PERMITS TO ELICIT INFORMATION*

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INTRODUCTION

Traditionally, permits are used by the government as an instrument to regulate private quantity decisions, such as limiting the number of liquor stores or taxis in a community. Occasionally, authorities resort to permits as a form of taxation, either to raise revenue or to price externalities, as is partly the case respectively with building permits and tradable permits for sulfur dioxide emissions. In this paper, we propose a further fundamental function that permits may fulfill: eliciting information. We will refer to such permits as PEIs (Permits to Elicit Information), pronounced like "pays." Information elicitation is crucial to making correct government decisions in a broad range of settings, but it is especially important when deciding how much protective infrastructure to provide to a community. (Such anticipatory decisions are almost always a feature of rebuilding decisions after a catastrophe, as with areas affected by Hurricane Katrina.) Since the marginal benefit of protective infrastructure increases with the amount of capital that it protects, the amount of infrastructure the government should provide depends on its expectations about the behavior of private investors.[1]

In practice, these expectations often weigh heavily in government decisions. For example, when Congress authorized raising levees and constructing new ones along the southern edge of Lake Pontchartrain, "protection of *existing development* accounted for only 21 percent of the benefits needed to justify the project. An extraordinary 79 percent were to come from *new development* that would now be feasible with the added protection" (Burby, 2006). The floodplain of Chesterfield, Missouri was inundated to a depth of around nine feet when a levee failed during the 1993 flood on the Missouri and Mississippi Rivers. After the flood, the levee was strengthened using money from a bond that was to be repaid from future taxes on conjectured new development following the increase in protection. When prospective development provides a major justification for a project, having an improved method for estimating the extent of new development would be worthwhile.

Dependence also flows in the opposite direction: investment decisions will depend on expectations about protective infrastructure. In a previous paper, (Kousky, Luttmer, and Zeckhauser, 2006), hereafter KLZ, we showed that even if all private information can be ascertained costlessly, this complex decision game may have multiple equilibria, one of which is optimal. In this paper, we show how permits can be used to elicit private information and how the government can use this information to select the efficient equilibrium. In addition, the information elicited by the permits can serve as a coordination device for the interdependent investment decisions of private investors. Residents may be reluctant to return to a neighborhood in New Orleans, for example, without knowing if services will be available; likewise businesses will be reluctant to return without customers. A coordination mechanism would be useful. We address a second challenge in our discussion of refinements: some permits may go unused, and some parties making future investments will not be available to purchase permits. Futures markets fueled by speculators can refine the quantity estimates provided by the permits market.

In this paper, we explain the functioning of PEIs in the context of catastrophes and infrastructure, but the concept of using permits to elicit information is broadly applicable. Thus, governments in newly developing areas might draw inferences on what size roads to build or schools to open from the number of permits that have been drawn to construct houses and apartments. A college might ask freshmen to take out "concentration permits" in deciding how many courses to offer the next year in particular subject areas. A school offering free classes or a government offering a free job-training program might sell permits to attend the class or program, the price of which would be reimbursed when the person attends.

Protective infrastructure investments tend to be irreversible in the sense that it is very expensive to retrofit them to increase their protection (e.g.,

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building a levee stronger or higher, and virtually nothing is reaped later if the level of protection is reduced). Thus, the government often must make a one-time only decision long before the protected area is fully built. Given this, the government would like to get a prediction of the amount of private capital that would locate in the area for each possible level of government infrastructure investment. Since talk is cheap, it is difficult for the government to get credible estimates of investment levels. In New Orleans, the Bring New Orleans Back Commission initially proposed a process for gauging whether residents would return to neighborhoods by requiring residents to develop plans for the hardest hit neighborhoods.[2]

Instead, we suggest the government could use a system of PEIs to extract information about private investors' intentions to place capital in the affected area. Investors would be required to purchase a PEI from the government for each unit of capital emplaced. The government, however, would sell PEIs at a low price before the government infrastructure decision is made, but at a higher price after this decision is made. The level of sales of PEIs would be public information, and for good reasons investors would not be allowed to sell any excess PEIs. After the investor has made the investment, the investor would receive a rebate equal to the size of his investment times the initial and lower price of PEIs. We show that this pricing structure will induce private investors, in the initial period, to purchase a number of PEIs equal to their median or expected investment, depending on the pricing system employed. Purchasing more than these amounts would be costly because surplus PEIs have no resale value; purchasing fewer is costly because, should intended investment be high, additional PEIs would need to be bought at the subsequent higher price. Thus, by monitoring the number of PEIs sold, the government can obtain an accurate forecast of expected private investment, or other summary statistic on investment intentions, in the area.

The system works best on a tâtonnement basis, where aggregate investor intentions are continuously announced, with no permits actually sold until all have adjusted to the behavior of others. As part of this information-revelation process, the government should also announce the level of infrastructure that it would build for any level of permits bought. In effect, the government announces its reaction function to the private announcements.

There are widely used alternatives to PEIs as ways to elicit information, but they all have drawbacks. Surveys are probably the most prominent elicitation device, but with them respondents suffer no cost from misrepresenting their expectations.[3] Such problems would be magnified if respondents could judge, as they might in the infrastructure case, that their response could influence a government decision that would affect them. (Thus, if a community conducted a survey to determine whether to build a public pool, ardent swimmers would likely exaggerate their prospective use to get the pool built.) Surveys encounter a second difficulty: with any inquiry about intended future actions, it is difficult to determine the universe of investors to survey.

PEIs can avoid both these problems: (1) they can provide incentives for respondents to honestly reveal their future intentions, and (2) they automatically give anyone who wishes to build an incentive to participate.[4]

BASIC SETUP OF THE DECISION PROBLEM

We consider protective infrastructure to be a public good. All who have capital in a threatened area benefit as the amount of protective infrastructure is increased. Let the amount of government investment in infrastructure be denoted by G, and let the total benefit of infrastructure be denoted by $b(G, K)$, where K is the total amount of private capital locating in the area. We will maintain the usual assumption of diminishing returns to government infrastructure investment ($\partial b/\partial G>0$, $\partial^2 b/\partial G^2<0$).[5] Given the predominant non-rival component of infrastructure, both the total and marginal benefit will increase with the amount of private capital in the area ($\partial b/\partial K>0$, $\partial^2 b/\partial G\partial K>0$). The efficient government will choose a level of infrastructure such that the marginal benefit of the last dollar spent on infrastructure equals 1:

(1) $\partial b(G^*, K)/\partial G = 1.$

The unique solution to this equation is denoted:

(2) $G^* = h(K).$

Equation 2 shows how the optimal amount of government infrastructure depends on the amount of private capital locating in the area, with $h'(K) > 0$ following from our assumptions on $b(\cdot,\cdot)$. To determine G^*, the government needs to elicit information about private investment intentions.

We posit that each potential private investor gets an investor-specific productivity signal, α_i, on the productivity of his future investment. The investor's decision on how much to invest will depend on that signal and the level of protective infrastructure constructed. In addition, he is likely to be concerned with the amount of investment by other investors. A dry cleaner may not want to rebuild in the Ninth Ward of New Orleans unless it knows that a significant population will be reestablished there. We capture these three forces by an investment function for investor i that is given by $k_i(G, K, \alpha_i)$. We posit that $\partial k_i/\partial G \geq 0$, which implies that the total capital stock will be weakly monotonically increasing with government infrastructure.

This formulation allows for positive spillovers ($\partial k_i/\partial K>0$), such as when a gas station benefits from being located nearby other development that brings in customers, or for crowding ($\partial k_i/\partial K<0$), such as when there is a limited demand for office space and once one building is built there is no benefit to building another. However, we assume that decreasing returns to capital at the individual level more than offset any positive spillovers, implying that the aggregate production function still exhibits diminishing returns in capital. Thus, we can think of the aggregate capital demand function (which is a function of infrastructure and all the productivity signals) as the solution to the following equation:

(3) $$K(G,\boldsymbol{\alpha}) = \sum_i k_i(G,K,\alpha_i)$$

with

$$\partial K/\partial G \geq 0 \text{ and } \partial K/\partial \alpha_i \geq 0,$$

where $\boldsymbol{\alpha}$ denotes the vector of investor-specific productivity signals.

Equations 2 and 3 establish that government and private infrastructure decisions are interdependent. Because government infrastructure and private capital reinforce each other, this system of equations may have multiple solutions, and care should be taken to select the global rather than a local optimum.

In practice, we believe the government usually has to commit to most of its infrastructure decisions before many private investors have committed to their investment decisions. Infrastructure takes time to build, and once built rarely allows for scaling up or scaling back on an economic basis. We therefore model this interdependent decision in a 2-period framework. Specifically, we assume that at the outset of period 1, when the government needs to decide on the level of infrastructure to be put in place for period 2, investors receive a noisy private signal of their productivity in period 2. We leave aside discounting and risk aversion in this analysis to ease exposition. Let Φ_i denote the cumulative distribution of the productivity signal for investor i. We do not assume that productivity signals are necessarily independent across investors; that is, there may be aggregate uncertainty about average future productivity.

THE OPERATION OF PEIS

The government can elicit investors' private information about their productivity expectations by selling PEIs using a pricing schedule that increases once the infrastructure construction decision is taken. In particular, suppose that a private investor needs to own one PEI for every dollar of private capital installed in the area in period 2. Suppose furthermore that PEIs trade at a price of q_1 in period 1 and that additional permits can be bought from the government in period 2 at a price of q_2 with $q_2 > q_1$. Our formulation prohibits investors from selling any excess permits. Finally, at the conclusion of period 2, the government will reimburse each investor in the amount of q_1 times the *actual* number of units of private capital installed. Thus, permits that were (1) bought in period 1, and (2) were used, are effectively free. In this way, the permit system does not tax private investment for investors who correctly forecast their investment. However, an investor installing fewer units of capital than the number of permits bought in period 1 incurs an effective adjustment cost of q_1 per unit of capital, while there is an adjustment cost of $(q_2 - q_1)$ to installing more units of capital than permits bought. For example, if $q_2 = 2q_1$, each investor should buy permits in period 1 until he is as likely as not to spend another dollar in period 2, namely his median expenditure conditional on his signal, as we show formally below.

Since the optimal amount of private investment depends on the amount of infrastructure provided, private investors would need to form an expectation about the level of infrastructure when deciding on how much to invest. This expectation could be based on investors' understanding of the government's decision problem (the usual assumption in the rational expectations literature). However, it would seem to make more sense for the government to undertake its cost-benefit analysis in period 1, and to announce the amount of infrastructure it would provide for each level of private capital: $h(K)$.

So, when selling permits, the government would continually inform investors of the intended aggregate level of purchase by all investors and the implied level of infrastructure investment. The process would be kept open, with investors indicating their changing intentions until an equilibrium was reached. (A very minor adjustment charge could prevent investors from trying to manipulate the outcome.) Alternatively, investors could make a onetime only submission of intended permit investment contingent on aggregate investment (i.e., each of them would submit a schedule of intentions).

Let m_i denote the number of permits bought by investor i in period 1. Let $\bar{\alpha}_i(G, K, m_i)$ denote the solution to $k_i(G, K, \alpha_i) = m_i$. Thus $\bar{\alpha}_i(G, K, m_i)$ is the productivity signal at which investor i would want to install exactly m_i units of capital if the total capital base is K and the amount of infrastructure is G.

For the moment, assume that the permit purchase decision by any individual investor has a negligible impact on the amount of infrastructure provided by the government. We relax this assumption in the fourth section. The investor chooses the number of permits m_i to minimize his adjustment costs given an expected level infrastructure of G^e and an expected total capital stock of K^e:

(4) $$\min_{m_i} \int_{-\infty}^{\bar{\alpha}_i(G^e,K^e,m_i)} q_1(m_i - k_i(G^e,K^e,\alpha_i))\, d\Phi_i(\alpha_i) + \int_{\bar{\alpha}_i(G^e,K^e,m_i)}^{\infty} (q_2 - q_1)(k_i(G^e,K^e,\alpha_i) - m_i)\, d\Phi_i(\alpha_i).$$

The first-order condition is:

(5) $$\int_{-\infty}^{\bar{\alpha}_i} q_1\, d\Phi_i(\alpha_i) - \int_{\bar{\alpha}_i}^{\infty} (q_2 - q_1)\, d\Phi_i(\alpha_i) = q_1\Phi_i(\bar{\alpha}_i) + (q_2 - q_1)(\Phi_i(\bar{\alpha}_i) - 1) = 0,$$

which implies: $\Phi_i(\bar{\alpha}_i(G^e, K^e, m_i)) = (q_2 - q_1)/q_2$. Thus, if the policy maker sets $q_2 = 2q_1$, then m_i^*, the optimal number of permits bought, is equal to the level of investment that the investor would undertake at the median productivity signal.[6]

Posit that $k_i(G, K, \alpha_i)$ is distributed symmetrically (i.e., that the median level of capital is equal to the expected level of capital) and assume that the government sets $q_2 = 2q_1$. We relax this assumption in the fourth section. During period 1, investors purchase or sell permits until we reach a fixed point for the system of equations:

(6a) $$\Phi_i(\bar{\alpha}_i(G^e, K^e, m_i)) = 1/2 \quad \text{for all } i,$$

(6b) $$K^e = \sum_i m_i,$$

(6c) $$G^e = h\left(\sum_i m_i\right).$$

If q is sufficiently small that the adjustment costs do not affect the aggregate level of investment, then the fixed points of this system of equations correspond to a solution of the optimal joint determination of the level of infrastructure and private investment.[7]

REFINEMENTS

Creating a Futures Market to Refine the Estimate

While the permit system works well for investors who are already considering in period 1 how much they will invest in period 2, undoubtedly there are some investors, for example, in a distant locale, who are not aware in period 1 that they might potentially invest in the area in period 2. The government may thus wish to improve its forecast of future investment by setting up a prediction market for the total amount of private investment in period 2. (See Wolfers and Zitzewitz (forthcoming) for a survey on prediction markets in general and see Case et al. (1993) and Shiller (1993) on the use of future markets linked to the housing market and other macroeconomic indicators.)

In particular, the government could create a futures market in contracts that have a pay-off that is proportional to the number of units of private capital installed in period 2. (Period 1's capital installed is presumed known.) The seller of such a contract, Z, receives a price p_Z from the buyer in return for the obligation to pay the buyer γK in period 2, where

γ is a constant and K is the total amount of private capital installed in the area in period 2.[8] The price at which these futures contracts trade constitutes the market prediction of the expected amount of period 2 capital because the market will only be in equilibrium if the expected profit of selling or buying a futures contract is zero:

(7) E[profit of selling] = E[profit of buying]

$$= \mathrm{E}[p_Z - \gamma K] = 0,$$

thus, $p_Z = \gamma \mathrm{E}[K]$. Note, this market would be strongly informed by the permits market. Absent it, participants in the futures markets would be missing the most important information for drawing expectations about total investment. In addition, this futures market would implicitly forecast the number of period 1 permits that would go unused. Hence, even though this futures market is intended to predict the key quantity, total capital invested, it should complement, not supplant, the permits market as a provider of information.[9]

Strategic Behavior and Permit Pricing

Appropriate pricing of permits requires balancing three forces. First, if the price of the permits is too low, investors may strategically purchase more permits than derived above in order to boost the government's infrastructure decision. (This is equivalent to the cheap-talk challenge with surveys, when respondents want more of a public good provided.) Second, permit prices must be high enough to spark the attention of investors and to make it worthwhile for them to incur any decision-making costs associated with forecasting their future investment. Both these factors push for a higher price for q_1 and q_2.

Third, and pushing the optimal price in the opposite direction, permits create adjustment costs for private investors. For investment levels below the number of permits purchased in period 1, permits act like an effective marginal subsidy of q_1 on investment; above the number of permits purchased in period 1, they impose an effective marginal tax of $(q_2 - q_1)$ on investment. The resulting deadweight loss has an upper bound of ½ $\varepsilon\, K\, q_1\, (q_2 - q_1)$, where the price of capital is normalized to 1 and ε is the elasticity of capital demand with respect to its price. This deadweight loss will only be second order, and negligible for sufficiently small values of q_1 and $(q_2 - q_1)$.

Investor i can influence the government's infrastructure investment decision by purchasing an additional PEI. This yields a strategic marginal benefit to investor i of:

(8) $$s'(m_i) = \left(dV_i / dG - \theta_i\right) \times h'\left(\sum_k m_k\right) \times \left(\partial \sum_k m_k / \partial m_i\right),$$

where θ_i is the share of the marginal infrastructure costs borne by investor i and dv_i/dG is the marginal benefit to investor i of an additional unit of infrastructure. The marginal benefit consists of three factors. The first factor is the net benefit to investor i of a marginal increase in infrastructure. Thus, if infrastructure costs are borne by investors in proportion to their share of total capital ($\theta_i = k_i / K$), this factor equals zero and investors will have no incentive to purchase additional permits for strategic reasons.

Most major infrastructure projects, however, such as the Army Corps of Engineers civil flood protection projects or beach nourishment for hurricane protection,[10] as well as the construction of the Big Dig in Boston,[11] or many highway projects,[12] receive at least a significant portion of funding from outside their location. This implies that the investors' share of the cost of infrastructure will be far less than their capital share, implying that the first factor will be positive, and will be largest for the largest investors. The second factor in the marginal benefit formula is the responsiveness of the government's protection decision to the number of permits sold. The final factor in the marginal benefit formula measures how the total number of permits bought varies with the number bought by an individual investor. If investors believe that no permits are bought for strategic reasons, this factor is less than one if there is crowd-out and greater than one if there are positive spillovers. Thus, the strategic purchase of permits is most likely for larger investors and in settings where there is little crowd-out or where there are positive spillovers. Including the marginal strategic benefits of purchasing permits in the investor's first-order condition (equation 5) yields:

(9) $$\Phi_i(\bar{\alpha}_i(G^e, K^e, m_i)) = (q_2 - q_1 + s'(m_i)) / q_2.$$

Thus to compensate for the strategic incentive to buy excess permits, the government needs to raise the price of permits in the first period relative to the price in the second period. In particular, to ensure that the investor purchases permits corresponding to the median level of investment, the government needs to set $q_2 = 2(q_1 - s'(m))$.

Conditional Permits

To eliminate the risk of ending up at one of the local optima rather than at the global optimum, the government can sell investment protection permits that are *conditional on the level of government infrastructure*. PEIs would be sold for each of the J levels of potential infrastructure; each type would only apply were the government to choose the corresponding level of infrastructure. Investors would buy or sell each permit of type j until we attain a fixed point for:

$$\textbf{(10a)} \quad \Phi_i(\bar{\alpha}_i(G^j,(K^j)^e,m_i^j)) = 1/2 \quad \text{for all } i,$$

and

$$\textbf{(10b)} \quad (K^j)^e = \sum_i m_i^j,$$

where $(K^j)^e$ denotes the expected amount of total capital at infrastructure level G^j. The fixed points for these sets of equations (one fixed point for each j) will give the expected level of private capital $(K^j)^e$ corresponding to each level of infrastructure G^j. The government can then calculate the expected benefit at each level of infrastructure using the benefit function $b(G, K)$, and can then find the globally optimal amount of infrastructure by determining which $(G^j, (K^j)^e)$ pair yields the highest expected benefits. Full refunds would be given for permits corresponding to infrastructure amounts not chosen. For permits corresponding to the amount of infrastructure chosen by the government, the second-period adjustment costs would be the same as before.

Nonsymmetrical Investment Distributions

The simplifying assumption that $k_i(G, K, \alpha_i)$ has a symmetric distribution can be relaxed easily; the government must then adjust the current system to make adjustment costs effectively quadratic. That is, the investor who purchases m_i PEIs must bear adjustment cost $(k_i - m_i)^2$, where k_i is the number of units of capital actually installed. To achieve this, and also have the investor bear no cost if he predicts perfectly, first period permits could be sold for qm_i^2. Then, if the investor installs fewer than m_i units of capital in the second period, he would receive a refund of $q(m_i^2 - (k_i - m_i)^2)$. If he installs more than m_i units of capital in the second period, he purchases the required additional permits at a net cost of $q((k_i - m_i)^2 - m_i^2)$. As before, this quadratic-cost permit system does not tax private investment for investors who correctly forecast their investment. However, installing more or fewer units of capital than the number of permits bought in period 1 now has an effective adjustment cost of $q(k_i - m_i)^2$. Under these quadratic adjustment costs, investors will purchase the number of permits that equals their expected investment.

Alternatively, if the government has good information about the shape of investors' distributions, but not their scale, it could simply elicit median information and convert it to means. For example, the government might know that investors' distributions are lognormal with variance relative to the mean known as well. Then, once informed about the median value for an investor, it could infer the mean of his distribution.

Structuring the Actual Markets and Transaction Costs

Appropriate markets will have to be constructed for each geographic locale where information is required. The optimal structure for such markets will inevitably tradeoff theoretical perfection against real world transaction costs. Thus, the mechanism might combine nearby and related geographic markets into one market, or risk a local optimum by avoiding conditional permit sales or limiting their levels.

CONCLUSION

This paper proposes a novel way for the government to elicit private actors' expectations about their future investment in a geographic area: require investors to purchase a permit for each unit of investment. By increasing the price of these PEIs over time in a prescribed fashion, the government can induce investors to purchase the number of PEIs that equals their expected future investment. The government needs such information to make optimal decisions about protective infrastructure investment in the area, such as how high to build the levees. The information elicited by the permit system will not only aid government decisions, but it will also benefit those private investors whose decisions depend on expected investment by others.

We show that the permit system can be designed so that it creates neither first-order distortions to investment in the area nor incentives for investors to misrepresent their expectations. Finally, we explain how a complementary futures market can get speculators to refine estimates of capital investment derived from the permits market.

We believe that PEIs will be particularly helpful for areas seeking to rebuild after disasters, and we have therefore illustrated the use of PEIs in this context. However, the idea of using permits to elicit information is much more general and we think there is potential for PEIs to be used successfully in a range of other applications.

Notes

1 The term "private investor" should be interpreted broadly – it includes any private agent's decision on how much immobile capital to install in the area. In particular, it includes housing capital.

2 It does not appear this will be done in practice, but even if it were, the plans would be unrealistic since areas would have the incentive to significantly overstate the investment they expect.

3 When there is no cost to misrepresenting preferences, results may be unreliable. For instance, when conjoint studies, which are used to uncover consumer preferences, are based on hypothetical situations in which participants do not need to "live with" their decisions, they are less reliable then incentive-aligned studies where participants do experience consequences from their choice (Ding, Grewal, and Liechty, 2005). There is also evidence to suggest that an individual's stated preferences do not match their revealed preferences (Diamond and Hausman, 1994). One reason may be hypothetical bias, where the stated amount one is willing to pay exceeds the actual amount (see, as an overview, Murphy and Allen, 2005). Further, it has been found that when the choice that maximizes group benefits does not maximize an individual's preferences, the individual has an incentive to distort the information they give to decision makers in the hopes of a group decision that is more favorable to them (for one discussion of how to discourage such strategic manipulation, see Yager (2001)).

4 Recognizing transactions costs (participation costs in this instance), there is a role for speculators to play, as we discuss in the first refinement discussed in the fourth section.

5 This is posited over the relevant range. There may be increasing returns over early expenditures (e.g., a $1 million expenditure on a levee may do no good at all).

6 We maintain our assumption of risk neutrality, which seems reasonable as a first approximation given that the cost of permits is most likely only a small fraction of investors' wealth. The permit system requires investors to pay more (buy additional permits at the higher, second-period price) whenever they have a positive productivity shock. Thus, effectively, the permit system provides some insurance: it transfers resources from "good" states of the world to "bad" states of the world. This effect might lead investors to purchase slightly fewer permits than the number corresponding to their median expected productivity. We expect that this effect is second-order and introduce a way to correct for it in the fourth section.

7 This assumption holds to a first-order approximation. The adjustment costs will reduce the marginal cost of investment by q_1 for half the investors (those with realized productivity levels below their median) and increase the marginal cost of investment by $(q_2 - q_1)$ for the other 50 percent of investors. Only to the extent that investment is a nonlinear function of its cost, do these effects not cancel out.

8 We assume that all private capital gets installed before the end of period 2, when the capital stock is measured. Tradesports.com offered a similar contract on the number of seats the Democrats would pickup in the November 2006 U.S. elections. (Actually, it was multiple contracts for different levels of gains.)

9 Beyond informing the government, this market could also serve those considering physical investments by providing them with a hedging tool. For example, some investors may need to commit to their investment in period 1, before the level of government infrastructure and the amount of other private investment is known with certainty. These investors could then buy or sell futures contracts that enable them to hedge their profits against the effects of these uncertainties.

10 The Water Resources Development Act, passed in 1986, increased local cost-sharing requirements for civil projects. Currently, for flood control and beach nourishment, the federal government will pay at maximum, 65 percent of construction costs, as well as bear the full costs of reconnaissance studies and half the cost of feasibility studies (Carter and Cody, 2005).

11 The Big Dig eventually cost around $15 billion, with over $8.5 billion coming from the federal government. Other funding came from state taxes and local increases in tolls.

12 Many highway projects receive federal funding. Although the Highway Trust Fund receives money from federal motor-fuel taxes, so that some portion of highway construction is paid by users, it is still not paid by investors in a newly developing location.

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