle.

Three Types of Infrastructure Financing Debt —————

This section of the chapter discusses three complex types of debt finance for infrastructure: certificates of participation, community facilities district debt, and tax credit bonds.⁵ Certificates of participation and tax credit bonds can be used for both new development infrastructure and replacement of old infrastructure. Community facilities district debt is best used for new development.

Certificates of participation (COPs), designed in the early 1980s, are similar to lease revenue bonds. Both are based on a lease agreement and are not subject to constitutional debt limits.⁶ A tax-exempt lease may be used to finance any

5. For space reasons, this chapter ignores the morass of agencies that issue debt. But note that when there is a maximum amount that residents wish to pay, either through traditional taxes or through assessments, overrides, special types of debt service payments, or special districts, there may be a race to the ballot by these agencies. There is no way of knowing whether the ultimate debt financing bundle is optimum (Kogan and McCubbins 2008).

6. Lease revenue bonds differ from COPs because the lessor (the owner of the property that is being leased in a true lease, or the secured party that finances and makes property available to

property that the public agency has the statutory authorization to lease, generally only land and depreciable property. In this financing arrangement, the city signs a long-term lease (equivalent to a sale) of a city-owned asset with a private investor. The investor usually does not need the city's asset and leases it back to the city, which promises to make annual lease payments. The private investor can then issue debt to buy the asset and use the city's lease payments to service that debt. The city appropriates the lease payments annually.

Some public agencies (for example, redevelopment agencies) may use tax-exempt lease financing to provide a facility for the use of a nongovernmental borrower. In this case, the public agency acquires the property by lease or installment purchase and then leases or sells it to the nongovernmental borrower. The stream of payments from the public agency is sold to investors through the issuance of COPs (California Debt and Investment Advisory Commission 2005).

Tax-exempt lease financing was originally used to acquire equipment. It was modest in amount and had short terms, typically five to six years (Vogt and Cole 1983). The advent of COPs made long-term tax-exempt lease purchase financing available for big-ticket items. In the mid-1980s, COPs were used to finance new, but unpopular, capital projects such as prisons, courthouses, parking garages, and power plants—infrastructure for which passing a bond issue would be difficult. Only 139 COPs (valued at \$3.3 billion) were issued in the first half of the 1980s (Gladwell, Sellers, and Brooks 1997, 27); but 26 states and Guam now issue them, and during 2008 over \$11 billion in COPs were sold. The top four issuing states had over 76 percent of the market (see table 13.1).

Essentially, a COP lease creates fractional interest or shares in the lease purchase agreement that are assigned or marketed to investors. Sometimes, these fractional shares are few in number and are privately bought by banks or other financial institutions. For other COP leases, the fractional interests are smaller and more numerous, and the certificates of participation are marketed to the public. A fractional share of a COP in a tax-exempt lease gives the investor the right to a share of the periodic payments made by the lessee during the term of the lease (Vogt and Cole 1983). The participation in sharing the payment generates the name “certificates of participation.”

Asset transfer pricing adds an additional complication. This technique follows the basic pattern of a tax-exempt lease, with complications (California Debt and Investment Advisory Commission 2005). The property that is the subject of the lease (typically an unencumbered public structure such as a city hall, a police station, a museum, or another government building) is already owned by the public agency lessee (user-owners in a lease purchase deal are called lessees). The lessee leases or sells the property to a purchaser (now known as the lessor) and immediately leases or repurchases the property from this private owner. Often,

the lessee-owner in a conditional-sales lease) must be a government entity with the ability to issue revenue bonds or a nonprofit corporation that issues bonds on behalf of a political subdivision. The bonds constitute a direct debt of the issuer, who is the lessor (Horler 1987, 140).

Table 13.1
Negotiated and Competitive COP Issuance, 2008

States	Par Amount (US\$ mil)	Rank	Market Share	Number of Issues
California	4,169.8	1	37.9	95
Florida	1,793.3	2	16.3	15
Colorado	1,554.8	3	14.1	16
Arizona	874.3	4	8.0	4
North Carolina	720.9	5	6.6	14
New Jersey	309.2	6	2.8	1
Missouri	289.8	7	2.6	55
Illinois	245.4	8	2.2	6
Ohio	166.7	9	1.5	10
Minnesota	159.7	10	1.5	9
Oregon	132.2	11	1.2	12
South Carolina	110.5	12	1.0	4
Texas	108.0	13	1.0	2
Washington	89.6	14	0.8	5
Georgia	71.4	15	0.7	4
Maryland	36.7	16	0.3	1
Iowa	27.7	17	0.3	4
Kentucky	24.8	18	0.2	12
South Dakota	23.9	19	0.2	3
Mississippi	23.9	20	0.2	3
Kansas	15.1	21	0.1	6
Nebraska	15.1	22	0.1	7
Alabama	9.7	23	0.1	1
Louisiana	9.2	24	0.1	1
Guam	7.5	25	0.1	1
Alaska	5.8	26	0.1	1
New Mexico	4.9	27	0.0	3
Industry Total	11,000.0		100.0	295

Source: Thompson Financial, private communication (2009).

the lessee deposits the funds derived from asset transfer financing into a capital improvement or other building or construction fund to pay for construction or acquisition of other public improvements. In addition, the lessor often raises funds to purchase the property by assigning the right to receive payments to a trustee (without recourse) who will execute and deliver COPs (California Debt and Investment Advisory Commission 2005, 128).

The asset transfer ability can thus allow a public agency to meet new capital needs by realizing the value of existing unencumbered assets. In the event that the leaseback is structured as a long-term lease, the public agency can immediately begin lease payments because it can have immediate use of the existing improvements (in fact, it may be currently using the building). Asset transfer financing is thus a method of leveraging public assets and borrowing all or a portion of the value of the public agency's equity in these assets in order to finance other necessary assets.⁷

A large, publicly offered COP is more complex than the traditional tax-exempt leaseback because of the creation of the fractional shares. In California, putting together a COP to fund a construction project typically follows these steps (paraphrasing the California Debt and Investment Advisory Commission, 2005, 126):⁸

1. The public agency that would like to undertake a construction project enters into an agreement with an investor, which can be a nonprofit corporation, a joint powers authority, a leasing company, a bank, or another investor.
2. The investor either purchases the appropriate site from a third party or leases the site from a public agency.
3. With the assistance of the public agency, the investor constructs the project to be located on the site and then leases the improvements to a public agency.
4. The lessor's rights to receive payments under the lease are assigned to a trustee. The trustee then executes and delivers to the underwriter the certificates of participation in the lease payments. This is an important step. In some cases, the lessor serves as trustee, but in most cases a separate bank or trust company fills this role. The trustee prepares and executes COPs, holds title to the leased property and/or a security interest in it on behalf of the certificate holders, holds the proceeds advanced by the certificate holders, makes progress payments as needed during construction, receives

7. Closely related to an asset transfer COP is a common form of privatization in which the public agency transfers ownership of a public asset (typically in the form of a long-term lease) to the private sector, with the government having no role in the management or financial support of the sold asset. With asset transfer COPs, the jurisdiction sells the asset for upfront cash and leases back the asset. In privatization, the jurisdiction often gives a 99-year lease for cash upfront.

8. The process is similar in other states.

the lessee's periodic lease or rental payments, and remits these payments to the certificate holders. If there is a reserve fund to guarantee some portion of the lessee's payments, the trustee is the custodian of that fund (Vogt and Cole 1983, 30).

5. A portion of each lease payment is designated as tax-exempt interest.
6. The proceeds of the sale of the COPs are used to pay the costs of acquiring the site and constructing the improvements (California Debt and Investment Advisory Commission 2005, 126).

The primary difference between traditional municipal bonds and COPs concerns the security of the debt repayment. COPs are not a binding obligation and do not require voter approval. They are secured by the particular capital project for which they are issued and are paid for by monies annually appropriated by the local government.⁹ Further, at least in California, publicly marketed leases are ordinarily not non-appropriation obligations and usually include a covenant to budget and appropriate lease payments as long as the leased property can be used (California Debt and Investment Advisory Commission 2005, 129).

There are both advantages and disadvantages to COPs from the perspectives of the issuers, the investors, and the public. The advantages include the following:

- Voter approval is not required.
- COPs often can be issued without affecting constitutional or statutory debt limits.
- Capital projects funded by COPs can often be built more quickly because of the flexibility of the public-private relationship.
- Often the developer/contractor and the government agency can avoid public procurement processes.
- Defaults are rare because COPs are often used for essential public projects.
- A physical structure serves as collateral in case there is a default.
- Compared to general obligation (GO) debt, COPs take about two-thirds of the time to go through the process, from initiating the finance program to the realization of the proceeds.

The disadvantages of COPs include the following:

- Voter approval is not required.
- Issuance costs may be higher compared to other types of lease financing.
- The government agency is not legally required to appropriate funds annually to meet the lease-purchase payments because COPs are not backed by the full faith and credit of the government agency, and legislatures are often not permitted to bind future legislative financial action.

9. At times, they are paid for by project revenues or, in California, by any lawfully available funds of the public agency (California Debt and Investment Advisory Commission 2005).

- If the government agency defaults on the lease payments, investors may lose a portion of their investment.
- Unless credit enhancement is undertaken, COPs are often rated one letter grade lower than GO bonds. Thus, to save costs, nearly all COPs have some type of enhancement. This makes the comparison of yields to non-COP instruments very difficult. As table 13.2 indicates, COP yields are often less than GO yields.

There are good COPs and bad COPs. A good COP finances a one-time need—a jail, a library, or a recreation center. A bad COP is issued as a short-run solution to a structural budget problem, a method to generate one-time funds, such as selling city hall for a lump sum to finance government services. However, because COPs are often structured in a complex manner, are hidden from the voters, and are often privately placed (with perhaps incomplete official statements), both good and bad COPs can be dangerous.

Community facilities districts (CFDs; sometimes known as community development districts) have been in existence for nearly 30 years. They first were authorized in Florida in 1980 and in California (as Mello-Roos Community Facilities Districts) in 1982. Chapin and Thomas (2007) argue that they were developed in Florida because of concurrency regulations that adequate infrastructure had to be in place prior to the issue of development orders. In California, they were a response to the cap on property tax rates resulting from passage of Proposition 13. Other rapidly growing states followed as the efficacy of the CFD technique became apparent. Although there are some differences among the CFD process in states, this chapter uses California as an example of the process and its implications.

CFDs are a type of special tax district with broader powers. Under this method, a city, county, special district, school district, or other municipal corporation or district may form a separate district to finance certain public infrastructure on a pay-as-you-go basis or may issue debt. The sponsoring public agency may raise funds to accomplish its financing objectives by collecting a special tax within the district (Horler 1987). For infrastructure provision, the CFD may include areas that are not contiguous, and the facilities constructed (which must have a useful life of at least five years) do not have to be physically located within the district. Facilities include park, recreation, parkway, and open-space facilities; elementary and secondary school sites and structures; libraries; natural gas pipeline facilities; telephone lines; and facilities for the transmission or distribution of electrical energy.¹⁰

10. A Mello-Roos CFD can also provide police protection, including criminal justice services for jails, detention, and juvenile halls; fire protection and suppression services and ambulance and paramedic services; recreation services; library services; operation and maintenance of parks, parkways, and open space; and flood and storm protection services so long as no increase in the level of service occurs (Horler 1987, 71–72).

Table 13.2
Average Interest Rates of Bonds in California (%)

Year	Revenue Bond		General Obligation Bond		Community Facilities District (Mello-Roos Community Facilities District)		COP	
	Neg	Comp	Neg	Comp	Neg	Comp	Neg	Comp
2000–2001	6.217 (20)		5.871 (91)	5.439 (141)	6.581 (55)	6.051 (4)	5.576 (158)	5.010 (21)
2001–2002	5.471 (40)		5.252 (94)	4.984 (155)	6.001 (85)	5.809 (10)	5.041 (211)	4.639 (26)
2002–2003	5.320 (30)		5.131 (168)	4.932 (140)	5.872 (109)	4.959 (6)	4.983 (193)	4.445 (36)
2003–2004	4.913 (51)	3.932 (5)	4.622 (260)	4.317 (70)	6.054 (110)	4.316 (11)	4.302 (215)	3.839 (38)
2004–2005	4.890 (53)		4.894 (218)	4.580 (132)	5.340 (155)	4.438 (10)	4.540 (156)	4.138 (26)
2005–2006	4.727 (67)	4.261 (9)	4.650 (285)	4.430 (164)	5.126 (184)	4.559 (4)	4.742 (178)	4.063 (20)
2006–2007	4.969 (67)	4.269 (2)	4.690 (196)	4.579 (127)	5.142 (177)	4.432 (4)	4.731 (150)	4.725 (20)
2007–2008	4.866 (59)	4.849 (5)	4.692 (293)	4.448 (89)	5.256 (133)	4.951 (6)	4.704 (179)	4.389 (24)
2008–2009	5.442 (19)	Unknown (1)	5.180 (193)	4.692 (44)	6.158 (39)	6.392 (2)	4.803 (134)	4.578 (11)

Note: The number of cases is in parentheses; Neg: negotiated sale; Comp: competitive sale.
Source: California Debt and Investment Advisory Commission, <http://www.treasurer.ca.gov/cdiac>.

There are three ways to establish a CFD: (1) the legislative body can institute proceedings on its own; (2) a written request may be filed with the legislative body and signed by two of its members; or (3) a petition signed by not less than 10 percent of the registered voters residing in the district or by owners of at least 10 percent of the land within the proposed district may be filed with the clerk of the legislative body. In the resolution of intention to establish the district, the legislative body must specify the rate and method of apportionment of the special tax so that all landowners within the proposed district can estimate the probable and maximum amount they would have to pay. A public hearing on the establishment of the proposed district and bonded indebtedness is then held. If there is a majority protest at this hearing, no further proceeding to create the district, to levy the special tax, or to incur bonded indebtedness can be taken for one year. But, if the hearing is held and the district is supported, the levy of the maximum special tax will be voted on by landowners in a district with fewer than 12 registered voters or by the registered voters in a district with 12 or more registered voters. A landowner vote is tabulated based on one vote for each acre or portion owned. Mailed election ballots may be used, and a two-thirds majority is required for approval (Horler 1987).

The bonds issued by Mello-Roos districts are classified as special tax bonds, although they are best known as “dirt bonds,” particularly if they are secured by unimproved property.¹¹ It is extremely rare for dirt bonds to be rated or insured, so normally their interest rates are noticeably higher than AAA-rated (insured) bonds (Bort 2006). Mello-Roos CFD bonds secured by developed areas can be nearly as secure as GO bonds. Both types can be issued as either serial or term and can have fixed or variable rates (Bort 2006). The more common way of selling CFD bonds is by private negotiated sales, but bonds that can be rated can be sold at public or private sales. The situation of CFD bonds changes over time; for example, as homes are built, sold, and occupied, the value of the security for the bonds increases. Some investors like to purchase dirt bonds because of their higher interest rates, anticipating that the security of the bonds will gradually improve as development occurs. The investor then ends up with a very secure bond, but receives a higher interest rate than is normally available for similar risk. The bonds thus increase in value, and the investor can sell them at a premium (Bort 2006). Table 13.2 compares interest rates for general obligation, revenue, and Mello-Roos debt in California.

Between 1993–1994 and 2007–2008, there have been 1,561 new issues or about \$18 billion of new Mello-Roos debt in California. During this same period, there were 147 defaults and an additional 198 draws on reserves, for a total of 345 areas of concern. In September 2008 the California Debt and Investment

11. The term *dirt bond* can be used when the security for debt service payment is based on property, regardless of the method of issuance. That is, dirt bonds do not have to be issued by CFDs.

Advisory Commission reported that “Despite the potential impacts of evolving mortgage conditions, CFDs have not reported higher default rates . . . but have reported a recent rise in the number of draws on reserves” (2008, 1).

CFDs might fit somewhere between local public goods and club goods. For the most part, CFDs begin with undeveloped land, typically owned by a small number of owners (often but not always by only one land developer; see Saskai 2004). While the developer cannot choose the quality of the homebuyers, there are opportunities to ration homes by price. One CFD can include a variety of apartments, condominiums, and single-family dwellings along with assorted types of shopping areas. Thus, following Scotchmer (1994), the entrepreneur is choosing facility size and, through the levying of a CFD charge on the property, choosing the price of admission (assuming the developer-landowner relationship has taken care of capitalization issues). Consumers can then distribute themselves among clubs, with each CFD offering a different set of development arrangements. In equilibrium, after the consumer has found both the correct development and the correct housing purchase within the development, there should be limited switching to increase utility. The developer will have an incentive to allow an optimum amount of congestion, which is indirectly done by the *ex ante* determination of housing composition. It is not clear that admission prices in this equilibrium will be higher than the competitive prices in a finite economy (as Scotchmer argues); for example, prior to the housing collapse, billboards in California advertised “No Mello-Roos financing.” Scotchmer concludes that profit motives are moderately effective in providing club goods, in particular when profit is interpreted to be wealth of landowners, although her concern about the lack of political viability of making property owners richer may not be as serious as she believes.

Rubinfeld (1994) is slightly more skeptical about these efficiency outcomes. He is not convinced that local officials are property value maximizers, so efficiency may not be easy to achieve. He agrees that the competitive equilibria in the club model generate a fully efficient outcome and that the admission fee serves as a competitive price. But he also argues that the case for efficiency depends on assuming either that there is no space dimension or that, if there is a space dimension, it can be partitioned into jurisdictions and that decision makers maximize the aggregate value of land. He believes that this will be an efficient equilibrium because all externalities will be internalized, so that the effects of the movement of an individual from one club to another and all the benefits of public goods can be accounted for by admission fees and land prices. However, he then argues that these assumptions are not likely to be found: there exists spillovers leading to extensive externalities among jurisdictions, which may not be appropriately priced by the club mechanisms, and managers are not likely to maximize property values or profits.¹²

12. Rubinfeld also discusses the situation of an initial settlement pattern in which some jurisdictions contain all low-income individuals and others contain all high-income households. In this case, low-income individuals will find it advantageous to move to the high-income

Rubinfeld is correct on the spillover argument. CFDs that charge the assessment to provide additional police service may very well drive criminals to neighboring areas that are not in the CFD. In analyzing the structure of CFDs, the developer is likely to be attempting to maximize profits. One developer in Arizona (which has a slightly different set of CFD regulations than California) would not consider developing unless the return is a minimum of 20 percent.

Although chapter 11 analyzes tax increment financing (TIF) districts, it is worthwhile to note the similarities and differences between TIFs and CFDs. Both are infrastructure financing tools, and both depend on the assumption of increasing property values for their success. However, in many cases, CFDs are not ad valorem property taxes; they do not need a declaration of blight (a necessary TIF requirement in many states); they do not differentiate between base property value and the increment (except to the extent that the base value in a CFD is the value of the undeveloped land); and there is minimal concern about overlapping jurisdictions because this is an additional charge to finance the developer's infrastructure (and sometimes service provision) only for the CFD itself.

Tax credit bonds (TCBs) are a recently developed instrument, with the first, qualified zone academy bonds (QZABs), authorized in 1997. TCBs allow the bondholder to claim a tax credit toward the federal tax liability that is equal to the percentage of the bond's par value for a specified term. Although some of these instruments are capped, they are available to nearly all state and local governments.

The secretary of the U.S. Treasury determines the specific credit rate, which is then multiplied by the par value of the bond. The rate of credit ensures that the bonds do not need to be sold at a discount or with interest cost to the issuer. The government entity selling the bond is obligated to repay only the principal; the federal government makes payments to the bondholder through the tax credits. These tax credits differ from typical tax credits in that they are included in taxable income as if they were interest income (Maguire 2008). This puts an upward bias in the setting of the tax credit bond rate, since there is a need to compensate the holder for the taxability of the credit. To attract investors, the credit rate should yield a return greater than the prevailing municipal bond rate and at least equal to the after-tax rate for similar corporate bonds. For example, if there were a 4.75 percent interest rate on municipal debt, an investor in the 15 percent income tax bracket would need a certain rate of at least 5.59 percent to choose a TCB over the municipal bond. Investors in the 35 percent bracket would need

communities, but high-income individuals may not want low-income in-migrants. He identifies this situation as a disequilibrium: "if there is a low-income jurisdiction that wants high-income members, the high-income households won't want to join, whereas anyone with a low income who wants to join a high-income jurisdiction will not be welcomed to membership" (1994, 122–123). He later argues that there are also legal, constitutional, and political limitations on the use of instruments to regulate the migration of individuals (123).

a credit rate of 7.31 percent.¹³ This suggests that the choice between a TCB and a traditional tax-exempt bond is dependent on the bondholder's tax rate and that, compared to traditional municipal bonds, bondholders in the highest tax bracket will find the tax credit less attractive than bondholders in the lowest bracket, because the tax credit is fixed at the same rate for all buyers. The credit is limited to the bondholder's current tax liability; it is not refundable (Maguire 2008).

It is not possible to adjust the federal tax credit from TCBs to reflect the potential or perceived risk of the individual bond issuers. In practice, this means that TCB issuers with relatively weak credit ratings have to offer supplemental interest payments, original issue discounts, or bond insurance to compensate investors for the greater potential risk. In 2008 Congress amended the law to allow tax credits to be sold separately from the related bond, hoping that this stripping would increase the marketability of the bonds.

A 2004 Congressional Budget Office (CBO, 1) study argued that tax credit bonds will always be a more expensive way of financing a program's spending than the government's conventional borrowing. The study calculated that the value of the tax credits that bondholders receive in lieu of interest on a long-term debt is substantial. In an example, considering a 20-year tax credit bond of 5 percent, the CBO concluded that the principal repayment would be only 38 percent of the bond. The remaining 62 percent would be the tax credits from the federal government. Continuing this example, CBO discussed the possibility that the authorizing legislation did not restrict the use of the debt proceeds. In this case, the issuing entity could engage in the process of defeasement—that is, it could put aside some of the proceeds from the bond's sale and invest them to fulfill its obligation to repay the principal at maturity. Assume that a state issued \$100 million in tax credit bonds for an infrastructure program. Under defeasement, the state could invest \$38 million of the proceeds to repay the principal and would have \$62 million (the value of the tax credits provided by the federal government) to spend on the program. This transaction could be viewed as a joint federal-state financing of \$100 million or as an entirely federal financing of \$62 million for the benefit of the state (Congressional Budget Office 2004). It is possible to design TCBs to deliver the same federal subsidy to state and local governments that current tax-exempt bonds provide, but at a lower cost. For example, the rate of the credit might be set at less than 100 percent to deliver the equivalent subsidy.

The American Recovery and Reinvestment Tax Act of 2009 (ARRA) significantly expanded TCB programs as follows:¹⁴

13. $4.75 \text{ percent} \div (1.00 - 0.15) = 5.59$; $4.75 \text{ percent} \div (1.00 - 0.35) = 7.31 \text{ percent}$. This example is from Maguire (2008, 6).

14. For additional details, see Government Finance Officers Association (2009).

- Qualified zone academy bonds (QZABs) were first authorized in 1997 at an annual appropriation of \$400 million. Under ARRA, the limit is \$1.4 billion annually for 2009 and 2010. QZABs are designed to improve schools in empowerment zones, enterprise communities, or districts in which 35 percent of students qualify for free or reduced-price school lunches. At least 85 percent of the bond proceeds must be used for rehabilitating or repairing public school facilities, providing equipment, developing course materials, or training teachers and other school personnel. The bonds cannot be used for new school construction. The dollar credits are authorized to each state based on the percentage of the population below the poverty line. The states then reallocate the credits to specific local governments.
- Qualified school construction bonds are new under ARRA. They can finance new public school construction as well as the construction, rehabilitation, or repair of public school facilities. The authorization under ARRA is \$11 billion annually for 2009 and 2010. Sixty percent of the funds is given to states based on the amount of local education grants each state receives under the Elementary and Secondary Education Act. The largest educational agencies in the United States receive 40 percent of the funds through the allocation process.
- Clean renewable energy bonds (CREBs) are used to finance qualified energy production projects, including facilities for wind, biomass, geothermal and solar, and trash combustion energy; refined coal production; and certain hydropower facilities. The amount appropriated is \$2.4 billion, with the annual tax credit equal to 70 percent of the tax credit rate set by the U.S. Treasury.
- Qualified energy conservation bonds (QECBs) were originally created in 2008, but were expanded by ARRA. Originally, the funding was designed to reduce energy consumption in publicly owned buildings, implement green community programs, and build research facilities. ARRA authorized \$3.2 billion (allocated by state population) to allow governments to make loans to individuals for green community programs, such as financing loans for homeowners to retrofit their homes with energy conservation products.
- Build America Bonds (BABs) is a new program under ARRA that allows state and local governments to issue taxable tax credit bonds in lieu of tax-exempt government bonds. The bonds can be used for any governmental purpose, and there is no authorization limit. Any government may issue BABs in 2009 and 2010 for projects where governments may otherwise have issued tax-exempt bonds. There is an option for the issuer to receive a rebate equaling 35 percent of the interest paid from the federal government instead of allowing investors to receive tax credits. Thus, an issuing government would receive a check from the federal government equal to

- 35 percent of the interest on the bonds. The bond proceeds must be used for capital expenditures, issuance costs, and reserve funds.¹⁵
- Recovery zone economic development bonds are a new ARRA program in which \$10 billion is authorized in taxable bonds for development or economic activity within a recovery zone. These bonds must be issued by 1 January 2011. In this program, there is no option for the investor to receive a tax credit, but instead the issuer will receive a payment from the federal government equal to 45 percent of the interest on the bonds.

Some Final Thoughts on Innovative Debt Financing of Infrastructure

There are many other important concerns surrounding the topic of infrastructure finance. This final section briefly notes several of them.

Often infrastructure projects, particularly large ones, dramatically exceed their budgets. There are many reasons for this, including the technical explanation of inadequate tools of analysis, agency models that predict excess spending, political models that might include deliberate strategic misrepresentation, and psychological explanations, including delusional optimism.

Delusional optimism comes from Flyvbjerg's (2004, 2005) work extending the reference class forecasting theory of Kahneman and Tversky (1979a, 1979b). Kahneman and Tversky concluded that people's judgment about a wide variety of events is often optimistic because of both insufficient acknowledgment of the risks of the event and simple overconfidence in their ability to judge outcomes. Flyvbjerg took their theory and developed a technique for its use. He believed that the technical explanations of overruns—inadequate data, bad forecasting techniques, and honest mistakes—were not the reasons for major overruns in large infrastructure projects. Rather, he argued, planners make decisions based on delusional optimism and intentionally overestimate benefits and underestimate costs. In examining 252 projects, Flyvbjerg developed probability distributions for several types of infrastructure projects.

Table 13.3, adapted from Flyvbjerg (2004), demonstrates how to compensate for possible overruns in several types of projects. For example, if a government is considering building a new road and decides that the risk of a cost overrun must be kept to less than 20 percent, the capital expenditure budget for that road should be increased by 32 percent. If the government decides that a 50 percent risk of a cost overrun is acceptable, the budget should be increased by only 15 percent (Flyvbjerg 2004, 4).

15. Under the BAB program, the tax credit bond rate is 26 percent below the taxable bond rate, since the 35 percent credit is both added to taxable income and subtracted from the tax liability (Thornton Matheson, International Monetary Fund, personal communication).

Table 13.3
Increases Necessary to Offset Delusional Bias in Infrastructure Expenditure Estimates

Category	Examples	50% Percentile Increase	80% Percentile Increase
Roads	Freeways, surface roads, park and ride facilities, pedestrian facilities	15	32
Rail	Light rail, guided buses on tracks, conventional rail, high-speed rail	40	57
Fixed links	Bridges, tunnels	23	55

Source: Adapted from Flyvbjerg (2004).

Bond and project default risks need to be carefully studied. A special report by Fitch Ratings (2007) defines three broad classifications of municipal debt with respect to default. The lowest risk class consists of GO, tax-backed, and most appropriation-backed debt of state and local governments as well as GO and revenue bonds issued by long-standing essential purpose enterprises that are either natural monopolies or have other strong protection against competition. From 1987 to 2002, the 5- to 15-year cumulative default rates in this class averaged 0.24 percent, which is less than the 10-year cumulative default rate of 0.43 percent for AAA-rated global corporate bonds.

Fitch's second risk class consists of activities that serve essential purposes but are not insulated from demand fluctuations or competition. These include hospitals, private higher education institutions, multifamily housing, airports, and toll roads. The 5- to 10-year cumulative default rates in this class are approximately 0.70 percent, compared to the 10-year private-sector cumulative default rate of 0.76 percent.

The third risk class includes enterprises that must compete against private-sector entities and that may face volatile revenue streams. They include industrial development bonds, local multifamily housing, toll roads that lack established traffic patterns, and tribal gaming bonds. These sectors have 5- to 15-year cumulative default rates averaging 3.65 percent, compared to the 10-year cumulative default rate of 3.97 percent for BBB+ corporate securities.

Many of the bonds that would be issued in the new infrastructure finance category may not have been analyzed by Fitch or may have had their ratings affected by insurance, and data on their performance over time are very difficult to obtain. In California, CFD bonds carry higher interest rates than revenue bonds or GO bonds, but in an unexplained anomaly, COP bonds have lower interest rates.

The infrastructure finance system is becoming increasingly complex, is hidden from the voters who consistently indicate that transparency in government is important, and can be misunderstood. Because the infrastructure financed by these instruments may be necessary for the economic growth and vitality of the

issuing jurisdiction, public-sector officials may face the ethical quandary of needing to balance community well-being through a series of arcane, but legal, instruments with a community desire to vote (often negatively) on debt. Overlaying the complexity of this system of debt, tax revolts, private-sector consulting firms, attorneys, population changes, capital mobility, and balanced budget constraints is the possibility that justifiable corruption can easily occur (Chapman, Kim, and Byron 2007).¹⁶

Many questions need further investigation. They include the following:

- What are the relationships between infrastructure financial techniques and infrastructure needs, fiscal sustainability, and environmental sustainability? Certainly, there is a relationship between the type of debt issued, debt service requirements, and fiscal sustainability. There is also a relationship between environmental sustainability and infrastructure needs. Yet, some environmentalists reject the importance of relative prices; and often the determination of programmatic and capital investment priorities, the calculation of the best delivery methods, and the provision of advisory centers or service bureaus (Dowall and Ried 2009) are only implicitly concerned with funding.
- The land use implications of several of the dirt-bond-oriented techniques need to be explored. For example, do CFDs encourage sprawl? Just as Yinger (1998) has done seminal work on the incidence of impact fees and assessment districts and Brueckner (2001) on the effects of a land tax on the urban footprint, these techniques need sophisticated theoretical work.
- Many of the new techniques have come about as public entrepreneurs respond to fiscal stress, development pressures, and voter antagonism to the property tax. While there is a rich literature on the Schumpeterian entrepreneur, there are few formal writings on public entrepreneurship outside of public administration and political science (and even there, the literature is scarce). The political economy of public entrepreneurship, mixed with dirt bonds, tax incidence questions, and formal political theory, is a potential gold mine for interdisciplinary analysis.
- The effects of user fees and other pricing mechanisms on the need for infrastructure construction require further analysis. While there has been some work on the potential reduction of highway spending if congestion tolls are implemented, more empirical work is necessary.

A Final Reminder

This chapter has ignored nondebt means of financing infrastructure that are assumed to be well known. The toolbox for infrastructure finance is full, but the

16. *Justifiable corruption* is defined to be a situation in which government “may engage in activities which, while clearly being legal, corrupt the very systems they seek to promote” (Chapman, Kim, and Byron 2007, 218).

method of choosing the tool and the implications of that choice are seldom discussed in the rush to prevent an infrastructure crisis. At least a marginal reallocation of research toward the understanding of the tools and their implications might be a Pareto improvement.

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