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THE REGULATION OF URBAN DEVELOPMENT: LESSONS FROM INTERNATIONAL EXPERIENCE

By

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This is a draft, and comments are particularly welcome.

I. Introduction

Regulation per se is neither good nor bad. What matters is the costs and benefits of specific regulations under specific market conditions.1

This paper is prepared as a background paper for the World Bank's 1999 *World Development Report* on "Globalization, Decentralization, and Urbanization." It is based on notes prepared for a session on "Regulations for Land Use, Transport and Other Urban Services" sponsored by the *WDR* team. Given my own expertise and research agenda, much of the focus will be on real estate regulations, including land use, rent controls, and the like. But the paper will also discuss, *inter alia*, some urban regulations affecting finance, labor, business enterprise and other activities.

First the paper will make some general observations on urban development in general, and on urban regulations in particular. Then we will very briefly discuss some of the main types of urban regulations (land use, financial, and so on). A "framework for analysis" is then presented, which discusses why governments intervene in general; some issues in interventions in cities; and some general principles for evaluating regulations and other interventions. The longest section of the paper presents key results from selected regulatory studies. Land use and real estate, labor markets, and business enterprise are among the substantive areas covered. Section IV examines some issues of higher order incentives and political economy. The paper concludes with discussion of generalizations and themes that emerge from these examples and from the larger corpus of work that lies behind them.

This paper focuses on empirical results, but of course there is a large theoretical literature[2] behind this work, some of which will be handled by reference. The paper is written primarily for a policy audience; while it will be of some interest to specialists in the technical economics of regulation, many of the references below go into the technical aspects in more detail. A select bibliography is also attached.

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1.   Class mantra of Real Estate 420, Urban and Regional Economics.
2 . "A picture is worth a thousand words, and a differential equation is worth a thousand pictures." (Source unknown).

Why Well Run Cities Are Important

A famous American bank robber of the forties, Willie Sutton, was being led away to prison after his fourth conviction. An enterprising reported asked him, "Willie, why do you keep robbing banks?" "Because that's where the money is" replied Sutton.

A simple and perhaps facile answer to the question why well-run cities are important is: that's where the people are. Even more so, that's also where the economic activity is. According to the United Nations projections, shortly after the turn of the millennium the world will see for the first time the majority of its population living in cities (UN 1995). And for some years now, the majority of the world's economic output has been produced in cities (World Bank 1991).

Urbanization has accompanied economic development for the last 10,000 years. Now, the facts that half the world's population, most of its economic production, and trade, take place in cities, and the correlation of urbanization and development over time, could be viewed as interesting stylized facts and no more. That is, is there anything about the process of urbanization that makes it a fruitful lens through which to view the process of economic development? Economists and other social scientists have examined this question rigorously since at least the time of Alfred Marshall (1890). At another level, the role of cities in political and economic development have been discussed at least as far back as Aristotle in the Western intellectual tradition; and there are doubtless examples from other traditions.

Put simply, since the first cities arose in Mesopotamia 10,000 years ago, the location of economic activity matters, and in fact matters a lot. The importance of location vis-à-vis (for example) natural features such as rivers and ports, sources of natural resources, and defensible positions, are self-evident. But the locations of economic activities are not chosen *simply* with respect to such natural advantages. Location choices feed on themselves. There are large gains from reducing physical distance between economic actors. All these factors give rise to *density*.

Urban economists focus on the role density and urbanization plays in facilitating trade, including the reduction of transportation costs, and the dissemination of information, and innovation. Economies of scale *internal* to the firm (the "usual kind" implied by U-shaped average cost curves) also imply urbanization, since any scale of effort beyond an individual worker employing her own capital implies some urbanization. Urban economists also focus particularly on economies of scale *external*

to the firm, called agglomeration economies. These may be external to the firm and external to the industry, i.e. related mainly to the size of the city in which the firm is located ("urbanization economies" in the jargon). Or they may be external to the firm but internal to the industry, i.e. related to the firm's location vis-à-vis similar firms, or firms in related industries ("localization economies" in the jargon).

A large literature exists on the theory and empirics of these phenomena, going back to Marshall and including such recent examples as Henderson et al. (1995); Krugman (1991); and Glaeser *et al.* (1992). The World Bank has contributed to this literature and recently drawn out the implications of urbanization for its lending and policy program in for example World Bank (1991), Ingram (1997), and Mohan (1994). The relationship between urbanization and economic development has even become highlighted in the popular press, for example *The Economist* (1995). Pop management writers have even picked up on the trend, see Porter (1995) and Ohmae (1995).

This paper is not the place to review this large literature and these important issues in any detail. For such a review, see the papers cited above, as well as Becker and Morrison (forthcoming); Hamer and Linn (1987); and Malpezzi (1997). The point that we need to emphasize in this paper is that location matters. It therefore follows that regulations and other government interventions that affect location must be carefully considered in light of these effects.

Another aspect of the urban environment that needs emphasis is that the majority of tangible capital in all countries, and even more so in all cities, is real estate and its associated infrastructure.3 This particular kind of capital is by definition fixed in location and very long lived. This means that investment decisions affecting real estate, and hence the regulations affecting these decisions, are important and we have to live with the consequences for a long time.

While real estate's durability and locational fixity are extreme, other factors of production such as the urban labor force are also durable and fixed in their own way. Decisions about education and training early in life are difficult to change later. And while labor is certainly a more mobile factor of production than a building, in fact labor mobility also has its limits at least in the short run. We also note in passing that

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3. For example in the United States about 3/4 of the tangible capital stock is real estate. Roughly half is residential and the other 20% is various forms of office, retail, industrial and other real estate. (Malpezzi, Shilling and Yang, 1998). This pattern holds worldwide. Over half the world's capital stock is in real estate (Ibbotson, Siegel and Love 1985).

the longer run mobility of labor – its ability to adjust to changing economic conditions – will depend in large part upon the ability of the real estate market to adjust to changes in demand for housing from place to place.

One can easily get through an entire course of study in either micro or macro economics without considering location explicitly. The vast majority of papers published in economics do not consider location explicitly. Of course that is by design. Tractable economic modeling requires that any particular modeling effort must necessarily strip away many features of the real economy in order to focus on the very specific issue at hand. Thus, for example, it is quite proper for a model investigating the role of capital accumulation in economic growth to abstract from the question exactly where this capital will be located, just as we abstract from just what kind of capital we accumulate. We argue, and once one thinks about it, it becomes self evident, that just as it is often necessary to abstract from location to make progress on some modeling fronts, at other times explicit consideration of location becomes essential.

The following simple thought experiment will show that location matters. Consider a world without cities. In its extreme form, such a world would be equivalent to a random and uniform distribution of the labor force and capital stock on the land mass of the earth. One really doesn't have to go further to see the importance of location. Take the United States as an example. Particularly well endowed with land, there are approximately 10 acres (4 hectares) of land for each person in the United States. The U.S. tangible capital stock comprises roughly $80,000 worth of capital *per capita*. Randomly distribute the population of the U.S. such that each individual is place in the middle of their 10-acre plot, along with $80,000 worth of randomly chosen tangible capital. The GDP of the world's richest country would asymptotically approach zero in short order, assuming that there were barriers to the movement of population and the reformation of cities.

Why Spatial Aspects of Regulation Matter

We will show below that many urban regulations have profound effects on local and aggregate economies. Much, although not all, of these effects are due to their locational implications. Take restrictions on allowable development density as an example. It can be straightforwardly shown that such regulations will lead to a reduction in the amount of real estate investment.4 But what is subtler is that it will

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4. Of course, we are not implying that means all such regulations are "bad," as will be

also affect the location of this capital. Both effects are important, and both need to be understood for the design of a proper urban regulatory system.

This leads us naturally to the final point in the introduction. Urban regulation is an essential part of good urban management.

Regulation and Urban Management

Urban management is a term often used and rarely rigorously defined. Like many such broad terms it is perhaps useful that its definition be somewhat elastic, depending on context. A typical World Bank definition is:

> Urban management is concerned with the policies, plans, programs, and practices that seek to insure that population growth is matched by access to basic infrastructure, shelter, and employment. (Davey 1993).

The image of urban management is often one of public sector management of the process of urban development. Clearly, urban governance is an important part of urban management, but also clearly the largest role – at least in terms of dollars or pesos invested, labor mobilized, and so forth – will be that undertaken by the private sector.

Much of the Bank literature on urban management has focused on local public finance, and there is no doubt that this is a critical element of such management (Dillinger 1991, 1994). In this paper we will examine quite explicitly the roles public sector actions, mainly regulatory actions, have on private and public sector contributions to the development of the city. We will argue that the regulatory function of government and its interactions with other functions including the financial one are often under appreciated. In fact the effects of urban regulations on the development of the city, and of the overall economy, are profound. Further, in many respects designing an appropriate system of urban regulation – or even better, designing a higher order system that in turn delivers an appropriate system of urban regulations – is as challenging and important as other aspects of urban management and governance. It is to these challenges we now turn.

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discussed in detail below.

II. A Framework for Public Interventions, Including Urban Regulation

Regulation, the special focus of this paper, is really only one of many instruments for public intervention in real estate and other urban markets. Governments around the world intervene through:

- the definition and enforcement of property rights
- taxation
- subsidies
- regulation and planning
- direct public provision

In one sense these interventions can be treated as substitutes. Certainly they can each be valued, and the incidence of the tax, subsidy, regulation or whatever can be studied. But of course there are other senses in which they are not equivalent. For example, in the environmental literature there is a huge body of work that suggests that in most circumstances tax policies will be superior to command and control regulation. The World Bank's (1989) sector study of Malaysian housing markets, *Getting the Incentives Right*, illustrates how to study interventions in a unified framework. That paper provides an illustration of how, using simple but defensible assumptions, it can be useful to treat a set of taxes and subsidies and regulations as functionally equivalent in order to study their net effect on urban real estate market outcomes.

Why Governments Intervene: Types of Market Failure

There are a number of possible reasons why private markets might not reach an efficient allocation, giving rise to a need for regulation. Detailed surveys and discussion of these rationales appear in Spulber (1989) and Haveman (1976). While often presented in texts as mutually exclusive and clear cut, in practice these types of market failure often overlap.

The classic rationale for public intervention is the existence of public good. Economists define public goods quite strictly, and in a sense not used by the general public. A public good as defined by economists is one where there are no rivalries in consumption of the good, nor can consumers be excluded from consumption of the good once provided. Most definitions also note that no method exists for determining consumers' true willingness to pay (but see the discussion of Tiebout below). A classic

example of a public good is national defense. It is generally impossible for a government to defend some of its citizens and not others. At the same time, individual taxpayers have an incentive to understate their willingness to pay for defense, since an individual either consumes the entire defense package or leaves the country. *True* public goods in this strict sense are rare in the urban context, and we will not discuss them at any length in this paper.

The next classic rationale for public intervention is the existence of a natural monopoly due to decreasing or increasing returns to scale over the entire relevant range. This is the rationale generally cited in the discussion of public utility regulation (Brown and Sibley 1986). Baumol (1982) demonstrated that markets could work well even under such conditions as long as the markets were contestable, i.e. that entry and exit were free. Baumol and Lee (1991) discuss the application of contestable markets to developing country urban contexts. Barriers to entry, or more generally conditions of entry and exit, have also long been recognized as critical factors. Of course it has also been recognized in the literature that regulation can have the consequence – intended or not – of impeding entry or exit into a market.

Another very broad class of market failure oft discussed in the literature is the existence of large transactions costs. Demsetz (1968) and Williamson (1975) are well-known discussions. A particular type of transaction cost much studied in the recent literature is information failure, more specifically asymmetric information.

Another major class of market failure relates to the presence of externalities. Externalities are costs that are imposed upon parties outside the transaction. External benefits are in parallel benefits conferred upon parties outside the transaction. We will discuss this important class of market failure in some detail in the next few paragraphs, and in this paper generally.

Some authors such as Spulber (1989) contrast "externalities" with "internalities." When used, the distinction is that internalities are costs borne by, or benefits conferred to, parties internal to the transaction, but still unpriced. An example of a negative externality given by Spulber is a product defect that is completely unanticipated by consumers and hence unpriced. An example of a positive internality given by Spulber is employee training, or some other benefit that was unanticipated in the labor contract.

Another source of market failure is the absence of clearly defined and enforceable property rights. Clearly the definition of such rights and adjudication of disputes is a prior requirement for such market transactions.

Curiously the general economic texts on regulation and public intervention often focus on efficiency related rationales, to the near-exclusion of distributional rationales. While it is common to note that regulation and other public interventions have distributional effects, rarely is a change in the distribution of social assets discussed as a rationale for regulation per se. Of course one could argue, for example, the existence of poverty generates externalities, and so meeting distributional objectives is subsumed in one or more of the classic types of market failure. But this does seem to obscure the point.

Of course one can take more than one view of the distributional objectives of regulation and other public objectives. The classic position in welfare economics is to view government as regulating and otherwise intervening to improve social welfare, however problematic the definition of social welfare (Arrow 1963). This view of government has been undermined on one side, as requiring the existence of a social welfare function that Arrow (1963) has demonstrated does not generally exist. From another angle it has been attacked by the Public Choice school of economists. These have pointed out that government bureaucracies, and individual government servants, may and often do pursue their own self interest as well as, if not to the detriment of, the social welfare (Buchanan 1975; Mueller 1990; Niskanen 1975).

Coase and Pigou

The classic analysis of public intervention (taxation or, by straightforward extension, subsidy or regulation) to correct for market failure was first clearly laid out by Pigou (1820). In 1960 Ronald Coase published his celebrated paper "The Problem of Social Cost." Coase demonstrated that if property rights were clearly and completely assigned, and transactions costs of bargaining were zero, that the parties involved in a transaction exhibiting externalities could reach a social optimum without government intervention. Of course, government intervention would generally be required for the definition and enforcement of these property rights (true is true under the Pigovian scheme as well).

Coase's insight is of course fundamental to the modern understanding of public interventions. It has led to a large literature, such as Fischel's (1985) application of the Coase theorem to land use regulation. Many authors such as Spulber (1989) draw out the implications of Coasian bargaining under different assumptions about the structure of the bargaining game.

It may seem strange at first sight that the Coase theorem has had such an impact, since the requirements for its use are extremely strong. Clear definition and enforcement of property rights is quite realistic in many cases, but the zero or even very low transactions costs assumption is often problematic.

It is possible to consider the application of the Coase theorem in an indirect manner. Rather than taking Coase's parables literally, e.g. with many individual citizens bargaining with a given polluter, one can view government as the proxy for one party or another in the bargaining game with other sides of the transaction. We will see below that thinking about the actions of government through the filter of the Coasian model can often be quite fruitful. But first we turn to the traditional Pigovian treatment of externalities.

The Simple Geometry of Externalities and Regulation

Exhibit 1 presents a very simple model of regulation. Without loss of generality, consider an externality-generating housing market as an example. For simplicity, all housing units are identical.5 Suppose that in the absence of regulation we observe supply S_1 and demand D_1, which are based on private costs and benefits for housing units. The market reaches equilibrium at point A. This equilibrium will maximize private and social welfare, unless some externality or other market failure is present. Suppose there are one or more externalities which raise the social costs of housing above their private costs; social cost is denoted by S_2. Then clearly A is "too much" housing at "too low" a price. If public agents were perfectly informed they could, in principle, regulate the supply of housing so that the socially preferable outcome B was reached.

The Sources of Regulatory Benefits

What potential externalities could raise social costs of real estate above private costs, and hence, in principle, require regulation? Among many candidates are the following:

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5. This model is very simple but sufficient to motivate our general discussion of externalities, regulation and prices. The argument can be extended from number of units to (for example), density, height restrictions, restrictions on particular uses. A wider range of such models is surveyed in Evans (forthcoming), Fischel (1990) and Pogodzinski and Sass (1990).

- *Congestion.* Building additional real estate in a community generally increases traffic locally (although new development, residential or commercial, may well reduce total commuting distance).

- *Incompatible Uses.* Siting a noxious factory next to residences has been regulated, formally or informally, since cities began. Restrictions on the location of activities like tanning and tallow chandling go back hundreds and sometimes thousands of years.

- *Environmental costs.* Real estate development may reduce the local supply of greenspace, may affect air quality, and may increase pressure on local water, sanitation and solid waste collection systems (although again the global impact is less clear).

- *Infrastructure costs.* These may rise as communities invest to grapple with the above problems. Effects will vary depending on whether the particular community has yet exhausted economies of scale in the provision of each type of infrastructure.

- *Fiscal effects.* In addition to the obvious effects from the above, demand for local public services may increase with both residential and commercial development (education, fire and police protection). New residents and firms may or may not pay sufficient additional taxes to cover the marginal costs.

- *Neighborhood composition effects.* New households may be different from existing households. If existing households prefer living with people of similar incomes, or the same race, they will perceive costs if people different from them move in. Regulation can be exclusionary in nature and intent.

If such externalities are large, *and* are correctly measured by the regulating authority, *and* the specific policy instrument used to regulate is sufficiently precise, regulation can correct for these externalities.6 But even if such externalities exist, departures from the preceding rather stringent requirements could leave society worse off in practice.

6We are also abstracting from who exactly bears these costs; for the moment, assume we tax winners and compensate losers so as to share costs "fairly." And note that governments may decide that some externalities, such as a preference for racial segregation, are not "legitimate."

Strictly speaking, not all benefits from regulation are external. Many regulations, for example, confer a private benefit on some households, the cost of which is born by other households. But to the extent such transfers are purely private,7 these are largely a redistribution rather than a net change in social costs and benefits. We say "largely" rather than "exactly" because a dollar's benefit to one household may not equal a dollar's cost borne by another, depending on -- presuming the existence of -- a particular social welfare function. While the extent and nature of such redistribution is of great interest, it is largely outside the scope of this paper.

Not all potential externalities associated with housing raise costs. Many arguments suggest that other externalities exist that increase social benefits beyond private benefits. Among potential external benefits are:

- *Productivity and employment.* Firms need locations for their activities. A well-functioning housing market is generally required for a well functioning labor market. In particular, labor mobility may be adversely affected and wages rise to uncompetitive levels if housing markets are not elastic.

- *Health benefits.* Lower crowding and improved sanitation may be associated with lower rates of mortality and morbidity.

- *Racial and economic integration.* One person's external cost (see above) may be another person's external benefit, if some households value heterogeneity, for themselves or for others. If a country is particularly concerned with employment of low income households and/or minorities, concerns about the productivity and employment effects mentioned earlier are reinforced.

- *Externalities associated with homeownership.* For households that own their unit, the unit is generally their largest asset, after their human capital. More housing units and/or lower housing prices may be associated with greater opportunity for homeownership. Homeownership has been argued to be associated with many desirable social outcomes ranging from improved maintenance of the housing stock to greater political stability.

7Private in the sense of 'generating no externalities,' *not* necessarily in the sense of 'due to the actions of private individuals.'

Externalities on the benefit side are represented in a stylized way in Exhibit 2, in which we add to Exhibit 1 a benefit-side externality, driving a wedge between demand D1, based on private benefits, and the social demand curve D2 which includes the externality. As drawn, note that the optimum regulated output shifts considerably to RS'. As most real world housing markets will have multiple externalities, we see that successful regulation -- regulation that on balance more or less does correct for market failure rather than leading to a situation even worse than the suboptimal market outcome -- makes very high demands on the regulator's knowledge and ability to translate that knowledge into effective policy instruments.

Many studies have attempted to calculate the cost of housing market regulation in one or a few markets, but only a few have attempted to estimate these costs across a range of markets.8 Many studies have attempted to measure the existence and size of some external benefit in housing markets, though these have rarely been related to the regulatory environment. In fact, despite much discussion and assertion, surprisingly little literature exists to confirm the existence of or to measure most of the specific externalities *across a range of markets* on either the cost side or the benefit side. Given the large number of case studies (see below), their existence is hardly in doubt. In addition, we can observe revealed behavior, and conclude that many people must believe such externalities exist. In fact, in many countries housing policy in particular is schizophrenic. When considering land use regulation, revealed behavior suggests that cost-raising externalities dominate. When considering financial policies, tax breaks and other housing subsidies many countries appear to assume that extra social benefits dominate.

The Tiebout Model

For the past forty years local public finance has been dominated by the model of Charles Tiebout (1956). A social problem of the demand for public goods, discussed above, is the difficulty of obtaining information on revealed demand from consumers. Writing in reply to a paper by Samuelson (1954), that demonstrated the general impossibility of obtaining such demand information in a national context, Tiebout pointed out that in a world with many "small" local governments people have an incentive to sort themselves into locations by the demand for local public goods.

8See examples below. Other examples of case studies of one or a few markets include Colwell and Kau (1982), Dowall and Landis (1982), Katz and Rosen (1987), Pollakowski and Wachter (1990), and Cho and Linneman (1993).

The strict version of the Tiebout model requires perfect information and a lack of inter-jurisdictional spillovers, as well as no scale economies in the production of local public goods. People then vote with their feet; people with low demand for a given good choose a jurisdiction that offers low demand (and low taxes). People with high demand do the reverse. Under such conditions the Tiebout model will yield an efficient outcome.

Of course the Tiebout model is subject to the criticism that there may be economies of scale in at least some local public goods as well as significant inter-jurisdictional spillovers. But in developing countries the first hurdle to pass is whether or not a given country has a series of small fragmented local governments. Particularly when applying the Tiebout model to regulation, its relevance will depend largely on whether or not many small jurisdictions exist, and whether they have autonomy in the regulatory environment. In many developing and transition economies this is clearly not the case. Many countries have national systems of land use control, rent control, etc. Other countries such as India have state level controls, which are still operating at too high a level to fruitfully apply the Tiebout model.

What Level of Government Should Regulate?

The textbook treatment of the role of local government is derived from Musgrave and Musgrave (1980) and Oates (1972). These papers focus on government taxation and spending policies, but the extension to regulation is straightforward. Musgrave and Musgrave distinguish among three types of government interventions; macro economic (stabilization) policy; resource allocation policies; and income redistribution policies.

Musgrave and Musgrave, and most of the literature that follows, point out that stabilization policy will generally be assumed by national levels of government, rather than provincial, state or local. While we can find historical examples of small local areas printing their own money, for example, we will simply take this national responsibility as given and will not discuss stabilization further.

The standard textbook treatment also suggests that national governments rather than local should undertake redistribution policies, since local attempts to redistribute fall afoul of tax payer and transfer recipient mobility. However we note that local interventions, including regulations, can have profound redistributional effects, whether or not that is their primary intent. Thus we will try to say more about redistribution in this paper than is normally found in a discussion of local regulation.

Resource allocation is government's third major role, in the Musgrave and Musgrave framework. We have already discussed the allocative rationale for government intervention in general. Oates' classic 1972 discussion is framed in terms of the provision of public goods, but again can be readily extended to regulatory interventions as well. Oates and those who follow focus on three criteria to consider in deciding which level of government should intervene (spend, or regulate): diversity in demand, externalities (of a particular interjursidictional kind discussed in a moment); and scale economies. Following Tiebout (1956), Oates argues that if there is high diversity in demand for public goods (or other fruits of intervention), and if local government boundaries mirror such diversity in demand, local governments may well accommodate such diverse demand better than a provincial, state or national level. However we note in passing now, and will elaborate later, that there is a potential downside to this diversity in demand. One person's diversity in demand can be another person's exclusion.

Oates also notes the critical role played by externalities, although he focuses on a particular type of externality, namely interjurisdictional benefit spillover. That is to say, Oates concerns himself here with benefits and costs that spillover outside the political jurisdiction at hand. The assumption that the local political process will weight only benefit or harm to those within the jurisdiction implies the existence of such spillovers will lead to inefficient choices.

Finally, and least controversially, to the extent there are scale economies in the provision of public or social goods, higher levels of government such as the provincial or national may have the ability to produce the good at a lower cost. As well summarized by O'Sullivan (1995), "Local provision is efficient if (1) diversity in demand is relatively large, (2) externalities [jurisdictional spillovers] are relatively small, and (3) scale economies are relatively small."

Efficiency

Urban regulations, like other government interventions, can be evaluated in terms of efficiency and equity. In public policy analysis, a useful distinction is often made among *production* efficiency, *consumption* efficiency, and *administrative* efficiency. Production efficiency refers to the economic value of the good affected by the intervention in relation to the true (shadow priced) cost of producing it. Consumption efficiency refers to the value the recipient places on the affected good in relation to its market value. Administrative efficiency refers to the amount of money that gets spent

on administrators and research rather than producing the good or service itself. The concepts are equally applicable to publicly provided goods (e.g. public housing programs) as well as regulatory and other interventions.

As an example, consider regulation of the urban housing market. Sources of potential production inefficiency in housing from regulation include: inappropriate location, high wages, using the wrong factor proportions, high administrative costs, off budget costs of financing, tax breaks, higher maintenance costs, and reduction in market discipline9 It should be emphasized that the notion relies on the market prices of inputs and outputs (or shadow prices if these are distorted). There may well be cases where hidden subsidies (in finance, for example) or hidden costs (for administration, for example) make careful analysis necessary to reveal true relative efficiencies.

Consumption inefficiency implies that the recipients of the good or service value it less than the market, or that their consumption is constrained by the requirements of the program. Public housing provides a clear example, since typically the product is very standardized while demand is not. Cash is, of course, the most efficient transfer in the sense that if the market works at all well most households would prefer the cash equivalent of a program to the program itself. *A priori* we might expect policies and programs which rely on private producers to provide a wider range of options and to reduce consumption inefficiency.

Equity and Fairness

Of course efficiency is not the only consideration; we also need to consider distributional issues. There are two main types of distributional or equity issues. The first, *horizontal equity*, is best phrased as "equal treatment of equals." Most commonly in policy analysis we define equals as more or less those with equal or similar incomes, although there are important exceptions, e.g. when age or physical limitations are considered. This principle is violated if, for example, we have two individuals of a certain income, one of whom lives in a rental unit with a deep public subsidy while the other pays a large market rent.

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9. That is, in the absence of intervention, developers who consistently build units worth less than their cost go broke; in the presence of intervention they may not, or at least going broke may be deferred. See the bad investments financed during the U.S. Savings and Loan debacle, or see the results of many public housing programs around the world, as examples.

The second equity principle, *vertical equity*, is more problematic. Vertical equity is about the treatment of unequals. That is to say it is about how society treats rich vs. poor or for that matter poor vs. middle income or moderately poor from the poorest. No society has ever been truly egalitarian - that is all individuals with an equal standard of living and well being. Judgments about what is a fair or just distribution, and what is, if anything society and or government should do about it, or value judgements and not strictly speaking related to "scientific" analysis. Much of politics is about making these kinds of choices about vertical (as well as horizontal) equity. While vertical equity often requires some political judgement, we believe most Americans would agree with some general propositions; for example that larger housing subsidies should go to lower income households rather that higher. So while we can not make precise statements about the desired outcomes in the housing market in terms of vertical equity, we can certainly make general statements of the form "larger subsidies are going to richer households, and this violates generally held norms of vertical equity in society."

It is also desirable that public policies be seen to be *fair*. Fairness is related to equity, as discussed above, but it is a somewhat more general concept; and one which is surprisingly difficult to define rigorously. Aristotle says that to behave fairly is to refrain from gaining some advantage for oneself by seizing what belongs to another, his property, his reward, his office, and the like, or by denying a person that which is due to him, the fulfillment of a promise, the repayment of a debt, a showing of proper respect, and so on.10 Another way of thinking about fairness is that it is a set of rules to which most individuals would agree in advance of knowing their endowment or position. In the housing policy context, to continue our example, fair rules would be those that most individuals would agree to in advance of knowing whether they were a renter or a landlord, a recent mover or a long time tenant, rich or poor.

Market Effects

The efficiency and equity issues discussed above are usually framed in terms of the effects of a program or policy on a typical participant household, or in some cases a typical affected firm or development project. However, when undertaken at scale, public programs and policies have the potential to affect the entire market, or

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10. Quoted in Rawls (1971) page 10. A good review of equity and fairness issues from the point of view of economists is Zajac (1995).

significant portions of it. Most often the *intention* of regulation is to affect the entire market.

We continue with our housing example. Consider first a prototypical supply side program. Suppose, for example, that the government decides to undertake development and construction of a large public housing project in a certain city. On the face of it, the supply of low cost housing increases in that city. What are the effects of such a development on the rest of the market?

The answer depends critically on some assumptions regarding the overall responsiveness of the rest of the market, and on some assumptions about the behavior of households. The role of the market's responsiveness, i.e. the price elasticity of supply of housing, is well known. If the market is inelastic in supply, and particularly if the number of low income households is largely unaffected by the presence or absence of this additional subsidized housing, then the additional public housing will have two salutary effects, from the point of view of low income households. First, the public housing itself will be available for rent, presumably below *ex ante* market rents, so households who participate will presumably benefit from lower rents and possibly better housing conditions. Second, under these assumptions, the price of housing will fall in the rest of the market, as demand for that fixed stock falls. Thus renters of the private stock will also benefit as prices fall; landlords and homeowners will bear the cost of these pecuniary externalities.

On the other hand, if the supply of housing is perfectly elastic (and the assumption of no change in number of households is maintained), the outcome is quite different. Under such conditions, an initial fall in the price of housing will lead to a reduction in its supply. Such a reduction will take place until the *ex ante* market price is restored. The total stock of housing will be unaffected *ex post*, but the new public units will replace or "crowd out" an equivalent quantity of private housing. Neglecting for the moment any costs of moving or quality or other material differences between public and private units, the participants in public housing will benefit from lower rents. No pecuniary externalities will be generated; and owners of some *ex ante* private stock will remove their units from the stock prematurely.

Green and Malpezzi (1998) extend this analysis, examining demand side subsidies, and changes in assumptions about the size of the program relative to the market. For our purposes, the point is that market wide effects of regulations or other interventions may have to be analyzed separately from effects on individual households or firms, and that market conditions matter in the analysis of these effects. It is worth reiterating the obvious, that market effects will only generally be

observable if programs or policies are "large" relative to the market. Regulations, in contrast to other interventions, are often "large" in this sense.

Major Types of Urban Regulations

Given my own expertise, many of the examples in this paper will be related to land use and other regulation of real estate. Of course land use regulation and real estate regulation itself is quite complicated. Real estate development is governed not only by planning processes, but by zoning regulations; restrictions on conversion of land from rural to urban uses; other land use regulation such as those governing road widths, set backs, and floor area ratios; building codes; rent controls; impact fees; and numerous regulations affecting the provision of infrastructure and the transport network necessary for real estate development. Reviews of the literature related to these regulations can be found in Evans (forthcoming), Fischel (1990), Pogodzinski and Sass (1990, 1991), Malpezzi and Ball (1991), and Malpezzi (1996).

Another set of urban regulations relates to the provision of finance. Municipal finance will be discussed elsewhere in this seminar, but see in particular Bahl and Linn (1992), Dillinger (1992) and Bird, Ebel and Wallich (1995).11   At the most general level, much of the work in the last ten years has been focused on moving financial markets in many countries from a regulatory environment oriented towards directing credit to favored markets, and towards better prudential regulation of the markets. Such regulatory shifts go hand in hand with the development of true financial intermediation generally, as well as intermediation that facilitates the development of the built environment. Bertrand Renaud put it best: "cities are built the way they are financed." Other presentations to the WDR conference covered some aspects of the regulation of financial institutions, so I will not discuss the topic in detail here (see e.g. Kane 1989, Barth 1990). Somewhat broad reviews of real estate finance, including this essential aspect of urban regulation, can be found in Renaud (1995) and Buckley (1996).

Infrastructure is often initially thought of as an area in which direct public provision plays the largest role, and this is still most true in most countries. But in many countries the private sector is undertaking, either by design or by default, a greater role in this area. Examples of such changes by design would be the proliferation of build-operate-transport schemes (reference needed). Less salutary

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11 From the conference outline, it appears less is on the preliminary WDR agenda related to real estate finance than might be expected.

examples include urban Nigeria, where the near total failure of the public sector to deliver infrastructure services has led to particularly inefficient private sector responses, e.g. substituting firm specific private generators for a national electricity generation and distribution grid that works (Lee and Anas 1992). Regulations play a role here as well; for example one of the problems with the Nigerian private sector response to public infrastructure failures is that regulations prevent private firms from selling electricity and water to each other, which inhibits the potential for even modest economies of scale. Literally each firm – each plant – has its own generating capacity, bore hole and well, messengers substituting for telecommunications infrastructure, and so on.

A particularly important area for the regulation of infrastructure is that related to transport. Many examples abound. For example many studies have been done, and many experiments undertaken, of privatizing urban bus services, and providing toll roads. (Gomez-Ibanez 1993, Weicher 1988, Walters 1980). The conventional wisdom among transport economists is that in many cities congestion pricing is the best if not the only way to tackle congestion problems. This is certainly true in virtually all U.S. cities and is true of an awfully large number of other cities around the world (Hau 1992, Behbehani, Pendakur and Armstrong-Wright 1984, Smith 1992). In fact around the world there seems to be a bias away from congestion pricing that could tackle congestion problems seriously, and towards public investment in fixed rail transit which is only efficient under very specific conditions (extremely high population density and a few fixed nodes of employment that would correspond to potential transit stops). See also Kain (1988), Downs (1992) and Small (1992).

Another set of urban regulations relates to the functioning of labor markets. Minimum wages are generally viewed with skepticism by economists. Related and very important urban regulations are those affecting entrepreneurship and business enterprise. Of course virtually all the regulations that we have discussed so far affect firms as well as individuals and households. But in addition, licensing systems such as India's (particularly pre 1993), or in Peru (see De Soto 1989) can reduce the productivity and efficiency of firms. See also Kahnert (1989) for a review.

III. Studies of Specific Urban Regulations and Related Inverventions

This section is the heart of the paper. We will discuss a number of studies focusing on property rights, land use and other real estate development regulation, rent control, labor regulation, other regulations affecting business, and macroeconomic effects.

Property Rights

Property rights are *sine qua non* of urban development. Until recently property rights have been much neglected in the "developed" country housing literature, but were somewhat better represented in the "traditional" developing country housing literature.12 Post Perestroyka (1989) the topic moved properly to the fore. Some property rights issues are common among countries, and some issues are specific (more or less) to Africa, Eastern Europe, or to some other specific region or country.

Property rights may be defined and assigned through a formal legal system, or by custom or tradition.13 Henceforth we use "law" to refer to both. Two areas of law that particularly affect the operation of housing and real estate markets are contract law and land use regulation. Contract law deals with the system which defines and facilitates the transfer of property and property rights, allocates those rights, and settles disputes. In formal systems these functions are associated with such instruments as contracts of sale, leases, easements and rights-of-way, operating agreements, mortgages and deeds of trust, etc. In all countries, rich and poor, some of these functions are also affected by less formal "mores and folkways of society." In many countries, including most of the transition countries and many African countries, these systems are in flux. Land use regulation includes the body of custom, law, regulation, and case law which governs the rights to locate certain uses in certain locations and provides standards of development and operation of those uses. Formal instruments include zoning ordinances, building and housing codes, subdivision regulations, private deed restrictions, environmental laws and regulations, etc.

Together, these two areas of the law render operational the notion of ownership, exercise, and transfer of rights in real property. A wide range of descriptive studies have examined property rights in Africa [Ault and Rutman (n.d.), Preskey (1993), Kiamba (1989)] in Asia (Bromley 1989), in Latin America (Betancur 1987, Gilbert 1989), and of course formerly socialist countries (Jaffe 1993, Pejovich 1990). From that descriptive literature, and from analytic literature such as Alchian and Demsetz (1972), Coase (1960), Demsetz (1967), and Williamson (1975), a clear list

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12. This neglect refers to the urban real estate and housing economics literature. Economists, political scientists, and of course lawyers have long studied property rights in other contexts. See, for example, Browder (1984), Friedman (1975), and Moynihan (1987). For an illuminating discussion of different frameworks for property rights see Miceli and Sirmans (1995).

13. This section draws heavily from Vandell's contribution to Malpezzi and Vandell (1992).

of general principles has emerged. In order to maximize the social value associated with rights in real estate, the set of laws and regulations governing their associated property rights must possess certain characteristics. They must be transparent and agreed upon by some not-as-yet-well-defined social consensus. They must be enforceable at a reasonable cost, with little or no uncertainty. There must be some generally agreed upon final arbiter of disputes (most often but not always the state).

In a well functioning system property rights will be transferable from seller to purchaser upon payment of consideration. The bundle of such rights can be largely complete (fee simple, although still limited by land use regulation), or partial, including leasehold. Specific rights include the right to use or modify the use of the real estate, the right to derive income or other benefits from its use, the right to bequeath the ownership interest, the right not to be evicted, etc. Government constraints may be required to prevent certain adverse market failures or imperfections (such as conflicting land uses or limitations on access or economic productivity) or in cases in which the buyer or seller has excessive market power.

Maximum social return to the stock of urban real estate requires liquidity, or the ease of transfer of real estate interests. Landis (1986) shows that high fees or other rights of entry to the market, restrictions on appropriate purchasers or tenants, unreasonable constraints on use, excessively costly development standards, etc. can be counterproductive. Markets are rendered most efficient to the extent that they are "thick", i.e. there are many transfers and prices/rents are well established (Bikhchandri 1986). Because the high purchase prices of real estate requires finance for most transactions, maximum benefit is obtained when financing is freely available at market rates. Financial innovations and reforms, discussed below, which enhance the liquidity of the mortgage market, such as the development of the secondary market or securitization, also enhances the liquidity of the real estate market in general. The possibility of foreclosure in the ownership market for the nonpayment of debt or other violation of the obligations of ownership (such as the nonpayment of real estate taxes) is essential for efficient operation (Buckley 1990), just as the possibility of eviction is required for an efficient rental market (Mayo and Angel (1993)).

Property rights profoundly affect not only the efficiency of the urban real estate market; they also profoundly affect other social goals or questions such as the distribution of wealth or income. Concentration of ownership rights may adversely affect on the concentration of wealth and power, as well as reduce the efficiency of the market, especially if quasi-monopoly exploitative situations are produced.14 Solomon

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14. Malpezzi (1994) argues that with a few important exceptions, mainly in taxation, urban

and Vandell (1981) discuss alternative conditions under which real estate markets may operate which cause deviation from the competitive ideal.

Many of the biggest property rights and regulatory issues regard land. Systems can function with long term leaseholds as well as with fee simple (Bromley 1989), but efficient markets require long and enforceable leases. In some countries there is no history or memory of private ownership of or significant use rights over land. Paradoxically, in such countries public landlords (central government, large state enterprises or cities) may have true market power, and don't respond well to external incentives. Moving to a market system has powerful redistributive consequences, which will be politically charged (Hegedus, Mark, Struyk and Tosics 1992; Buckley, Hendershott and Villani 1995). More research is certainly required on the essential property rights necessary sufficient for efficient use of land. Most studies of land reforms have focused on agricultural and/or rural land. Certainly we should study the effects of past major *urban* land reforms just as carefully.

Representative Results for Specific Types of Real Estate Regulation

There are many instruments for the regulation of real estate, among them master plans, zoning, growth controls, planning guidelines, and other restrictions on land use; impact fees and exactions; subdivision and building codes, and deed restrictions.15 Related issues include new towns, and tax and subsidy policy. In this section we will briefly review a few of the main categories of real estate regulation.

Zoning, Greenbelts, and Restrictions on Land Use Conversion

Zoning, greenbelts or "urban service boundaries," and planning restrictions on the conversion of land from agricultural to urban uses are among the kinds of regulation that mandate or limit the type of use of a parcel. They are similar analytically, although the exact mechanism varies. For example, in the U.S. zoning, following a set of land use codes keyed to a map of parcels is more common; in much of Europe planners make such decisions about land use. For convenience I will sometimes use zoning to refer to the specific practice, and sometimes as convenient

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development regulations and policies that are more efficient are also more equitable. The argument can certainly be made with respect to property rights, e.g. the large literature linking land reforms to faster growth.

15 Broad overviews of interventions in land and real estate markets in developing countries can be found in Farvacque and McAuslan (1992) and Kissick (1991).

shorthand for the class of such land use restrictions. The context will make the meaning clear.

The way in which zoning can correct for externalities is clearly laid out in a number of theoretical papers; see Crone (1983), for example. The first question is, are there such externalities in land use? Or, more precisely, are they "large," and can regulation successfully mitigate them?

Perhaps somewhat surprisingly, several well-regarded studies in the U.S. and Canada conclude that such externalities are not really very large. Mark and Goldberg (1986), Crecine, Davis and Jackson (1967) and Grether and Mieszkowski (1980) undertake to measure spillovers, i.e. how much the value of a parcel is affected by nearby parcels. Typically they employ some variation of hedonic models (based on a regression of property values against characteristics of the property, and in this case characteristics of nearby properties as well). In general, their conclusion is, externalities are surprisingly small, and (in the case of Mark and Goldberg) that the effects vary over time.

Generally these studies have suffered from the endogeneity of the zoning decision. In fact, as Fischel (1990) among others points out, if zoning works well – internalizing the externalities – and zoning is provided "on demand" to existing homeowners, then we will not observe many situations where nonconforming uses that do reduce values, because zoning will prevent their occurrence.

Other studies, such as Lafferty and Frech (1978) and Li and Brown (1981) find that spillovers do, indeed matter. Lafferty and Frech, for example, develop an index of dispersion of nonresidential uses within cities, and use this index in a model of housing prices. Cities with concentrated nonresidential uses do indeed have higher property values than cities where these uses are spread out among residential neighborhoods.

Only a few studies have tried to estimate the net cost-benefit of zoning, i.e. benefits as well as costs. Peterson (1974)'s study of Boston examined costs and benefits from the landowner's point of view. Peterson found that large lot zoning conferred local benefits from the positive externalities associated with being in a richer neighborhood, and from a lower fiscal burden. However, under large lot zoning, land is used less intensively, and in this sense landowners bear a cost from developing less densely than optimal. In this specific case, the cost of prohibiting more intensive development greatly outweighed the first two benefits. And of course the exercise did

not consider the costs and distributional implications of restricting housing supply for households of modest means.

Greenbelts can be thought of as an extreme form of zoning: areas of the city are labelled off-limits to any development. Seoul, Korea has a large and very stringently enforced greenbelt. Seoul also has very high housing prices, and one of the stranger development patterns of any market based city, more like the outcome from a command and control city like Moscow (see Bertaud and Renaud). Kim (1991) presents a general equilibrium model that simulates the effect of relaxing Seoul's greenbelt. Under plausible assumptions, a one percent increase Seoul's land supply (equal to a 1.2 percent decrease in the supply of the greenbelt) leads to a 1.4 percent decline in the price of land, and a 0.2 percent decline in the asset price of housing.

In many markets we don't need arts-and-craftsy econometric exercises to convince ourselves that greenbelts and similar problems can cause difficulty. For example, Evans (forthcoming) reports that in the 1980s the price of land in London's greenbelt was about £5,000 per hectare if in agricultural use; but if such land were to receive planning permission for residential development its value could exceed £1,000,000.

Subdivision Regulations

Subdivision regulations affect development at the project level. They cover things like the standards for provision of roads, sewer and other on-site infrastructure; set backs, and so on. Lowry and Ferguson (p. 150) show that in a lightly regulated U.S. county (Orange FL) finished building lots are about 4 times the cost (per hectare) of raw land already zoned for residential development. In Sacramento County, CA, with much more stringent subdivision codes, the ratio is more like 9 to 1.

Subdivision regulations are not much studied, unfortunately, in the published academic literature. But Alain Bertaud has examined many of these regulations in his numerous studies using the "Bertaud Model." In an example from Malaysia, discussed below and in Bertaud and Malpezzi (1998), he finds that under rules in effect circa 1989, modest changes to setbacks and back alley requirements could nearly double the effective density of land use.

Regulating Densities with Floor Area Ratios

Bertaud and Cuenco (1996) show how inappropriate levels of the floor area ratio (FAR), called floor space index or (FSI in India) adversely effect development,

using Ahmedabad as an example. The FAR is the ratio between the area of a land parcel and the floor space allowable. A parcel with a FAR of 1 can build 1 square meter of floor space for every square meter of land. For example, with a FAR of .5, one could build a two-story house with 50 square meters on each floor on a 200 square meter plot.

One key to appropriate density regulation is to permit the FAR to vary with location within the city. Bertaud points out that the appropriate FAR varies in different locations of large cities. Ratios can and do vary by a proportion of 20 to 1, and sometimes even 50 to 1, between CBDs and suburbs in cities around the world.

Indian planning regulations have a near uniform FAR, ranging between 1 to 1.5 in most cities. Ahmedabad, the city under study, has an FAR as a high as 3 in the old city area, which is high by Indian standards. But FARs in other cities of similar size around the world run as high as 5 to 15 in the central business district, falling to as low as 0.2 in suburban areas.

Bertaud and Cuenco show that the extremely low and relatively uniform FAR in Ahmedabad leads to a higher total consumption of land, and general urban sprawl. A uniform low FAR increases the cost of land in the aggregate without increasing its productivity.

Bertaud and Cuenco show that FAR should be allowed to vary within the city to mirror the changes in population density that would be expected within a city of Ahmedabad's size. Land use would become more rationalized, infrastructure costs would fall, the city would be more compact, and traffic and parking problems would be reduced . They also show how an impact fee could be developed to cover the cost of additional infrastructure needed for such dense development, internalizing the currently external costs of such development.

Impact Fees

Impact fees are in effect taxes on development. Generally, new development imposes marginal costs outside costs typically privately considered. Trunk infrastructure is one example, congestion another. Among the types of fees and exactions are in kind - dedicated land and infrastructure for schools, etc. as well as cash impact fees for community facilities, trunk infrastructure and so on. Linkage fees can be used as as a tax to bring private costs in line with public, i.e. to ameliorate problems

such as congestion. (Delaney and Smith, 1989; Gyourko 1991). In the jargon of economists, impact fees can be used to "internalize the externalities."

Of course that presupposes that the impact fee or development charge is set at a level that approximates the marginal cost of development. This is generally a non-trivial exercise. See, for example, Gomez-Ibanez (1996), Nelson (n.d.), and Peiser (1988). For analysis specific to a developing country, see especially Bertaud and Cuenco (1996).

Building Codes

Building codes are another type of development regulation that have been generally neglected (but see Bertaud and Lucius 1989, Carliner 1989, Colwell and Kau 1982, Cook 1984). Some problems that have developed in building codes stem from either or both of two common related shortcomings. First, many codes specify particular construction methods, rather than outcomes. For example, a code that specifies a particular kind of fire-resistant door in an apartment building will generally be inferior to a code that specifies a standard for fire resistance, and accepts any door that can be demonstrated to meet such a standard. Second, many codes that specify specific methods or materials fail to keep up with improvements in technology. For instance, codes that inhibited the use of plastic pipe in U.S. markets certainly added significantly to the cost of plumbing for many years.

Rent Controls

Rent controls have been one of the real estate related regulations most studied by economists, from the well known partial equilibrium analysis of rent control as a tax on housing capital, to more sophisticated models such as those of Olsen (1969) and Arnott (1991). Until fairly recently, most of the literature on rent control has been theoretical rather than empirical (with significant exceptions such as Olsen 1973). Several years ago the World Bank undertook a research project examining the cost and benefits of rent controls in a number of markets. One part of the study was analysis of the type and nature of controls across a wide range of some sixty countries (see Malpezzi and Ball 1993, 1994). There were also cost-benefit studies done for individual markets in Kumasi, Ghana; Bangalore, India; Rio de Janeiro, Brazil; and Cairo, Egypt. Exhibit 3, from Malpezzi (1998), presents cost-benefit results from Cairo. Exhibit 4, from Malpezzi (1993), presents a very brief summary of costs and benefits from the consumer surplus analysis of controls in all four markets, and

Exhibit 5 presents some distributional results relating to the incomes of landlords and tenants.

When the research project was initially proposed, the then-chief economist for the Asia region suggested that we already know rent control's effects, and that we make "arguments in favor of rent control (on welfare grounds) or against rent control (on efficiency grounds)." In fact, the widely held notion that rent control trades off efficiency losses for equity gains is not born out by the Bank research (or for that matter by most empirical research undertaken in developing and undeveloped markets). Certainly there are efficiency losses associated with controls; see Malpezzi and Ball (1993) for evidence that housing investment declines with more stringent forms of controls, for example. But some of the more interesting findings from the research were regarding the deleterious distributional outcomes of controls. Consider the population housed in controlled rental housing. While the median or "typical" renter in a controlled market often had some benefit from controls, in each case study market there was an enormously wide distribution of household benefits. Some households received very large benefits; but many other households existed whose benefit from a lower rent was greatly outweighed by a welfare loss from disequilibrium in the consumption of housing services. Further, the costs and benefits were never well targeted by income and sometimes perversely targeted.

In several countries it was possible to directly compare the incomes of landlords and tenants, as in Exhibit 5. The data suggested that rent controls were not a very progressive redistribution mechanism in this sense either. In all cases landlords were richer than tenants, but not that much richer. The rule of thumb that emerged was that typically about a quarter of tenants would be richer than the median landlord, and about a quarter of landlords would be poorer than the median tenant in the markets for which we could undertake these comparisons.[16]

Some Cross-Market Results on Real Estate Prices and Regulation

There are two very general categories of empirical studies about housing and real estate prices and regulation.[17] One type of study examines a case study of an

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[16] Of course if each landlord's income was weighted by the number of housing units they owned, the redistribution would appear more progressive (in the common use of the term).

[17] There are very few studies of the effects of other real estate prices and regulation, but those that have been done for law land or for commercial real estate tend to follow the results here.

individual market or a few markets, and examines a very rich set of local regulations in great detail. Asabere and Colwell (1984) Schuetz and White (1992) and Green (1997) are examples of such case studies. However studies of a single market are always open to questions about their generalizability. Another type of study, which loses some of the richness of detail, but which is on stronger grounds regarding generalizability, is the cross-market study. Both types of studies are important and complementary, but we focus on the latter in this section.

Several papers have attempted to measure "regulation" across U.S. markets, and a few of these have examined the effects of regulation on land and housing prices. Segal and Srinavisan (1985), for example, surveyed planning officials and collected their estimate of the percentage of undeveloped land in each MSA rendered undevelopable by land use regulations. Using a simple OLS model of house prices, they found that the percent of developable land removed by regulation had the hypothesized effect on house prices.

In the same journal issue, Black and Hoben (1985) developed a categorization of MSAs as restrictive, "normal" or permissive, based on a survey questionnaire from planning officials. They appeared to base this on a series of questions from which they scaled "areas most openly accepting growth" as +5, and those where growth was "most limited" as -5. They found a simple correlation of -.7 between their index and 1980 prices for developable lots. Chambers and Diamond (1988) used data apparently based from the ULI questionnaire in a simple supply and demand model for land. They found what they characterized as mixed results; for example, in their equation explaining 1985 land prices, average time of development project approval had a positive and significant effect on land prices, but negative and insignificant effect in the 1980 regressions. In another paper using the ULI data, Guidry et al. (1991) found that the average 1990 lot price in 15 "least restrictive" cities was $23,842 but that in 11 "most restrictive" cities the average was $50,659.

Rose (1989a,b) constructed an index which measured land removed from development by natural constraint, and in Rose (1989b) used the number of governments a la Hamilton as a proxy for regulatory constraint. City by city, Rose carefully measured area removed from development by natural constraint (mainly water), and used a simple monocentric model of a city to account for the fact that an acre removed close to the CBD has a greater effect than an acre farther out. He found using FHA and ULI land price data for 45 cities that the natural and contrived restrictions explained about 40 percent of variation in land prices; about 3/4 of this was due to natural restriction and about 1/4 apparently due to regulation.

States regulate land use as well as local governments. In the seventies the American Institute of Planners collected a great deal of information about state land use and environmental regulations (American Institute of Planners 1976). Shilling, Sirmans and Guidry (1991) found that cities located in states with more restrictive land use regulations had higher land prices. The elasticity of price with respect to state land use controls was estimated to be 0.16.

Malpezzi (1996) constructed a cross MSA regulatory measure, REGTEST, from data collected by Linneman and Summers (1990):

(1)   the change in approval time (zoning and subdivision) for single family projects between 1983 and 1988
(2)   Estimated number of months between application for rezoning and issuance of permit for a residential subdivision less than 50
(3)   time for single family subdivision greater than 50 units.
(4)   How does the acreage of land zoned for single family compare to demand
(5)   How does the acreage of land zoned for multifamily compare to demand
(6)   Percent of zoning changes approved
(7)   scale for adequate infrastructure (roads and sewers.

Exhibit 6 shows that house values are strongly affected by regulation, albeit in an apparently non-linear way.[18]   Additional research, by Malpezzi, Chun and Green (1998) shows that the strong relationship between housing prices and regulation is robust with respect to choice of model and measure, in particular if an instrumental variable is used to correct for possible simultaneity bias.

Of course, as noted earlier, regulations have benefits as well as costs; why else would we regulate? Malpezzi (1996) notes regulations are presumably put in place to tackle externalities such as congestion, environmental costs, excessive infrastructure costs, fiscal effects, or neighborhood effects. Potential external benefits might be found in measures of productivity and employment, health benefits, racial or economic integration or externalities associated with the ownership of the housing asset.[19]   In

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[18] In Malpezzi Chun and Green (1998), we endogenized regulation, and were not able to reject the hypothesis of linearity in regulation. The broad positive relationship was robust with respect to sign and magnitude.

[19] See Green and White (1997) for evidence on existing of such externalities.

addition to price effects in both the owner and rental markets, Malpezzi (1996) tested for effects of regulation on tenure choice, neighborhood rating, racial segregation, and congestion. Results suggested that there was little in the way of benefit to offset costs, once one went past the inflection point apparent in Exhibit 6. Home ownership rates declined (which one could view neutrally, or as an additional cost if one believes that such asset ownership is important). The only measured positive effect was a slight reduction in commutes.

While this cross-market work has been pushed furthest so far using U.S. data,20 it actually has its roots in international comparisons. Panel A of Exhibit 7, from Malpezzi (1990) (and reproduced in World Bank 1991) illustrates. In order to facilitate international comparisons, the dependent variable is the ratio of typical house prices in the largest metropolitan area of each country to the median income of the same metro area.[21] The measure of regulation is actually drawn from work on price distortions from government interventions more generally by Ramgopal Agarwala (1986). The positive relationship between "bad" regulatory environments (overvalued foreign exchange markets, rationing finance by directed credit rather than by price, distorted labor markets, etc.) clearly effect the housing market. Malpezzi (1990) conjected that this could be because some such policies affect real estate markets directly, but could also be because there is a correlation among policy environments. That is to say, countries that have distorted regulatory and policy environments for their economy generally also tend to have distorted real estate and other urban development regulations (see Malpezzi and Ball 1993 for confirmation and discussion).

Panel B of Exhibit 7 is a more speculative picture. In this graph we've added data from the early 1990s for countries emerging from Marxist systems. Note the extraordinarily high house price to income ratios that were observed.[22] Agarwala did not include these countries in his study used to construct the regulation index, so for expositional purposes we have simply placed them to the right of the developing

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20 But see Angel and Mayo (1996).

[21] Other price measures such as user cost and hedonic measures can be used for international comparisons. Unpublished analysis by Stephen Mayo using simple hedonic models yields results qualitatively similar to those presented here. Research using user cost measures has not yet been undertaken, but in the absence of taxes and little formal finance (as in many developing and transition economies), the value of the asset itself will be the biggest determinant of variation in user costs.

[22] While they have tended to decline, as expected, in many countries they remain high.

countries. Recent work by Angel and Mayo (1996) with data from the Housing and Urban Development Indicators Project confirms these qualitative results.

Regulation of Land Markets

The "Bertaud Model"

The Bertaud Model is a model that is used to numerically compare the cost-benefit of alternative project designs.23 It can be used both for the analysis of specific projects, and for the analysis of the costs and benefits of land use regulation more generally. The Bertaud model costs out a proposed project design, simultaneously considering a wide range of design parameters, such as road width and design, floor area ratio (FAR), land required for public uses (e.g. schools and parks), infrastructure standards (off-site and on), minimum plot sizes and setbacks, site preparation costs, and design and administrative costs, among others. A complete description of all inputs and calculations of the model is too lengthy to present here; details can be found in Carroll and Bertaud (1986), Bertaud (1981) and Bertaud *et al.* (1988). But a simple example is sufficient to illustrate how the model works, and its value.

Consider the development of a plot for a housing unit with 10 meters frontage, and assume the price of land is $10 per square meter. Suppose there is a requirement that the road in front of the house be 7 meters wide. If the house in question faces an identical unit, we would say roughly that the land required for the road adds .5*7*10*10 or $350 to the unit cost of development. Of course there is an offsetting benefit provided by the road, but in order to set the "correct" road width, we wish to know the cost-benefit of a meter of required width, on the margin.

Bertaud and Malpezzi (1998) discuss exact and approximate methods for such analysis. In general, exact methods require more information about the demand for public goods than is feasible to obtain, so that the Bertaud model relies on an approximate method, best explained by example. Suppose that by studying the market in question we determine that, in fact, existing developments can be found where households similar to the target market for this development live and which have roads averaging, say, 5 meters in width; that no evidence can be found that units with slightly wider roads command a higher price; and that no significant unpriced, external benefit of such wider roads can be established. Using one of the computer

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23. This section closely follows discussion in Bertaud and Malpezzi (1998).

implementations of the Bertaud model, the user would enter a 5 meter road as a baseline case, and a 7 meter road as an alternative for comparison. Under the assumptions above, changing to a 5 meter road would yield a savings of $100 per unit. Of course, if it was determined that there was some offsetting (private or public) benefit for the wider road, the amount of offset could be readily entered.

The example above is so trivial that the value of a computer model for such calculations may not be readily apparent. In principle such calculations are quite simple, but in fact they quickly become more complicated in practice. Returning to our simple example of road width, narrower roads will also require less grading, engineering and paving. Compared to a proposed 7 meter standard, a network of 5 meter residential roads will imply a denser overall development (given fixed plot sizes) and hence less area devoted to feeder roads. In rainy climates smaller road area overall leads to less runoff and less required drainage infrastructure. Keeping track of all such interactions among design features, when many design parameters are considered simultaneously, is one of the central features of the model. For example, in the Malaysian case study below, the standards issued for the Special Low Cost Housing Program comprised some 43 specific regulatory standards, and this complexity is by no means unusual. Computer implementation also has the advantage of translating design parameters implied by regulations into CAD representations of representative site layouts, as well as monetary amounts.

Of course comparing the costs and benefits of alternative project designs is a quite general problem, and the Bertaud model has application beyond the study of land use and related regulations. But its applicability to regulatory cost benefit is obvious. Binding regulations change project designs, and the Bertaud model permits a careful analysis of the costs and benefits of these changes. "Good" regulations generate (public and private) benefits which exceed their costs; "bad" regulations the reverse.

Thus the model calculates the cost of a given project design, subject to the land use and infrastructure policies in force. The model is used successively to compare alternative designs; i.e. it does not produce the optimal design as an output. Most applications involve comparing a current or proposed design to one or more alternatives. The choice of alternatives involves some judgement, so the model is not a "black box" for designing optimal projects. One of several alternatives studied will emerge as the best alternative, but an unstudied alternative may and in fact usually will exist which is still better, at least on the margin. However, experience in numerous countries confirms that when used by or with the advice of experts in real estate

development, exercises undertake with the model consistently yield significant improvements in design, in the sense of more favorable cost-benefit.

The Bertaud Model Applied to Malaysia

Various versions of the model have been applied to roughly 30 countries, as diverse as India, Thailand, Peru, Senegal and Russia. To illustrate how this model to can be used to analyze land use regulations in practice we examine late 1980s Malaysian land use regulation as a case study.

Exhibit 8 shows a typical site plan for a new housing development under Malaysia's Special Low Cost Housing Programme (SLCHP) guidelines.24 Under these regulations, public uses take up 56 percent of land; only 44 percent is saleable, and the overall floor area ratio is a mere 0.23. This is despite the fact that the regulations were in fact designed to give relief from an even more restrictive regulatory baseline. Some potential areas for further savings include:

- Roads are wide: internal roads (shown horizontally on Exhibit 8) are 8 meters wide; distributor roads (shown vertically on Exhibit 8) are 12 meters wide.
- Back alleys 6 meters wide are required.
- Large set backs are required on corner plots. Set-back requirements of 4.5 m. along vehicular roads when applied to the minimum plot size of 67 sq.m. imply that corner plots would have an area of at least 140 sq.m. However, because of set-back regulations, only 38 sq.m. of the total 140 sq.m. of the corner plots are buildable.

Exhibit 9 is a typical site plan for a new housing development with changes suggested by the Bank mission after analysis with the Bertaud model. These suggested changes include:

- Reduction of internal roads to 7 meters, and distributor roads to 10 meters.
- Elimination of back alleys.

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24. The SLCHP was a Malaysian government initiative to facilitate the development of low cost housing using a variety of land and finance subsidies, and regulatory relief. In this section we focus on the proposed land use regulation standards. We return to a broader view of the full set of interventions later in the paper.

- Reduction in corner setbacks to 2 meters.
- No reduction in regular setbacks.

Under these suggested regulations, saleable land rises to 55 percent, and the overall floor area ratio rises from 0.23 to 0.41. This means that to build the same 1,000 m^2 of floor space, a developer needs to acquire 2,440 m^2 of raw land instead of 4,350 m^2 under the SLCHP guidelines. This implies a reduction of 44 percent in raw land demand to build the same amount of housing. The plot FAR rises from 0.62 to 0.78 because of the increase in the amount of floor space which can be built for about the same ceiling price. In other words, the reduction of roads standards allows an increase in floor space of 11 m^2 per unit, the equivalent of an additional room.

The Bertaud Model also adds up land required for roads, schools, parks and other required common uses under the land use regulations in force. The *site* floor ratio is the FAR with each plot's share of common land uses taken into account. Because of high requirements for common areas, the SLCHP site FAR is actually less than the supposedly higher-cost middle income plot standard:

- Certain types of community facilities have to be provided only when a population threshold is reached. For instance, a primary school must be provided in schemes with populations of over 5,000 persons. Each one of the nine types of community facility required has its own threshold.
- The cost of redundant street area is very high, as it has the triple effect of consuming additional land, increasing civil works cost, and increasing the speed and quantity of storm water run-off, thus requiring higher design standards for the whole downstream drainage network.

How does this affect developer profitability? At market prices at the time of the study the Bank mission estimated that profit per hectare for a middle income development would have been about $165,000. Developing a similar plot under the Special Low Cost Housing Program guidelines would have yielded a profit of $140,000, or about a 15% decline in profit per hectare. But despite the decline in profit, overall density of the low cost project under the SLCHP guidelines was shown to be similar to the density of the middle income project, around 280 people per hectare.

The revised standards suggested by the Bertaud model analysis led to an increase in plot floor area ratio to .78 for standard plots and .6 for corner plots, a significant increase over both SLCHP and middle income comparators. The overall

site floor area ratio increased to .41. Perhaps most importantly, with the higher FAR the estimated profit per hectare rises to $193,000, a 17% increase over the base line middle-income alternative development. Thus, it becomes clear that changes in the regulations can tilt profitability back towards the low-income market, in Malaysia the bulk of the market. Density was increased to 378 people per hectare.

The Bertaud Model Applied Elsewhere

This particular example was from Malaysia, but the model - and some of the lessons learned - are quite portable to other markets, developed as well as developing. The model has been applied to a number of countries which are currently moving from a command and control approach to a more market oriented approach to land use; including South Africa and reforming formerly socialist economies.

For example, in Russia and in all countries which were part of the former Soviet Union, very detailed master plans allocate land between various land use and include a street design layout often including the tertiary level. The model has been used to test the consistency of permitted land use with current market price for each type of construction included in the plan. The model can be used to then "back out" the value of undeveloped land. When assuming land uses based on portions of the master plan, using current construction and market sale price, the calculated value of land is often negative. Using the model the plan can be iteratively adjusted to reach positive land values.

As Russian municipalities simultaneously control land use and sell land, they have an incentive to adjust standards to maximize land value. Parameters that can be readily improved upon include type of land use, road right of ways, infrastructure standards, and standards for community facilities. Politically, it is often easier to amend the current plan to make it consistent with market prices and customer preferences, rather than recommending discarding the plan because it is inconsistent with market forces. The amended master plan is thus progressively transformed into a zoning plan, allowing much more land use flexibility, and reducing the sort of costly infrastructure overdesign described above for Malaysia.

Current market price per m2 of housing, offices and commercial facilities in different locations are of course one of the most important input of the model. The municipalities willing to use this method thus will put considerable effort into monitoring land and property markets. This monitoring has in turn a positive effect on the market itself, by disseminating real estate price information. Previously such price

data were often only reluctantly shared by the various government entities in charge of land sale and lease.

Examining a Wider Range of Urban Regulations

We have already noted in our discussion of the Bertaud model that in 1989 the World Bank undertook a study of why housing prices were so high in Malaysia. This oft-cited study still repays careful study.25 Panel A of Exhibit 10 shows how prices accelerated after 1978 compared to prices generally, with a bust in 1984.[26]

When the government invited the Bank to examine this issue in Malaysia, they forwarded their concerns about issues such as the price of labor and certain key materials. However the Bank's analysis demonstrated clearly that the biggest problem faced by this market was related to regulation.

The housing development process in Malaysia was particularly complex at that time, with something like thirty major steps required in order to obtain permission to develop residential plots. A flow chart of this process developed by a local analyst M.K. Sen (1986) has become a sort of cult totem to those working on regulatory issues. The flow chart can be found in Sen's original article, and has been reproduced in World Bank (1989) and World Bank (1993). Instead, we prefer to focus on Exhibits 8 and 9 above, an illustration of the opposite phenomenon: sometimes costly regulations are complex and subtle. Presented with a Exhibit like Sen's, showing thirty steps required for land development that take seven years to circumnavigate and which can be short circuited at any step, any one can see a problem. Not only is there a holding period cost, but the additional risk involved in development is enormous.

Rather than belabor that obvious point, let us examine the differences between Exhibits 8 and 9. Analysis by Alain Bertaud of the mission team, discussed at length

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25. Elements of the study have been replicated in (e.g.) Indonesia, Turkey, Korea, Ethiopia, and numerous other countries. The study has been cited widely in housing and urban development literature, e.g. World Bank (1991, 1993), Baken and van der Linden (1993), Datta (1991), Dowall (1992), Rakodi (1992), and Strassman (1994), among others.

[26] Malaysia does not release housing price data on a regular basis. The housing price index in the Exhibit was constructed by the Bank mission from raw data provided by developers. Qualitatively discussions with Malaysian developers before the recent crisis suggests there has been another full boom and bust cycle since the end of the data in Exhibit 2.

above, suggested that reducing excessive set backs and requirement for a back alley increased the floor area ratio (FAR) of the development from .23 to .41. Such an increase speaks volumes to any potential developer. More to the point, analysis by Bertaud showed that the regulations tilted profitability away from low cost housing and towards the high end of the market. Bertaud's suggested regulatory changes tilted profitability back towards the lower and middle ends of the market.[27]

In a similar spirit, the Bank team costed out a whole series of interventions – regulations, taxes and subsidies – in present value terms, and examined the net effect of these incentives and disincentives on development outcomes. The remaining three panels of Exhibit 10 summarize the outcomes of the exercise. Panel B presents a graphical representation of the costs and benefits of these interventions from the point of view of the developer. In order to encourage low cost development, a number of Malaysian states were donating free land to developers who agreed to develop to Special Low Cost Housing Program standards. But Panel B shows that this extremely large subsidy was more than offset by large costs imposed by price restrictions on the sale of resulting units and the cost of land use regulation.[28]

Panel C shows how costs and benefits of interventions accrued to consumers in the program. They receive a unit worth M$30,000 for M$25,000, and in addition obtained a subsidized mortgage.[29] Thus the net benefit to the consumer was enormous. Panel D shows how these incentives add up from the point of view of the economy as a whole, the producer, and the consumer. In this particular case, we find that developing such a unit was estimated to be an efficient use of society's resources (benefits exceed costs); but given the excess regulation and price control that more than off set land subsidies, the net benefit to developers was negative. On the other hand, the benefit to consumers was substantial. Thus, as a first order estimate of the

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[27] Analysis by Bertaud showed that the setbacks and back alleys were not much valued by consumers, even though they were very expensive in terms of land. So roughly reducing these regulations had the effect of lowering costs without a significant change in benefits. Of course if consumers valued set backs or back alleys highly, the analysis would have to be modified to account for this.

[28] The controls on selling prices were an attempt to pass through the land subsidy to consumers. As a general principle if subsidies are provided to housing suppliers, we would view such price controls differently as controls on rents or prices in a purely private development market. The point here is that the price control intended to pass the subsidy through to the developer insures that the land subsidy is not available to the developer to off set the excess regulatory burden.

29. At the time of the study the U.S. dollar was worth 2.5 Malaysian ringitt.