The Economics of Environmental Regulation of Housing Development

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Abstract:

Conflicts over protection of biodiversity and other environmental amenities seem to be at their strongest when housing development is at issue. Housing affordability has emerged as a major national policy issue, and is seemingly in conflict with other mandates to protect and enhance environmental quality. Despite this apparent policy conflict, and despite the enormous potential wealth transfers resulting from environmental regulation of land use changes, it is somewhat surprising that there are relatively few papers linking these two problems. The paper reviews some of the issues arising from environmental regulation of housing development, and highlights a number of areas for future research.

I. Environmental Regulation of Housing Development

Environmental regulation is a significant hurdle in the housing development process, and is a major part of national efforts to protect biodiversity, environmental amenities, and other landscape features such as wetlands. Governments at all levels routinely conduct environmental reviews of proposed projects to ensure that development is compatible with environmental protection or, at least, that economic and environmental objectives are balanced in some fashion. Interestingly, federal environmental agencies have assumed an increasingly important role in oversight of land use changes, an area traditionally reserved for local governments.

This survey reviews the economics of environmental regulation of housing development. For clarity, this analysis focuses on federal regulations, stemming from the Clean Water Act and the Endangered Species Act, intended to conserve wetlands and habitat for endangered species, respectively.

These regulatory programs have come under increasing scrutiny by academic economists and lawyers. Economists have noted that these interventions, like other land-use controls, have the capacity to transfer large amounts of wealth among groups in society. They can also distort local housing markets and result in general equilibrium changes in location choices, housing prices and commute times. Lawyers have focused on the federalism aspects of these two regulatory programs.

In one sense, the conflict between environmental protection and housing development is not surprising since neither the Clean Water Act nor the Endangered Species Act were designed with economic efficiency in mind. In both cases, Congress

acted as if the nation's water quality and species conservation problems could be solved without federal land use controls, and both laws were shaped to avoid direct conflict with the autonomy interests of local governments and private landowners (Dukeminer and Krier, 2002). Consequently, federal environmental agencies lack the authority to mandate ambitious levels of land conservation if that would stop most or all development in affected areas. Rather, federal regulation tends to impose the same moderate requirements everywhere regardless of biological effectiveness (Pedersen, 2004).

Wetlands

The discharge of material into wetlands is regulated by the Army Corps of Engineers under Section 404 of the Clean Water Act. Federal regulations provide that the Corps must examine the following main issues in its review of proposed projects:

- Does the applicant have no practicable alternative that would avoid impacts to wetlands and has the applicant minimized unavoidable impacts?
- Does the mitigation proposal adequately compensate for any adverse impacts of the project?
- Does the project contribute to significant degradation of the aquatic ecosystem?
- Is the state where the activity is to take place satisfied that the project is consistent with state water quality standards and coastal zone management plans?
- Is the project contrary to the public interest?

The first two issues are handled according to a process called "sequencing" in which the applicant must establish that all practicable steps have been taken to avoid and minimize adverse impacts before the Corps and other agencies will consider the mitigation proposal. Accordingly, the end result of environmental review is often a combination of avoidance and mitigation. Avoidance often leads to a reduction in the overall output of the project (i.e., a reduction in the number of new homes constructed), and mitigation becomes one component of the transaction costs of regulation. Other out-of-pocket costs include the need to hire outside experts such as attorneys and biological consultants to navigate the permitting process, and the need to redesign the project based on the outcome of the review process.

Endangered Species

The Endangered Species Act (ESA) can have a profound effect on housing development, particularly in the western United States. The ESA explicitly prohibits "take" of a listed species, and can even limit development when "take" does not occur if the government deems the project to be on essential, if unoccupied, habitat.

Economic analysis has a role in the endangered species regulatory process in the designation of critical habitat. Section 4(b)2 of the Endangered Species Act authorizes the Secretary of the Interior to exclude land from critical habitat if she determines that the benefits of exclusion outweigh the costs. This exercise has created much controversy, mostly around the method used to assess benefits and costs. The recent *New Mexico Cattlegrowers* case has proved important in helping to settle the issue.[1] Plaintiffs in the case challenged the Fish & Wildlife Service's designation of critical habitat for the

[1] New Mexico Cattlegrowers Assn. v. U.S. Fish and Wildlife Service, 248 F.3d 1277 (10th Cir. 2001).

southwestern willow flycatcher arguing, *inter alia*, that the Service's "baseline" approach to measuring the economic impacts of critical habitat designation was an erroneous construction of the ESA. Under this approach, the Service would consider the initial listing of the species to be part of the baseline and thus would not analyze the economic impacts of listing, but only the economic impacts attributable directly to the critical habitat designation. Applying this baseline approach to the critical habitat designation for the flycatcher, the Service relied on its Section 7 regulations to conclude that no economic impacts would have occurred "but for" the critical habitat designation, and that the impacts of critical habitat designation and listing of the flycatcher were co-extensive.

The Tenth Circuit rejected this "baseline" approach, holding that the Service is required to analyze all impacts of critical habitat designation, regardless of whether those impacts are co-extensive with those of listing. The court acknowledged that the ESA "clearly bars economic considerations when the listing determination is being made." However, the court stated, the ESA also plainly requires "some kind of consideration of economic impact" at the critical habitat designation phase. The Service's regulatory "definition of the jeopardy standard as fully encompassing the adverse modification standard renders any purported economic analysis done utilizing the baseline approach virtually meaningless." Thus, the court concluded, the baseline approach failed to give effect to the congressional directive that economic impacts be considered at the time of critical habitat designation and was not in accord with the language or intent of the ESA.

II. Environmental Regulation and the Development Process: General Observations

The process of real estate development is highly variable and project-dependent. Nonetheless, it can be divided into several phases, bearing in mind that these are only general patterns. These basic steps apply to development of single-family housing, office buildings, shopping centers and other private sector projects that are the subject of this report.

In the planning and initiation phase, the development team is assembled, major hurdles are identified and overall project objectives are assessed. Next, the feasibility of the project is considered through an assessment of market conditions, local and regional governmental objectives, availability and cost of financing, and potential project sites. Typically, land will be optioned by the end of this phase at the latest. The commitment phase of the development process involves land assembly, preparation and negotiation of environmental documents, assembly of materials needed for other regulatory approvals, preparation of documents needed for financing, and finalizing the design of the project. This phase culminates when the developer obtains the needed financing and regulatory approvals. The developer then moves on to construction and operation of the project.

Real estate development is a complex undertaking and economic analysis of the effects of environmental regulation must reflect some basic features of this process. Some of these realities include the following:

- Development is subject to multiple, uncoordinated regulatory processes.
- Federal regulation can be a "signal" that increases the cost of other regulation.
- There are numerous physical constraints on site selection.
- Development is sequential in space and with regard to the regulatory "queue".
- Project delays can be very costly to developers, consumers and others.

- Development process requires sufficient financial and human capital.

Each of these factors in turn will be addressed further and with an emphasis on how they affect economic analysis of environmental regulation.

While the subject of this study is primarily federal environmental regulations, a salient fact about the land development process is that it is the subject of a complex web of federal, state and local regulation. These processes are largely uncoordinated and have differing objectives, but they are interrelated in that the outcome of one permitting process can reverberate through the others. One dimension of this interrelation is that if the outcome of federal regulation is to reduce the size or configuration of a housing project, for example, this modification will require the developer to alter the application to the local agency. Another dimension of this interrelation is that findings from one process can influence decision-making in others.

A consistent observation of the developers who were interviewed as part of this study is that once land is labeled as critical habitat or waters of the United States, all environmental permitting processes become more onerous. An important implication of this finding is that federal environmental regulation can impose significant costs on development even if the project has no federal nexus.

Public decision makers take into account the impact of the regulation on various constituencies, including environmental groups, local businesses, landowners, developers, agency budgets etc. Agencies differ in the weight given to various factors. Federal agencies are less likely to consider non-environmental factors and are less certain in their requirements. Local agencies are more likely to balance economic factors with environmental impacts.

Another aspect of coordination is that land can be subject to multiple environmental regulations. The cumulative effect of environmental regulations is likely to be larger than the sum of individual effects. Unless habitat associations are perfectly correlated across species or targeted amenities, adding regulations increases the amount of land set aside and increases permitting costs.

Any designation at the federal level may affect the treatment at the local level by a "signaling" effect. Regulators operate under uncertainty and may be risk-averse. Any designation that federally-protected amenities are present on a property may raise a flag about negative environmental impacts and lead the local agency to take a more conservative perspective on the development project. The response of local agency to federal regulation may vary depending on local sensitivities to environmental protection and economic development, as well as the extent of knowledge on the part of local agencies and the public. This way of thinking about the signaling effect of environmental regulation leads to some interesting predictions:

- The less informed the local agency is about the local environment, the more likely designation is to increase the difficulty of permitting.
- The more emphasis the locality places on environmental protection versus economic development, the stronger the impact of designation on local approval.
- The higher the actual risk posed by development is, the stronger the impact of federal regulation.
- Designation has an economic cost even on lands with no federal nexus. It may affect the severity of treatment and delay approvals at the local level. The delay effect will be larger in cities and counties with a more limited permitting capacity.

Site selection can occur before or after the developer evaluates local market conditions. This process is often exhaustive since a large number of factors are relevant to the site selection process. In fact, the National Association of Home Builders has developed a list of over 1,000 factors that should be considered before acquiring land for development. Among the factors that make a site suitable for development are the following:

- location and neighborhood
- size and shape
- accessibility and visibility
- environmental conditions
- legal constraints
- utilities
- zoning and regulation

The cumulative effect of these factors is that, while an area may appear to have a large amount of vacant land available for development, in reality there can be little land actually or realistically available for development. Imposition of additional regulation may reduce the amount of land available for development in a region, reduce the regional stock of housing and other goods and create unintended consequences on other resources such as agriculture and local planning processes.

Other factors constrain the development process. "Leapfrog" development is increasingly problematic since local governments often seek to confine development within defined boundaries. Further, non-sequential development requires utilities, roads and other infrastructure to be extended longer distances, thereby increasing project costs.

Thus, land located away from the urban boundary may be, at best, an imperfect substitute for land located on the boundary which is set aside for habitat protection.

Local governments have limited capacity to process permit applications and may consider them in the sequence in which that particular local government would like the area to evolve. Most developers can recall instances in which they were forced to wait long periods, in some cases several years, for a local government to work through its backlog of applications for projects that were closer to the city center.

Delay is another impact of environmental regulation on the housing development process. Sunding and Zilberman (2002) offer some direct evidence on the length of time needed to obtain a discharge permit from the federal government. Based on a nationwide analysis of individual wetland permit applications, they conclude that the average permit takes a total of 788 days to prepare and negotiate. Of this amount, 383 days are required for preparation (that is, from initiation of the process until submission) and 405 days from submission until receipt of a decision from the Corps.[2] Environmental review is often the pacing item in a housing development project, especially since local environmental reviews can be impacted by federal decisions about mitigation and avoidance.

[2] These figures are in contrast to the Corps assertion that it takes only 127 days on average to obtain an individual permit. The discrepancy is largely explained by the "completion game" in which months or years can pass before the Corps deems an application to be complete and therefore ready for review.

Consider the costs of delay on just one component of land development expense such as the cost of acquiring land. The developer typically acquires land for the project in three steps: a "free-look" period, a period in which the developer has locked up the land with an option to purchase, and closing. Developers usually acquire an option to purchase fairly early in the process.

The welfare cost of delay (and of the related uncertainty about permit completion time) can be large. Mayer and Somerville (2000) show that delay can have a significant negative impact on development incentives. Majad and Pindyck (1987), Grenadier (1995) and Bar-Ilan and Strange (1996) also consider the incentive effects of delays in the context of a dynamic optimization framework. While these papers focus on the supply side of the market, it is also important to note that consumers bear significant costs from delay since they lose all consumers surplus during the period of delay (Sunding, Swoboda and Zilberman, 2004).

Table 1

Typical Months Elapsed for a Small Office or Apartment Building

	Stage of Development	Area with Few Regulations	Area with Many Regulations
1.	Earnest Money Contract Signed	0	0
2.	Earnest Money Committed	1	1
3.	Market Study	2	2
4.	Preliminary Design	3	3
5.	Engineering Studies	6	6
6.	Approvals[a]	6	24-60[b]
7.	Financing Commitment	6	24-60
8.	Working Drawings and Building Permits	9	27-63[c]
9.	Land Purchase and Construction Loan Closed[d]	9	27-63

[a]Assuming no zoning changes are necessary.
[b]Environmental, political, design review, and other approvals can take two to five years.
[c]Building permits can take six to nine months after working drawings are finalized.
[d]Most sellers require closing on the land sooner than nine months, but the deal should not be finalized until tentative financing commitments and approvals are in place.

Source: Urban Land Institute, 1989.

Table 1 shows how the development process can be affected by environmental regulation. In this stylized example prepared by the Urban Land Institute, the developer acquires an option near the start of the development process, only one month after initiation (even before performing a market analysis). The developer must then pay to maintain this option until all regulatory approvals are obtained. In areas like California where land is expensive, delay can significantly increase development costs.

The ultimate decision to assemble land and construct a project is the result of many factors. If environmental regulation requires a redesign of the project or simply delays receipt of needed permits, overall project costs can increase significantly. For

example, if environmental regulation reduces the number of allowable units in a project, then the developer may need to redesign the entire project, reconsider the financial analysis, and rework financing.

Beyond increasing development costs, delay can reduce societal benefits from development in other ways. One obvious effect is that delay reduces the present value of development by pushing consumption further into the future. Thus, delay reduces the present value of the developer's return on investment and the final consumer's enjoyment of the product. In extreme cases, delay can lead to bankruptcy if the developer is highly leveraged. Delay may also lead to relocation of key industries away from the region as they search for needed facilities. Delay can also increase the costs of related infrastructure development – cost often borne by cities or counties.

Taken together, these observations imply that the development process may be highly constrained, and environmental regulation to conserve habitat can reduce the stock of housing and increase its market price. To summarize:

- Regulation increases development cost and reduces the size of affected projects.
- Because numerous constraints on development reduce the substitutability of projects, regulation can reduce the size of regional housing stock.
- Environmental regulation can alter the configuration of cities, squeezing development out of some fringe areas, resulting in increased commute costs, sprawl and other problems.
- Development projects can be delayed by environmental regulation, resulting in increased development costs and other effects.

The impacts of habitat protection go well beyond the developer and landowner to include current and prospective homebuyers, commuters, local government and others.

III. Conservation Benefits and the General Equilibrium Effects of Regulation

Spatial models are widely used in urban economics to explain various characteristics of the urban landscape (see Anas, Arnott and Small, 1998, for a review). These models have been adapted to consider such problems as urban sprawl (Brueckner, 2000 and 2001, Fujita and Kashiwadani, 1989, Mills, 1981). Models of this type have also been extended to consider the provision of open space and environmental amenities (Yang and Fujita, 1983, Lee and Fujita. 1997, Wu and Plantinga, 2003, and Brueckner, Thisse and Zenou, 1999).

By protecting habitat and other local amenities, environmental regulations can increase the demand for housing in a particular location. These benefits should be considered when drawing any conclusions about the size or distribution of the costs and benefits from environmental regulation of housing development. While it is hard to draw general conclusions about the market effects of habitat protection, it is possible to identify alternative scenarios.

It is tempting to consider the benefits of environmental regulation in the same way that one would model the benefits of providing open space or parks. This would be a mistake. Protection of open space usually results from an indigenous planning process that expresses the preferences of local residents. Federal environmental regulation, by contrast, flows from the preferences of the nation as expressed by Congress, and preserves habitat only by overturning the decisions of local governments. Further, by

negotiating with individual applicants and requiring changes to a large number of independent projects, the conserved habitat resulting from regulation can be fragmented, isolated and of debatable recreational or aesthetic benefit (if it is accessible at all). There is also a question about proximity to the conserved habitat. The principle of off-site mitigation is well established in both wetlands and endangered species regulation. Thus, the end result of regulation may not be to conserve habitat near the area in question, but many miles away and, thus, be of little direct benefit to those homeowners. While the conserved habitat may be valuable, benefits are separable from costs since they do not affect the regulated housing market. Finally, the quality of conserved habitat may be questionable. Again, wetland regulation provides a good example. Many landscape features that are regulated as waters of the United States are not highly valued by neighbors and, indeed, are sometimes considered nuisances. Such features may include irrigation canals, desert washes, roadside ditches and tire ruts, and erosional features on hillsides. Again, the implication is simply that benefits are separable from costs and need not affect the location choices of households.

These observations suggest that the benefits of regulation are hard to characterize acontextually, and that different possibilities need to be considered. Unlike the case of open space, there is a very real possibility that the land conserved as a result of environmental regulation provides few if any benefits to local residents. Thus, it seems prudent to consider two alternative scenarios regarding benefits: i) The benefits and costs of regulation are separable in that the benefits of regulation do not affect the location choice of households; and ii) conserved habitat is a local public good that benefits homeowners as a declining function of distance to the preserved habitat.

The first scenario can be dealt with through partial equilibrium analysis, which is addressed in the next section on screening analysis. There are some results in the literature that shed light on the general equilibrium effects of environmental regulation in the case where benefits are local public goods and affect housing market choices. In general, environmental regulation can perturb the urban economic equilibrium in two ways. First, it acts as a development tax in that it increases the cost of converting open space into housing. Second, it may provide localized amenities that increase the utility from housing consumption in certain locations.

Measures of the willingness to pay for local environmental amenities are treated in various studies including Acharya and Bennett (2001), Leggett and Bockstael (2000), Mahan, Polasky and Adams (2000), Breffle, Morey and Lodder (1998), Kline and Wichelns (1998) and Palmquist (1992). This research is of variable quality, with most papers suffering from the serious defect that they do not distinguish between the supply-reducing effect of regulation and its benefits, but rather infer that observed price changes result from the creation of local amenities.

The recent paper by Wu and Plantinga (2003) illustrates the kind of general equilibrium effects that can result from habitat conservation in the case where regulation creates local public goods. For example, they show that open space policies should not be viewed as independent of, or even compatible with, growth management goals. Ignoring the cost increasing feature of land conservation, their analysis shows that creating open space will distort the location choices of households since residents prefer to live close to open space and the creation of open space has an extensive margin effect by attracting migrants to the city. They also find that the creation of open space can

create leapfrog development, increase the total size of the city, and result in congestion externalities.

Another interesting finding of the Wu and Plantinga paper is that the creation of open space may be highly regressive. In equilibrium, housing is allocated to those who bid the highest price, indicating that households with a relatively flat bid price gradient with respect to the central business district will locate further from the city center. The standard result from the neoclassical model of urban growth is that the distribution of income groups in relation to the central business district depends on the relative magnitudes of the income elasticities of housing demands and marginal travel costs. If income has a larger effect on housing demand than on marginal travel costs, then wealthier households will locate farther from the central business district, as observed in many cities in the United States.

Environmental regulation that creates open space can change the location pattern of different income groups because it changes the spatial distribution of amenities. Wu and Plantiga (2003) consider various forms of open space (ignoring congestion effects) and simulate outcomes. In these simulations, the designation of open space shifts upward the bid price function of all households. However, because the open space is located some distance from the central business district, it tends to benefit high-income households more than low-income households. In all scenarios, creation of open space causes more high-income households to migrate to the city. Moreover, the high-income households locate closer to open space but further from the central business district where they face more favorable tradeoffs between housing and transportation costs.

IV. Measuring the Cost of Conservation at the Project Level

Partial equilibrium analysis is useful for screening to identify areas of cost-effective conservation. Its data requirements are much more modest than that of general equilibrium analysis. Because it is relatively easy to implement, partial equilibrium analysis is supportive of more efficient implementation of clean water and biodiversity conservation objectives than the current system of untargeted regulation.

There are two basic theories of housing market equilibrium, and both should be considered in the partial equilibrium analysis. The most common approach is to assume that the price of housing reflects the marginal cost of construction and development. In this view, commonly called the neoclassical approach to housing market equilibrium and taught to every graduate student in urban economics, density will adjust to equate the price of land with its marginal value to consumers. This view also holds that developers do not earn excess profits from their activities.

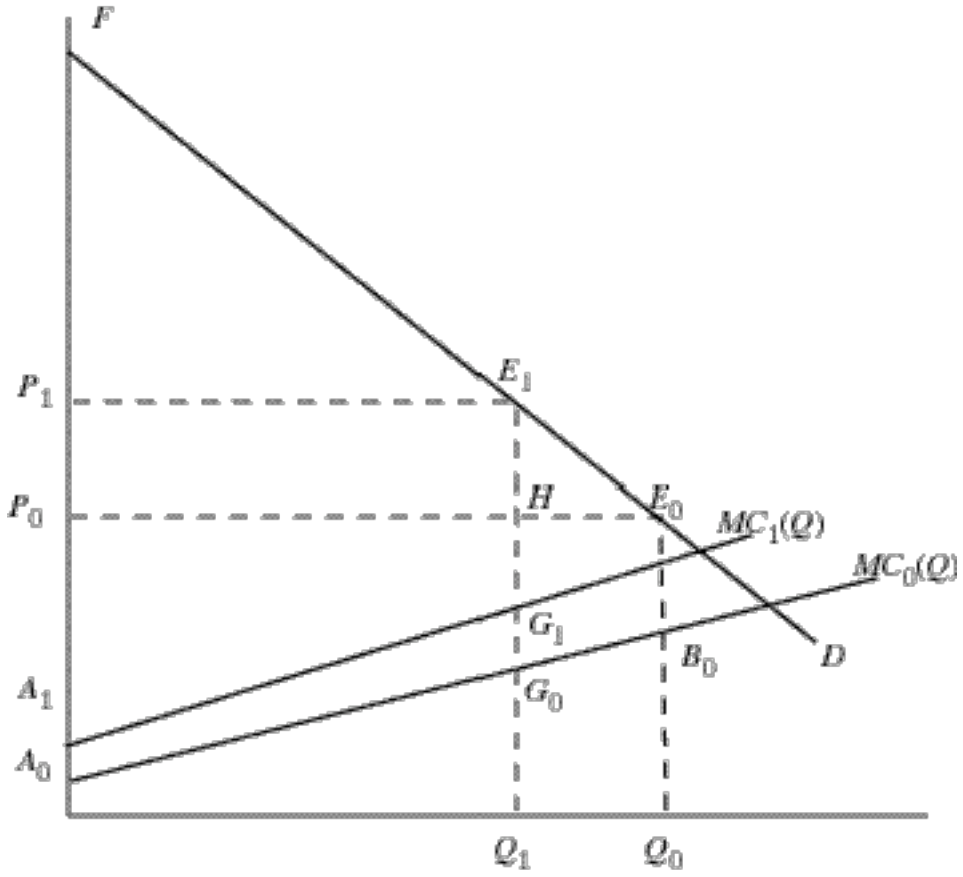
An alternative approach stresses the importance of regulation such a zoning and density controls that limit the supply of housing (Sunding and Swoboda, 2004, Glaeser and Gyorko, 2004). In this approach, the marginal cost of construction and development can be far below the market price of a house since houses are rationed among a number of consumers and their price is bid up accordingly. Thus, in the regulation-focused approach, housing prices reflect scarcity more than the costs of production. In this view, the value of land with a house on it may be far greater than the willingness of consumers to pay for an additional unit of lot size.

This distinction between the neoclassical and regulation-focused explanations of the price of housing is important to the impact of environmental regulation on the housing industry. In markets where housing prices reflect marginal costs, the impact of regulation on costs of construction and development will be of the most importance; the marginal welfare costs of output restrictions are negligible since marginal cost equals marginal utility in the pre-regulation equilibrium. When housing supply is limited and houses are rationed as a result, the supply-reducing effect of environmental regulation takes on major significance. By further restricting supply, environmental regulation imposes costs on consumers and results in losses to landowners and developers undertaking projects on conserved land.

Figure 1 shows the partial equilibrium impact of environmental regulation on the housing market. Let the demand for new housing in a region be given by $P = D(Q)$. Benefits are treated as separable in this case, and the analysis focuses on cost in an effort to screen out areas of high impact. The pre-regulation quantity of development occurs at Q_0, reflecting the fact that land at the project location earns some quasi-rents.

Figure 1

Partial Equilibrium Analysis:
Impact of Regulation on the Local Housing Market



Environmental regulation increases the marginal cost of homebuilding in that the developer must expend resources to get through the permitting process, redesign the project if necessary, and perform off-site mitigation. The post-regulation marginal cost is denoted by MC_1.

The second effect of environmental regulation is to reduce the output of the project in an attempt to minimize on-site impacts. This effect is captured in the reduction in project output from Q_0 to its post-regulation level, Q_1. An important consequence of

the reduction in supply is that the price of new housing increases from P_0 to P_1. This change in price transfers wealth from consumers to developers and landowners.

The third main effect of environmental regulation is to delay completion of the project. The loss from delay is potentially quite large, and has been generally overlooked in the economic literature on regulation and permitting. The surplus concepts in Figure 1 are net present values since housing is a durable good. Thus, the costs of delay involve the total amount of surplus lost from the failure to build during the period of delay, the length of this period, and the rate of interest. The cost of a one-period delay in completing the project is essentially the area of total surplus multiplied by the rate of interest.

An example will help to illustrate data requirements, how to calculate welfare losses, and the potential range of welfare costs. Consider a 1,000-unit housing project proposed on a 250-acre parcel, implying a gross density of 4 units to the acre (typical for suburban Southern California). Suppose that the market price of the new homes is $250,000 and that the constant marginal cost of development and construction (exclusive of land assembly costs) is $200,000 per housing unit.

Environmental regulation of the proposed land use change impacts the development in three ways: The cost of development is increased by $6,000 per unit, the number of homes is scaled back to 900, and completion of the project is delayed by one year. Under the assumption of a unitary demand elasticity, application of the impact framework shows that the price of housing rises to $275,000. The total welfare loss is $28.5 million, over half of which results from delay.

An interesting extension of this example is to consider environmental regulation's implicit cost of conservation. If the end result of the permitting process is to prohibit

development on one-tenth of the total acreage of the project, then the $28.5 million dollar welfare loss should be divided by the 25 acres preserved by regulation. Viewed this way, the cost of conservation exceeds $1 million per acre.

V. Conclusions

The topic of environmental regulation of housing developments draws on several themes in economics, in particular urban economics and environmental economics. Despite the large number of papers on urban growth processes and on the costs and benefits of environmental protection, it is somewhat surprising that there are so few papers on the impact of environmental regulation on housing development. Given the potential for large wealth transfers and amenity creation, this seems to be a major area of opportunity for economists, policy analysts and others who study processes of urban growth and development.

Housing development is subject to an array of overlapping regulations. Thus, the textbook neoclassical model of urban growth may be of limited relevance to the task of measuring the costs and benefits of environmental regulation. Rather, what is needed is a detailed model of the housing development process, and a more complete understanding of how developers interact with regulators and how the regulatory process alters the sequence and timing of development activities. Further, environmental regulation of land use changes is conducted by numerous levels of government, raising interesting questions about the possibility for interaction among regulatory agencies and additional problems caused by a lack of coordination.

Another area in need of further research is the question of measuring the benefits from environmental regulation of land use changes. Some environmental economists have a tendency to equate stopping development with provision of meaningful public goods. While there have been some attempts to measure the value of preserving open space, it is hard to draw general conclusions about the benefits of protecting habitat on the margins of urban areas. Further, most economists attempting to measure the benefits of protecting environmental amenities such as wetland and open space fail to adequately account for the supply-reducing effects of environmental regulation that may, by themselves, account for observed price differences.

While most of the discussion in this paper has been couched in terms of partial equilibrium, protection of habitat may have interesting general equilibrium effects on urban form. For example, if some land is placed off-limit to development, the market may respond by encouraging development in more remote areas. Regulation may even result in leapfrog development that strains public infrastructure. Thus, the benefits of environmental regulation may be best studied in terms of competing risks, as is common with other kinds of regulation.

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