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Introduction of Price Signals into Land Use Planning: how applicable in China?

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Abstract

Although starting from the British system of Town and Country Planning the central ideas in this chapter seem to be increasingly relevant for China and, indeed, many OECD countries. Using the British system as a reference the chapter starts by characterizing the basic features of any system of land use planning, viewed from the resource allocation point of view of an economist. A conclusion is that the British system explicitly excludes any use of price signals from its decisions, a feature it shares with may other systems including that which is being constructed in China. The chapter then summarizes the problems which the exclusion of price information gives rise to. Where planning systems deliberately or indirectly constrain the supply of space, given that space is an attribute of housing which is income elastic in demand, rising incomes not only drive rising real house prices but also mean that land prices rise considerably faster than house prices. Several housing attributes other than garden space are to a degree substitutes for land but the underlying cause of the inelastic supply of housing is the constraint on land supply. If planning systems constrain the supply of space for other urban uses then similar consequences follow. However, the discontinuities which differential constraints on the supply of space give rise to, signal the relative scarcity of land for different uses at each location and could be used to improve the economic efficiency of planning decision-making without sacrificing the wider goals of planning. In the context of rapid economic growth and urbanization in China the evidence examined with particular detail for the Shanghai area strongly suggests that substantial costs of planning imposed constrictions and other regulatory constraints are appearing in the housing market. Given the nature of the still embryonic planning system it appears that price signals derived from urban land markets could be used and would improve the efficiency of decision-making.

1 Introduction

Land is an environmental resource but it is also, of course, a factor of production and a consumption good which yields direct welfare to households in the form of living, recreational and amenity space. Yet in many parts of the world land use planning systems treat land use only in the first of these senses or functions. This may seem an overstatement but, if so, it is only mildly overstated. If we take the British land use planning system, for example, we find that issues which any economist would recognize as central in resource allocation (outside a Stalinist central planning regime) are actually legally excluded from consideration. The price of land or housing, or the rents for commercial or industrial space, are not 'material considerations'. Since only factors which are legally defined as 'material considerations' can be recognized in planning decision making all price information is systematically excluded from the planning decision making process.

Equally planners in Britain, in assessing how much land to release for housing or for economic activity, project 'housing need' and future employment but there is no attempt to estimate demand for land for particular uses in any sense that would be recognized by an economist. 'Housing need' is projected on the basis of estimated household numbers using demographic models. This is translated into an estimate of implied land supply to be released on the basis of planning-determined fixed densities. The role that real income has in determining both the demand for space within houses and in gardens and even the number of houses is wholly ignored. Similarly the relationship between the real price of housing and household formation rates is excluded, as is the role that real and relative house prices have on interregional migration. Estimates of the need for land for economic uses are equally devoid of economic content. Employment is projected mainly from past trends, adjusted to political priorities and planners' value judgments. These tend to favor policies to retain city centre shopping and industrial over service employment. The resulting employment projections are translated into land needed to be released for development on the basis of existing or assumed densities. Again no account is explicitly taken of demand as an economist would define it so the shift to out of town industry and retail with low rise industrial and retail buildings using more land and more land for parking was largely resisted – and in the case of retail is still strongly resisted.

New service employment in non-traditional locations has likewise been resisted. The struggles of major British companies and institutions illustrate this. A 27,000 m^2 extension to the Wellcome Trust Genome Campus just outside Cambridge – one of the premier bioscience research facilities in the world - took a five-year struggle to get permission. The epic and expensive struggle of Vodaphone – one of Britain's most successful companies of the last 20 years - to get permission for a headquarters building in its home town of Newbury, Berkshire, is recounted in Evans and Hartwich (2006). Over a 20-year period Vodaphone had grown from a small spin-off from a defense company to the largest company by capitalization on the London Stock Exchange. By 1997 its HQ functions were spread over 50 different sites in the Newbury area but only last minute political intervention enabled the company to get permission to consolidate in a single new building. Despite the fact that Vodaphone was the largest employer in the town its expansion and planned new HQ was not in the development plan for the area and was initially refused on 'planning grounds'.

Economic factors are equally absent on the supply side of the planning decision making process. The supply of land for different categories of use is identified simply as the amount of land the

planning process has allocated to each use (primarily residential, retail, industrial and office). Ownership and availability are not taken into account. The land is usually privately owned and, of course, frequently developers own it. But some land designated as part of 'land supply' may be owned by individuals or agencies not willing to develop it at all; or, more often, by owners who choose not to develop the land either to maintain a land bank over some wider geographical scale of operation or to retain the option of future development (see Titman, 1985).

The British land use planning system may be near the end of the continuum in terms of the extent to which it ignores economic signals and concepts but many systems are close to it. The evidence currently available suggests that the Chinese system is one of those effectively ignoring economic signals and principles in its land allocation decisions. The summary of the system provided by the Vice Minister Lu Xinshe (2004), for example makes no mention of any of the economic variables, including prices, identified above in the characterization of the British system. The only hint at economic content is that one of the roles identified for planning is to 'promote a healthy economy' but since this comes in the same paragraph as 'preserving arable land and water' and 'containing urban sprawl' it is not clear that there can be any specific economic content implied.

Equally if we look at the planning of one of China's fastest growing cities, Shenzhen, we can see a process similar to that which characterizes Britain with physical units such as hectares of land and densities and population projections, not apparently based on economic modeling including migration, as the drivers. Shenzhen, across the border from Hong Kong was designated for economic expansion but in 1996 the 'planned ' population was 4.2 million in 2000 and 5.1 million in 2010. In fact by 2006 there were already more than 10 million people living in the new city. 'Land consumption' per person was projected on 'Standards' intended, in 2000 to have reached 'International Standard III' of 90.1 to 105 m^2 per person and by 2010 to have reached 'International Standard IV' of 105 to 120 m^2 per person. Each projected population total and land standard was then projected into a total urban constructed space total. These population figures, however, took no account of relative real wages and hence induced migration and the space 'standards' take no account of changes in income per capita, the price of land or the income elasticity of demand for land.

Given planning's role as a system for allocating a scarce resource it seems perverse in a market economy – or even in an economy opening up to market mechanisms as is China's – to exclude the use of price information. The extent to which the use of price signals might help improve land allocation is variable, however, and depends on the details of how a planning or zoning system actually works and what exactly it controls or constrains the supply of.

2. Systems of planning or land use regulation

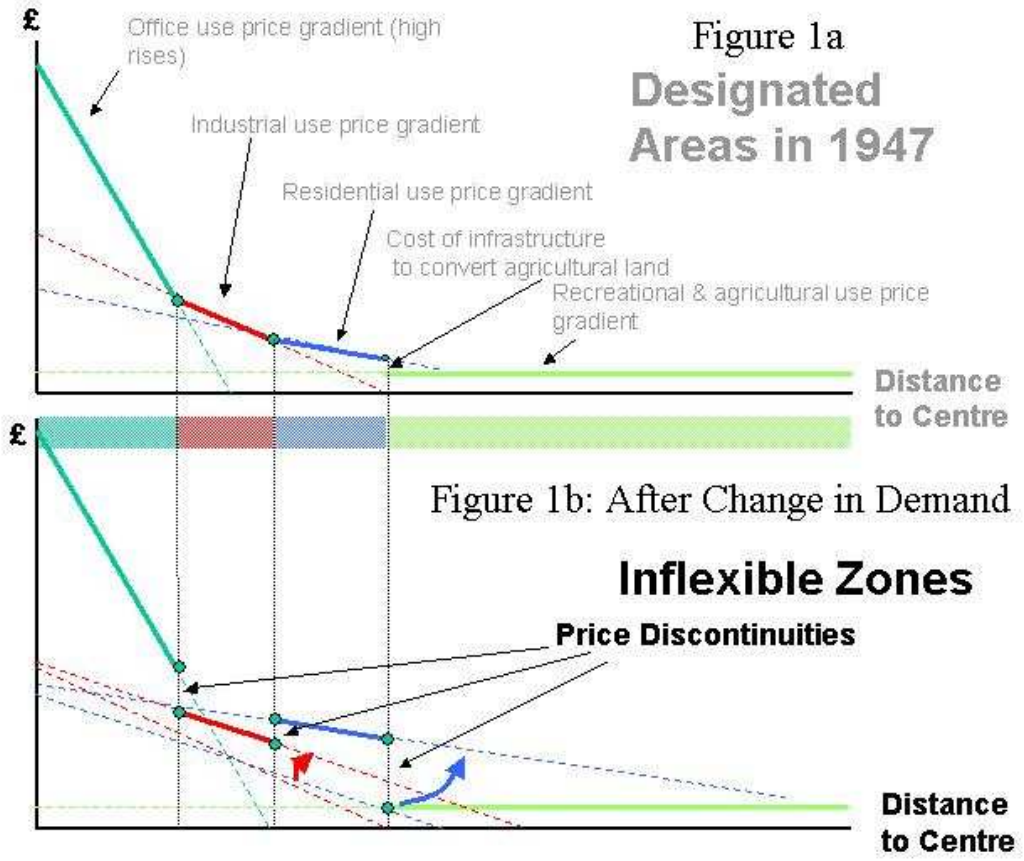
We must distinguish between regulation as such and regulation which has the effect of restricting the supply of either urban land or space in buildings,[1] or – more commonly – both. There are many good reasons why land markets require regulation and economic analysis is one source of such reasons. Interdependencies in the use of land create serious externality problems and there are important classes of public goods associated with land; both with its development and its preservation from development. Unregulated markets would not respond to such classic issues of market failure. This provides a good basis for land use regulation but does not necessarily imply the restriction of supply[2]. The question, however, is the move from regulation designed to internalize externalities or provide desirable quantities of public goods (such as parks or wildlife habitats) to regulation which has the effect of restricting the supply of space in buildings or for private consumption in the form of gardens. When regulation constrains its supply, the price of space is increased. It is only this aspect of regulation which is relevant to the present discussion.

The degree of land market regulation and specifically restrictions on the supply of land for urban uses is particularly strong in the U.K. In the face of deregulation of most markets in the U.K. over the past 25 years it is notable that not only has deregulation of land markets not until very recently even been on the agenda (see Barker 2003) but land market regulation in general, and restriction in particular, have been becoming tighter and more complex and constraining. But land market regulation in the sense of supply restriction has been spreading to other countries over the past forty years. South Korea, when it was restructuring after the Korean war in the mid 1950s, adopted a system closely modeled on the U.K. original but included a feature discussed but not implemented in Britain: a state monopoly on the development of urban land. The Netherlands has had a long history of strong land use control but historically did not impose a significant constraint on the supply of land for urban uses (Needham 1992). But there is increasing pressure in the Netherlands now for containment of urban development in the search for 'sustainability'. In the U.S., likewise, there is increasing evidence of a regulatory constraint on the supply at least of housing (see Glaeser and Gyourko 2003, Glaeser *et al* 2005 or Gyourko *et al* 2005).

The situation in China is not yet fully documented although Section 5 of this chapter provides some relatively strong evidence of a restriction on residential space availability in two particularly large, and faster growing cities, Shanghai and Beijing. China has restructured from a former centrally planned socialist economic system to one relying increasingly on markets more quickly and more successfully than any other country. In the era of Communism land ownership was in the hands of the state and state enterprises and there were, for practical purposes, no markets in real estate. While its economy began to move towards market mechanisms from 1978, it only introduced the first recognizable elements of a land use planning system to regulate land markets from 1987. Land markets and their associated institutions have only developed in the past 15 years and are still evolving. The ability of large state enterprises to re-zone land for urban uses (in principle for their own use) only officially disappeared at the end of August 2003. Even then a possibility was retained for state enterprises to develop land for housing for their own workers but then to sell a proportion off to the general public although reportedly such practices are getting rare.

The details of the planning system are significant because these condition the particular patterns of land prices depending on whether the system imposes a restriction of supply relative to demand and, if it does, what precisely it restricts the supply of. Systems such as operate in the U.K. determine the supply of land for each defined use independently and – as noted above - independently of price. Figures 1a and 1b represent in a schematic way the result of having imposed such restriction over the whole period since the Town and Country Planning Act of 1947 which founded the essential structure of the British planning system. Of course it is not just the supply of land itself which is restricted but there are also restrictions on building heights (for example in the City of London and even more so in the most expensive office location in the world, London's West End) and conservation measures preserving old structures from a range of types of change (but most ineffectively from those which result from neglect). But the stated aim of the system is to contain urban development and since DoE (1994) and DETR (1999) explicitly for 'densification'. The result of this is that very substantial land price discontinuities have emerged at the transition zone between designated uses. These are largest in areas which have experienced the strongest economic growth, mainly the south east of England, but for reasons explained below, since real incomes have grown very substantially everywhere since 1947, there is a substantial price discontinuity between residential and agricultural land prices at the fringe of urban areas throughout Britain. Some examples for a prosperous city in the south east of England, Reading, are shown in Appendix tables A2 and A3.

Figure 1: The Emergence of Land Price Discontinuities in the Face of Fixed Supply



In successive planning laws the Chinese have introduced a land use planning system modeled mainly on Master Planning. Detailed plans are made to determine the total amount of land available and for all parcels of land zoned for urban use and that which is permitted within the plan can be developed. This is in contrast to U.S. zoning or the U.K.'s development control system although in practice the difference between these systems is not clear cut and absolute.

The system as it works in the U.S., however, in those regions where it is in an economic sense restrictive, seems mainly to restrict not the supply of land as such but something else. In a swathe of territory through the central regions of the U.S. from Mississippi to Arizona and north through to Illinois and Idaho there may be little restriction on supply at all (see for example Glaeser *et al*, 2005). Because of the fiscal incentive on local communities to allow commercial development there may be little restriction of land for commercial development anywhere. On both East and West coasts, however, there is evidence that there is a growing restriction on the supply of lots permitted to have houses on them – or 'house+land bundles' - which, because of the costs of getting zoning ordinance waivers to convert to multifamily occupation or to subdivide lots, are increasing generating rising house prices although not a rise in the price of housing land. Indeed, Glaeser and Gyourko (2003) estimated a negative marginal price of an additional unit area of lot space in New England implying that zoning while constraining the supply of houses (and so driving up their prices) was causing households to 'over consume' land, leading to more urban land take in total. The system appears to be restricting the supply of house+land bundles rather than the supply of land itself so land price differentials would not be the appropriate price information.

This illustrates the point that to see whether we can use price signals derived from land markets as useful information to help planning decision making become more economically efficient we have to know the details of how the system works. This is because the details of the system and its institutional setting will determine exactly what is being restricted in supply and the pattern of incentives and distortions regulation generates. Even the reactions of agents may differ between societies and cultures. For example, the context in Britain is one of an efficient and relatively transparent imposition of planning regulations. Given the potential financial gains available – in the south east of England an owner of agricultural land would be able to get a windfall capital gain of 40,000 per cent if they could get development permission - corruption seems surprisingly absent. The system in Italy seems on paper to be restrictive but agents behave differently. A large proportion of development, especially in the south, is essentially illegal. This may be bad for planning but it reduces the supply restriction and so the price of urban land and housing.

Let us now turn to a more detailed discussion of how economic factors interact with systems of land use regulation and so uncover the types of price signals that may be generated, what they imply in economic terms, and how the information they generate might be used. Most of this discussion is in the context of the British system although the evidence available from China suggests there would be significant parallels between the Chinese and British systems, particularly given the pace of Chinese economic development and China's rate of urbanization.

3. The Role of Economic Factors

a) Housing and land markets

Over the past 35 years, there has been an increasing body of economic literature applying hedonic analysis to the housing market. The basic idea is to conceive of complex goods such as houses as being composed of a bundle of attributes, each of which commands a price that can be estimated and for each of which a conceptual and, in principle, identifiable market exists with its own supply and demand characteristics. In the case of housing the most important categories of attributes are those that relate to the physical structure (such as space, number of rooms, specification or design) and those that relate to its location (such as the character of the neighborhood, the access it provides to employment, the quality of local schools or access to locationally fixed environmental amenities). For a recent literature survey and summary of progress in the hedonic study of housing markets see Sheppard (1999).

There have now been hundreds, perhaps thousands, of hedonic studies of housing markets undertaken around the world and no credible study has been done which has not found a strong and significant attribute price for internal space within the house. Far fewer studies have been done which include lot size or garden space[3] but those which have been done similarly find that garden space itself is an attribute which commands a price. Findings of studies such as Song and Knaap (2003) that there is, other things equal, a price discount for houses in higher density neighborhoods are essentially the flip side of the same coin. Appendix Table A1a, reproduced from Cheshire and Sheppard (2005), shows a selection of attribute prices, and changes in them, estimated for the Reading area, a prosperous housing market about 60 kms west of London, at two different dates, 1984 and 1993.

It is immediately apparent that prices for attributes whose supply is relatively elastic, provided through a market process and produced by industrial means (such as central heating or simple changes to construction/design such as the number of bedrooms) fell in real terms between 1984 and 1993. In contrast, the price of those attributes not provided through markets but via fiat through

the planning system, rose substantially in real terms. Not only that, but the price of garden space rose proportionately most where the supply was most constrained by the planning system: that is at the edge of the urban area where the containment policy was felt most strongly. Garden space nearer to the centre, although it cost more per square meter in absolute terms, increased in price proportionately less. The price of local public goods effectively bought through the housing market, such as access to the best secondary school, rose more or less in line with incomes. This is consistent with most of the costs of private schooling of similar quality - an obvious substitute - taking the form of labor costs.

The reason for this pattern of price changes over time for specific attributes is the interaction of changes in the demand for, and supply of them. Evidence on the demand characteristics for individual housing attributes is relatively scarce but in a British context can be gleaned from Cheshire and Sheppard (1998) and Cheshire *et al* (1999). These estimates – see Appendix Table 1b - suggest that the demand for space in England was strongly income elastic[4]. This was true both for internal and garden space. It was true across the three cities and for each period estimates were derived for: Darlington in 1984 and 1997, Nottingham in 1997 and Reading in 1984 and 1993. Not only was the income elasticity of demand for space strong but also there was considerable stability in the estimates over time and across housing markets. Evaluated at median observed incomes, the values varied from a low of 1.6 for internal space in Reading in 1984 to a high of 3.8 for garden space in Darlington in the same year. Four of the five estimates for the income elasticity of demand for garden space were higher than the corresponding estimates for internal space and the mean value of the income elasticity of demand for garden space was 2.4 compared to 2.0 for internal space. The evidence strongly suggests (the not surprising conclusion) that the demand for housing space - both internal and external - is normal, with consumers seeking to buy more space as their incomes increase.

There seems, therefore, to be evidence supporting the conclusion that by restricting the supply of urban space in the face of rising real incomes and a normal income elasticity of demand for space – the operation of the planning system, especially in areas of high income growth such as Reading, has caused the price of space to rise significantly. If this is correct, then a further implication is that over time the price of housing land should have risen in real terms more rapidly than the price of houses. This is because houses are composite goods and there is substitutability between attributes. If land becomes more expensive then more floors can be substituted for a larger floor plan, terraced or semi-detached houses can be substituted for detached houses, apartments for individual houses, or perhaps public open space can be substituted for garden space. Equally, more but smaller rooms with design features such as built-in storage can be substituted for larger rooms. So over time, if land prices rise as a result of a constraint on supply, design, densities and construction techniques are likely to adapt to substitute cheaper for more expensive attributes with the result that house prices rise less than land prices. Such a result is made even more likely if the apparent higher value of income elasticity of demand for garden space compared to internal space is supported by other evidence.

The evidence on long run trends in real land and house prices is indeed supportive of this interpretation (see Cheshire and Sheppard 2004 for details). Although the focus of debate in the U.K. has been on the housing market, over the long period the increase in housing land prices (times a factor of 11 in real terms since 1955) greatly exceeded that of house prices (times a factor of 3.5 over the same period). Moreover, if there is an increasingly tight constraint on the supply of space one would expect an increasing degree of price volatility in the market. Adjustment to short run changes in demand has to be increasingly through changes in price rather than quantity. This, too, is observed with the amplitude of the cycle increasing over time since the mid 1950s and being

very much greater for land than it is for house prices. The evidence thus supports the view that the planning system in Britain constrains the supply of space (rather than the supply of houses) but space is an attribute not only demanded but one which is highly income elastic in demand. As a result the price of housing is also increased over time in real terms and the market becomes more volatile as supply becomes more inelastic.

b) Discontinuities in the land value surface

A further implication is that the operation of the planning system in areas of demand growth (for housing effectively all of the U.K. since demand is chiefly dependent on growth in real incomes – although with differential growth in the south east of England) substantial discontinuities in land values would arise over short geographical distances. This was illustrated in Fig 1 and results from the feature of the system discussed above: that it controls the supply of land for each category of use, individually, and independently of price. Thus, if housing land is kept in short supply relative to market demand, its price at the urban fringe will rise above the combined value of land for agriculture and the infrastructure costs associated with converting land to housing. Similarly, if land for any other designated use is constrained relative to demand for it to a greater degree than the constraint imposed on the supply of land for use in the adjoining zone, then its price will be bid up above that of land in the neighboring zone but designated for some other use.

Observing such discontinuities is relatively easy at the urban fringe because the supply of agricultural land is not constrained by the planning system, so in high demand areas the discontinuity is very large. Moreover, since housing is the dominant use of urban land, there is relatively good information on housing land prices at various locations. Appendix Table A2 shows estimates of land values in the Reading area for a range of separate uses at a given date – 1984. These estimates were prepared for a study on the economic effects of the planning system undertaken between 1983 and 1986 and were reported in Cheshire and Sheppard (1986). Healey and Baker, a major firm of professional real estate agents and appraisers, estimated the non-housing land values while the housing land values represent the range reported by local estate agents (realtors). The Zones refer to zones of constant value (more precisely values which could not be reliably separated) within the total area delimited by the planning system for each use. The higher value zones within each land use category tended to be nearer to the centre of the city.

At the time of the study, agricultural land values at the urban fringe (stripped of 'hope' value) were about £2,500 per acre – not far from levels prevailing in 2005 - and infrastructure costs were reported as being from £25,000 to £50,000 per acre at 1983 prices. It can be seen, therefore, that there was a net premium for residential land at the urban fringe of from £70,000 to £180,000 per acre. An important point to note is that these reported prices are for a quasi market price of land incorporating the capitalized value of all the amenities, expected value of neighborhood characteristics and local public goods such as schools. Market prices are to be distinguished from the concept of ‘land price’ as analyzed in the classic monocentric urban model of Alonso, Muth or Mills which refers to the price of land as ‘pure-space-with-accessibility-to-employment’. This will typically be significantly lower. In the case of Reading, it was estimated for 1984 as being from around £20,000 at the urban fringe rising to just over £200,000 per acre at the centre. Returning to the quasi-market prices reported in Appendix Table A2 there was also a premium for industrial land adjoining residential zones, for neighborhood retail land internal to residential or adjoining industrial zones and for land for office use adjoining central areas zoned for either residential or retail use. The highest priced land of all, however, was for prime retail sites in the main shopping streets in the town centre. Nevertheless, at each border the premium was very substantial: at the residential-industrial border it was more than £200,000 per acre and at the industrial-retail border

more than £2,000,000 per acre. All these figures are at 1984 prices. The third column of the table converts these to 2002 prices simply using the Retail Price Index (RPI).

Since about 1965, the economy of the Reading area has become increasingly specialized in hi-tech and financial sectors. The sharp downturn in these that took place following 2000 to 2001 produced a new situation. Demand for housing appeared still to be very high but prices developers were paying for sites zoned for industrial use had fallen sharply. Prices reported for a selection of parcels of residential land in the Reading area between 1999 and 2001 are shown in Appendix Table A3. As can be seen these remained very high, reaching £4 million per acre early in 2001. Later that year they fell back somewhat but the price reported for a 1.5 acre site on the southeastern fringe of the urban area in August 2003 was expected to be some £3 million per acre[5]. This was for a site then designated by planners for industrial development, however, so the premium appeared to have gone the other way compared to 1984. There was still a discontinuity in the price surface but with residential land commanding a significant premium at the residential-industrial zone border because of the sharp fall in interest for industrial development.

c) Why worry if land prices are raised?

At first glance the idea that we should not be too concerned about any increase in land prices caused by supply restrictions imposed by regulation and planning may seem plausible. Such increases might seem to represent a 'free' tax base for public revenues. Such a view superficially reflects a very long intellectual tradition going back to legal arguments in the late Middle Ages about the concept of Betterment, via Henry George and the arguments leading to the British Town and Country Planning Act of 1947, right through to current concerns about funding infrastructure by levying a charge on the increase in land values that results from improved accessibility. The simple point is that if the community uses its resources to produce values for particular parcels of land, it is not only equitable that the community should share in the benefits by taxing (a proportion of) them, it is electively efficient since it will not change the behavior of economic agents. Such taxes – in so far as they are on pure rents – could be neutral, even benign, in terms of economic efficiency and the allocation of resources. They could make it possible to finance beneficial public investments which might otherwise not be funded.

There have always been at least two major obstacles to actually levying such taxes. The first has been how to estimate the element of the value of the land on which to levy them. A second is the traditional opposition of financial ministries everywhere to permit 'hypothecated' taxes.

In fact, with improvements in data, econometric methods and calculating power and better theoretical understanding of the process of capitalization, it is no longer unreal to think that one could estimate the change in land values consequent on expenditure by 'the community' on, say, infrastructure (but it could be expenditure on crime reduction or the provision of a public park) sufficiently reliably and cheaply to levy a tax on the relevant increase in land values to fund the community investment; and even the positions of financial ministries can change.

This, however, is a quite different situation to that which appears to exist as a result of the current operation of the land use planning system in Britain. Planning certainly does generate amenities which are capitalized into land prices and the values of these in particular times and places have been estimated. But the evidence (see, for example, Cheshire and Sheppard, 2002) is extremely strong that the increase in land prices we observe in the U.K. does not just - or even significantly - reflect the value of the amenities planning generates but largely – perhaps overwhelmingly – reflects the restriction of land supply for urban purposes. The net welfare costs of restriction were

estimated by Cheshire and Sheppard (2002) to be substantial – equivalent to an additional tax of 3.9 percent on reasonable assumptions.

The main cause of the increase in the price of land for all urban uses is the constraint on land supply imposed by the combination of containment – now densification – and development control. This determines the supply of space independently of actual demand or price for each category of use. This means that higher land prices do not so much reflect the benefits generated by the benign actions of the community and the use of public resources but, in effect, monopolistic supply restrictions.

There are two implications of this: i) the increase in land prices (although taxable if policy makers chose) represents a deadweight loss - there is no offsetting benefit and there are real welfare losses; and ii) some one – in reality all economic agents using land either directly or indirectly – has to pay the higher cost.

Higher space costs mean that economic activity, other things equal, becomes less competitive in that location; the loss for any given increase in land prices resulting from a constraint on supply will reflect the land intensity of the particular activity and the ease of substituting land/space out of 'production' (production here includes services – try shopping in Ikea in the U.K. compared to France or in a U.S. Walmart compared to a British Tescos for a demonstration!). Higher land prices also mean that people have to pay a higher price for housing which when they are i) internationally mobile - as is the case for highly skilled workers in, for example, London's financial sector – means wages and so operating costs have to be increased; or when they are immobile ii) real incomes are reduced. Real incomes suffer not just because more disposable income is sucked up in housing but also because the housing is inferior in terms of key characteristics, particularly internal space and garden size.

So, in so far as the increase in land prices reflects a restriction on the supply of urban space relative to demand (rather than just community provided benefits such as infrastructure or open space) the value is **not** an asset government can tax in a neutral way without any impact on economic efficiency or the allocation of resources. The 'value' on which the tax is being levied represents a real cost (of course the tax would be capitalized but the 'cost' would stay the same). Indeed there is a real danger that if the gains consequent upon development permission were to be used as a source of government revenue the perverse incentives this would generate for government would lead to an even greater restriction on supply. If government has effective monopoly rights on the supply of land and the ability to tax the uplift in land values consequent upon changes in use, the temptation to use these powers to increase revenues (with further real economic costs for reasons explained above) might prove difficult to resist however good intentions might initially be.

d) Using price discontinuities to improve planning decision making

Despite the problems caused by price distortions resulting from regulatory restrictions on the supply of land for different purposes they do provide a potential means of introducing price information into the system of planning decision-making in a politically neutral and quasi-objective way. As was noted in the introduction, at present British planning authorities in making their decisions about the supply of land for any category of development exclude all factors which are not defined as 'material'. Factors constituting such 'material considerations' are defined within the planning legislation and are taken into account since, if they are not, the decision of the planning authority is liable to be overturned on appeal. Nevertheless, planning authorities are quasi-political bodies and since they are very local – Districts – they are under pressure from local interests. Local interests alone are highly asymmetric and overrepresent those who bear the costs of development rather than

those who may benefit[6] (many of whom are located outside the District and therefore not a part of the relevant political constituency).

The planning system is designed to generate amenity benefits. The problem is that given the constraints on land supply that have been entailed in generating these benefits it seems that – certainly in areas of high demand in the U.K. and probably elsewhere too – there is a substantial, sometimes serious, net welfare loss associated with producing them generated by the increased costs of housing space. Householders in areas such as Reading would be significantly better off if constraints on land supply were relaxed despite the reduction in planning generated amenities such a relaxation would entail (see Cheshire and Sheppard 2002). This is of course looking at the costs and benefits in terms of equivalent flows of income needed to generate observed or estimated welfare levels. Supply constraints and the amenities planning produces also generate asset values (as analyzed, for example, by Fischel 2001) which substantially redistribute wealth to house owners from renters and to older households compared to younger ones.

The suggestion here is that the premium in land prices for one use over another at zone borders should formally constitute a material consideration which planning authorities would be required to take into account in determining development decisions. If the premium exceeded some specified threshold then there should be a presumption that development permission would be granted unless, and only unless, it could be shown that the excess premium reflected amenity, environmental, social or economic values generated by retaining the land in its current use; and that these amenity values were equal to or exceeded the current premium. If this were the case then it would be deemed that the current use of the land was in the public interest.

If such a mechanism were to be implemented a number of practical problems would need to be solved. There would need to be an authoritative and accepted mechanism for estimating current land values in any given use[7]. The planning authority could, of course, challenge such evidence. It might be reasonable to measure the mean premium over, say, two years rather than rely on a signal of perhaps a purely temporary shortage of supply. Markets can change rapidly, especially given the cumulative effect of constant constraints on supply over time and the resulting cumulative increase in the inelasticity of supply. However, price thresholds before a presumption of development was triggered, could be set high enough to resolve this problem: that is there should not just be a price differential but a differential exceeding some absolute threshold before a presumption of development would arise. There would be a minor practical problem of establishing what was a reasonable level for such thresholds. A final practical problem is how amenity benefits could be estimated if the planning authority sought to object to the presumption of development on the grounds that the value of the land to the community in its present use exceeded the price differential plus any threshold. Here advances in hedonic analysis (see for example Sheppard, 1999; Cheshire and Sheppard, 2004 or Anderson and West 2006, forthcoming) holds out a reasonable solution although any reasonable valuation of social or environmental benefits from intensively farmed agricultural land is so low (see Barker 2003) that case practice would probably become quickly established leading to a sufficiently large increase in urban land supply to resolve supply constraints for the foreseeable future.

4. Where is China?

As was explained above, the extent to which using land price differentials in planning decisions would improve the economic efficiency of the planning process is conditioned on the particular form of the system and its institutional context. If the system imposes a uniform regulatory burden on all development then differentials will not necessarily arise and certainly will not fully reflect the economic costs of the system. If, as in the United States, the system does not constrain the supply of

land as such but the number of land+house bundles, again land prices themselves will not embody the appropriate market signals to improve allocative efficiency. This section tries to address the question of the extent to which the emerging planning system in China, interacting with an almost unparalleled rate of increase in real incomes and rapid urbanization, may generate useful land market price signals. Between 1978 and 2003 the percentage of China's population living in cities doubled to some 40%. Over the same period the rate of increase of incomes averaged 9.3% per year. The World Bank expects China's growth rate to be 9.5% in 2006. The increase in urban population is important but the increase in real incomes is considerably more important both for the welfare of China's population and, more importantly in the present context, for its implications for the demand for housing space. As was noted in the introduction, planners in both the UK and China, tend to plan urban land supply in terms of physical numbers or people or households. Rapid urbanization has increased China's urban population needing new housing. But, particularly where housing-related space is constrained, the British experience shows that it is the income elasticity of demand for the space attributes of housing, interacting with rising incomes, which drives demand[8].

China has moved very rapidly from a state controlled and centrally planned command economy to an economy increasingly open to market forces and the private ownership of property. In its centrally planned period, urban land was owned by the state directly or indirectly and planning was essentially a by-product of the central planning system and the needs of state enterprises for premises and housing for their employees. State agencies both controlled the decision making process about the use of land and the development process. Progressively since 1987 something more akin to a free market in land and real estate has been constructed and with it a land use planning system. Decisions about urban development have been devolved to Districts with the Municipality/Prefecture tier of government providing the strategic framework. As it is emerging the system relies on a Master Plan with important caveats. Until very recently there was a dual land market, with state enterprises able to acquire land for their needs (including housing for their workers) and also to sell off surplus land. This worked in parallel with a commercial land market with Districts allocating land for urban development and selling to developers. As was noted in Section 2 this dual land market system is being run down.

The second important caveat is that the development process is still subject not only to the sort of regulation common to systems in OECD countries such as FAR restrictions and controls on the transfer of land between uses – particularly from agriculture to urban – but to an extensive array of bureaucratic controls typical of a centrally planned system. It is reported by a Chinese developer in Shanghai, for example, that more than 130 separate permits, stamps, authorizations and licenses are necessary to execute a residential development from site acquisition through to completion of the building[9]. Each of these, of course, costs significant real resources both for the developer and for the State. Regulation of the development process is a universal feature of any planning system but such a complex and opaque system of control as seems to exist in China represents, in effect, a tax on development. It will be capitalized into land values, reducing the price of land for development because it increases the developer's expected costs, but increase the sale price of completed developments and the costs of both residential and economic space.

The aims of the Chinese system of land use planning as stated by the Vice-Minister responsible for the planning system, Lu Xinshe, in 2004 are to:

- Promote 'rational' land use
- Guard 'public interest'
- Protect natural resources – *de facto* strong protection of designated agriculture land

This last seems to reflect a wider policy aim motivated by mercantilist concerns for agricultural production and national self-sufficiency.

Given the rapidity of both economic development and institutional change in China it is hard to absolutely characterize the system or its context: it has been constantly changing and is still. The dual land market gave state enterprises the ability to acquire land with only mild constraints at nominal costs. All that was required was that existing land owners – mainly small farmers – were compensated on a minimal formula intended to allow them to acquire equivalent agricultural land. Since the system lasted until so recently it seems likely that land supply for economic uses is still relatively unconstrained. To an extent the same may be true of housing space, especially for industrial workers and in less rapidly developing regions, since state enterprises were also able to acquire land for housing their workforces. Ownership of such housing was to a varying extent vested in the occupants of the houses. This means that even the extent of house ownership is not a clear cut issue because ownership may be an unqualified property right or it may be something considerably less than unqualified.

Table 1: Comparative data for Six Chinese Cities: Prices in RMB ($1=RMB8.01)

Variable	**Anqin**	**Beijing**	**Changzhi**	**Shanghai**	**Yiyang**	**Zhengzou**
Population '000s	566.1	10,800.0	593.5	12,900.0	1,343.0	2,076.0
Office space CBRE Occ. Costs RBM pa m^2	…	2,975	…	3,500	…	…
Raw land Urban fringe + permission RMB m^2	2,000	4,975	1,525	3,600	525	3,600
Ratio to agricultural land	1.3	2.0	…	…	1.25	…
Mid range new dwellings RMB m^2	3,200	12,900	2,200	14,900	1,600	2,200
Mid range monthly HH income buyers RMB	4,975	8,000	3,475	8,000	2,950	5,450

Source: Sheppard (2006) and CBRE (2005)

Table 1 shows some comparative data for six Chinese cities covered in Sheppard (2006), including both the cities analyzed in the next Section. In the context of the present chapter perhaps the price of raw land on the urban fringe, zoned for housing development, is the most indicative number. Local realtors estimated this value. Although the data are not available for all cities there seems to be a substantial differential with the local price of agricultural land, suggesting a restriction of urban land supply.

5. The examples of Shanghai and Beijing

a) Shanghai

It seems impossible to take a 'representative' Chinese city and generalize to the economic impacts of China's planning system. Not only is the planning system in various degrees of construction but the regional pattern of development, and the inherited stock of available land owned by state enterprises, is so varied that the extent to which any constraints on land supply may be impacting on prices for land in different uses is likely to differ widely from place to place and be changing rapidly over time. Instead I have focused on two cities which have been subject to some of the most rapid growth both economically and in terms of population: Shanghai and Beijing. The data for Shanghai are more detailed although the story the data tell is similar for both cities. The rational for selecting just these two cities – apart from the availability of data – is that although highly

unrepresentative of China as a whole, they in some sense represent where China is going and so the situation one would expect to develop more widely over time if present policies are continued with. Because of their particularly rapid growth they are exhausting the land resources they inherited and rising incomes are causing the demand for housing space to increase rapidly.

Although, as noted above, there is beginning to be data available for the price of land in recorded transactions that is not what this analysis relies on. This is for a number of reasons. The first is the difficulty of interpreting the data that are available. This is not just an issue of translating from the Chinese and locating a thousand or so parcels and their uses, it is also because of the suspicion that the data need a great deal of processing and careful sifting before they can be useful and the difficulty of knowing how far they are reliable. For example, in the data for 362 Shanghai land transactions for the first 9 months of 2005 (Shanghai Real Estate Appraisers Association) several prices are recorded over 5,000RMB per m^2 but more than a quarter of all transactions are reported to have had just three exact prices; 6.4 percent of transactions recorded for 2004 have a price of zero. So instead of looking directly at land prices I have adapted the methodology of Glaeser *et al* (2005) to estimate a total 'regulatory tax' in Shanghai and Beijing for observations drawn from the past year. A further reason for adopting this approach is the expectation that a significant element of the regulatory costs of planning in China is still accounted for by a generalized burden of compliance which would not give rise to land price differentials. Nevertheless, the differences in this value as estimated between different categories of use provide a guide as to the use-specific extent of restrictions on space.

An obvious problem in analyzing the economic impacts of land use planning is identifying exactly what element in price per m^2 of housing space or total occupation costs may reasonably be attributed to 'planning' restrictions. This is because 1) such restrictions can take many forms over and beyond restricting the supply of land or space; and 2) it is essential to compare like for like or to eliminate from the results the normal factors such as city size, income level, transport costs, topography and growth rate that urban economic theory tells one should be expected to influence the price of land and space

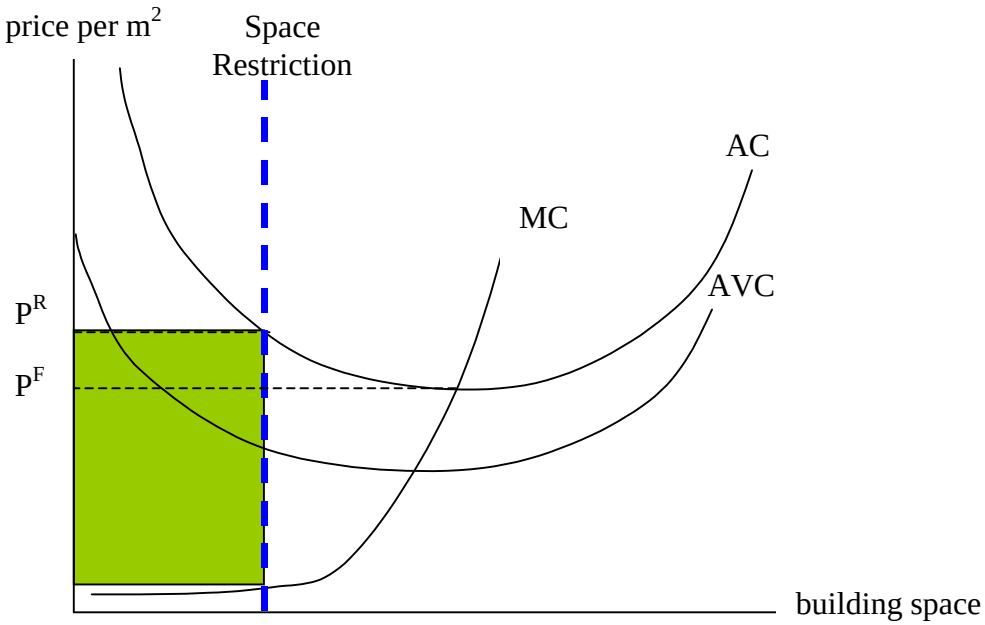
The Glaeser *et al* methodology was developed to estimate the impact on prices of high rise apartment blocks in New York of all forms of regulatory constraints taken together: that is restrictions on land supply, space by floor area ratios (FARs) or off-street parking requirements or height restrictions (operationally equivalent to space constraints – see Bertaud and Brueckner 2005) or indeed compliance complexity or delays in decision making.

It has the considerable attraction that it is intellectually coherent, resting on established microeconomic theory, and it is not demanding with respect to data and estimation techniques. Furthermore it can be applied to any category of space in which a unit of space in an additional story is a more or less perfect substitute for an additional unit of space obtained via a larger building footprint or garden. Thus, it can be applied to apartment blocks, offices or hotels, but more doubtfully to industrial, retail or warehouse space. Its downside is that it is a 'black box' number. It does not differentiate between costs that are imposed by different aspects of regulation such as complexity and compliance costs, delays, or space restrictions; and it only gives a 'cost' not a net welfare or net impact on output measure because it does not net out benefits although Glaeser *et al* (2005) do include an allowance of loss of the value of views to existing apartments resulting from building an additional floor. The impact of this is small, however, and is ignored here.

The Glaeser *et al*. (2005) methodology is derived from one of the basis results of neoclassical economics spelt out in any textbook in economics intended for first year university courses.

The basis is set out in Figure 2 where PF is the price of an additional unit of space in an unconstrained market while PR is the price if supply is restricted by regulation. As is argued in detail in Cheshire and Hilber (2006), however, this is a significant oversimplification since the regulatory system may influence the costs of construction itself. However the conclusion there is that so long as the system of regulation imposes a constraint on building heights, the Regulatory Tax (RT) will reflect the gross costs of regulations but be a lower bound estimate of their real costs.

Figure 2: The Regulatory Tax (RT) Result from a Restriction on Supply



Given the international nature of the development industry and the large number of domestic developers and construction firms it is not unreasonable to characterize the development industry as competitive. Nor, given the ways in which construction costs per m^2 increase with building height, is it unreasonable to assume that marginal costs of generating space increase with height. If we consider buildings in which additional vertical space is a perfect substitute for a larger floor pad or site size, then any difference between the marginal cost of an additional m^2 of space produced by building an additional floor and the price of that m^2 is, therefore, in effect, a measure of the gross costs imposed by regulation or the 'regulatory tax'. By estimating this for classes of use in which additional floors are near perfect substitutes for additional floor plan or site size, the issue of the determinants of land prices is abstracted from. All that is necessary is to calculate well-founded estimates of the costs of building a 'hypothetical' additional floor and comparing that to the price such space would command when sold.

Tables 2 and 3 show price and construction cost data for two sets of buildings constructed for the commercial market in Shanghai. The first is a set of residential buildings built for sale; the second is for a set of office buildings. In both cases the data relate to late 2005. The prices are per square meter and are capital values – market prices - as estimated by local developers for an extra floor

were it possible to build one. They are thus intended to relate as closely as possible to the free market price of additional residential or office space in a context in which an additional floor is a perfect substitute for a larger floor plan. The construction costs include extra service and foundation costs as well as the cost of decoration and fitting out as estimated by a qualified surveyor currently working in the Shanghai construction industry. To the reported costs for materials and labor has been added 10% for additional taxes and financing costs. They are thus intended to reflect as closely as possible a generous definition of the marginal costs of constructing additional residential or office space.

Table 2 The Regulatory Tax': Shanghai Residential; Prices in RMB ($1=RMB8.01)

Obs	Type & Location	For an additional floor if one were permitted		Price: Cost ratio
		Price m^2 (Capital Value)	Construction cost m^2 + 10%	
Highest quality				
1	Central Pu Dong within area designated for offices: riverside + views	115,000	13,200-15,400	7.47-8.71
2	Within CBD Pu Dong	35,005	7,700-8,800	3.98-4.55
3	Central West - Pu Xi	45,000	10,120-11,220	4.01-4.45
4	Central West - Pu Xi	49,219	9,350-12,650	3.89-5.26[a]
Upper middle quality				
5	Central location Pu Xi	23,555	4,950-5,500	4.28-4.76
6	Central location Pu Dong: riverside	30,000[b]	6,160-6,820	4.40-4.87
7	Good central Pu Xi	20,258	6,380	3.18
8	Good central Pu Xi	26,997	3,410	7.92
Average				
9	Within Middle Ring	11,000	2,310	4.76
10	Within Outer Ring -close	10,036	2,530	3.97
Basic plus				
11	Pu Dong close to Outer ring	8,443	2,310	3.65
12	Pu Xi close to Outer ring	7,870	2,200	3.58
Basic				
13	Pu Xi beyond but close to Outer Ring	5,490	1,650	3.33
14	Pu Xi beyond Outer ring	4,049	1,650	2.45

[a] Surveyor judges claimed decoration and fitting out quality and costs seriously overstated
[b] Price estimate at between 25 and 35,000 RMB per m^2 depending on premium for riverside location

The final column shows the price/cost ratio calculated in a similar way to Glaser *et al* (2005) for residential apartment buildings in Manhattan. Their estimates for Manhattan ranged around 2. It will be seen that the estimates for residential space in Shanghai are considerably higher even if the two outliers are discounted (Obs 1 and 8 – although Obs 1 seems intelligible as explained below – it is not likely to be representative). Discounting these, and taking the mid point of observations for

which there is a range, implies a mean value of 3.93 with a range from 2.45 for basic housing on the edge of the urban area to 5.26 for a luxury apartment in a central location (if one accepts the surveyor's judgment reported in footnote a is correct and decoration and fitting out standards were in fact well below those claimed for the development).

One of the residential outliers – Obs 1 – is unusual both in location and in its history. Shanghai planning regulation has toughened up since 2003 according to local developers, with virtually no permissions being allowed for FAR values greater than 2.5 (a judgment which accords with the FAR values which are recorded with each land transaction record available since that date) and tougher requirements for demolition and re-housing all local residents housed on sites being re-developed. However Obs 1 is a high rise development of luxury flats with a FAR value for the development of around 7 - possible because the land was acquired some years previously when the planning regime was considerably more flexible. The site, moreover, is in an exceptionally sought after location and the flats have some of the best views in Shanghai.

Table 3 The Regulatory Tax': Shanghai Offices; Prices in RMB ($1=RMB8.01)

Obs	Type & Location	For an additional floor if one were permitted		Price: Cost ratio
		Price m^2 (Capital Value)	Construction cost m^2 + 10%	
Highest quality International Grade A				
1	Prime Pu Xi CBD	40,005	11,000	3.64
2	Prime Pu Xi CBD	25,632	10,500	2.44
3	Prime Pu Xi CBD Nan Jing Rd	30,840-32,040	10,500	2.94-3.05
High quality Grade A				
4	Pu Dong CBD edge	23,000-25,000	7,700-8,800	2.61-3.25
5	Pu Xi – 20 mins CBD	20,000-23,000	7,700-8,800	2.27-2.99
Good quality: Central locations				
6	Pu Xi: less good location in CBD	15,372	5,500-6,600	2.33-2.79
7	Pu Dong – 20 mins CBD	11,000-14,000	5,500	2.00-2.55
Secondary/more peripheral				
8	Pu Dong but 15-20 mins from Pu Xi CBD	N/A	3,850	…
9	Pu Xi beyond Outer ring	5,610-6,000	4,950	1.13-1.21
10	Pu Xi beyond Outer Ring	8,529	4,070-4180	2.04-2.10

Table 3 gives similar data for a smaller sample of commercial offices in Shanghai – again for capital values and estimated marginal costs with a 10% mark up on the materials and labor costs. It is apparent that these indicate a substantially lower degree of regulatory restriction than in the residential sector although one that is still significant. There are no obvious outliers and values range from 1.13 for secondary office space in an outlying location to 3.64 for an international Grade A building in the best location of the original Shanghai CBD in the western sector of the city, Pu Xi. The mean price : marginal cost ratio calculated on the same basis as for the residential buildings, is 2.38.

b) Beijing

Comparable data are available only for a small sample of apartment buildings in Beijing, three of which are elements in a comprehensive redevelopment of a large site. These are set out in Table 4. It will be seen that the measure of the regulatory tax in the form of the Price : Marginal Cost measure is similar to that for Shanghai residential although the sources are entirely independent of each other. The apartments in the highest price bracket appear to have the most regulatory constraint with some uncertainty about construction costs. The different buildings in the same development scheme have reassuringly similar ratios, with a mean of 3.3 compared to 3.9 in Shanghai. Data for office developments in Beijing are not available although the summary data in Table 1 suggest that office prices are somewhat lower in Beijing than in Shanghai. Couple that fact with the information on construction costs for housing available for both cities (which show the marginal cost per m^2 in Shanghai for comparable units ranging from about RMB 2, 200 to 6,400 compared to a range of RMB 2, 400 to 3,250 in Beijing) and it does not seem that there are substantial differences in building costs between the two markets. From that one might conclude that the regulatory tax on offices in Beijing is no higher, and perhaps slightly lower, than in Shanghai.

Table 4: Residential Apartments in Beijing: Prices in RMB ($1=RMB8.01)

Obs	Type & Location	For an additional floor if one were permitted		Price: Cost ratio
		Price m^2 (Capital Value)	Construction cost m^2 + 10%	
1	Good quality apartments	22,000	2,400-3,200	6.9-9.2
Components of a single large development				
2	Low rise low density (6+ floors)	11,000	3,325	3.3
3	Mid rise small units (20+ floors)	8,800	2,900	3.0
4	Large units, high rise (30+ floors)	9,000	2,530	3.6

Source: Beijing real estate specialist

6. Conclusions

The great strength of using the price differentials thrown up by the land market as signals that the planning system needs to release more land locally for the appropriate use is that they would be entirely flexible, reflecting the balance of supply and demand at all locations. They would, therefore, automatically reflect both variations in demand over space and time and the planning stance of different authorities. A further advantage of introducing price signals into the planning decision making process is that it would achieve a similar degree of relaxation more or less everywhere, as indicated by the patterns of price premiums observed. This would tend to equalize regional prices for comparable real estate over the long term and so allow greater labor and firm mobility. Taking housing, the constraint on land supply and so impacts on prices, bites sharpest in regions of high demand and strong economic growth. This increases regional house price differentials and makes it harder for workers in less prosperous regions to move to where job prospects are better. This is particularly true for poorer workers in social housing. The proposal would, therefore, help resolve problems of regional inequality which increasingly affect China,

improve housing affordability in growth regions and create greater labor market flexibility. A comparable argument applies to the efficiency and flexibility of firm location.

The proposal also has the considerable political merit of introducing a transparent, quasi-objective and so politically defensible mechanism into decisions about land supply. It would have parallels with making Central Banks independent. It would help to distance land availability decisions from politicians and the political process. Clearly there would be political difficulties in introducing a reform as radical as that proposed here. Partly that is a problem of imagination: we are simply used to the system we have and that is particularly true of issues related to real estate and planning because of the spatially fixed nature of such markets and activities surrounding them. But also the implied relaxation of supply constraints would have significant redistributative effects and people would seek to defend the value of their assets whether expensive space or the capitalized value of planning generated amenity benefits such as proximity to agricultural land. However in the U.K., space is enormously expensive because the planning system has been controlling its supply independently of its price for two generations and that is what underlies the problem of housing supply; and, as was shown in Cheshire and Sheppard (2002), the amenity benefits – especially the amenity benefit which would be most affected, proximity to unbuilt land – are particularly regressive in their distribution: they are distributed even more inequitably than incomes of owner occupiers. So reforms along the lines proposed would both improve the operation of the housing market and, at least in the U.K., in the long run have a progressive impact on the distribution of welfare across households.

The evidence examined in Sections 4 and 5 suggests that at least in the most prosperous cities of China land use planning is imposing a severe regulatory burden which bears more strongly on the residential sector than on services and more strongly on more expensive housing, designed for higher income residents, than on housing for poorer families. The measure of total regulatory burden on the residential sector is substantially greater than estimated for New York by Glaser *et al* (2005). Given the apparent difference between the regulatory burden imposed on housing compared to offices and for housing designed for different income groups, the evidence is also consistent with there being a restriction operating on land supply for particular categories of development and so the proposal to incorporate the price signal generated in land markets to inform planning decision making should have (increasing) application to the Chinese context. Its application is likely to be increasingly relevant both because of the continuing rapid rate of increase of real incomes and the increasingly tight planning regime that has operated since about 2003.

However incorporating price signals would not solve problems of generalized over-regulation or red tape. Clearly planning and building codes need regulation and oversight but if the report of 130 separate approvals needed to complete a single real estate development in Shanghai is accurate then there is obviously scope for reducing complexity. Such generalized regulatory burdens will be reflected in the measure of 'regulatory taxes' but if applied even handedly to all development would not affect land price differentials between uses. The costs would be capitalized into (lower) land prices for all development. The solution is, in this case, not less restriction but restriction more efficiently imposed. Nevertheless, the evidence available suggests that planning is not only imposing a generalized burden in China but also differentially restricting the supply of space for urban uses in general and higher income residential in particular. This implies that land price differentials should provide useful signals to assist the efficiency of planning decision making.

Allocating a scarce resource without regard to price is rather like navigating without a compass. The rising demand for living (and working) space seems to be primarily driven by rising incomes. Since the Chinese economy has demonstrated such extraordinary speed of growth then, if planning

continues to ignore price information, housing and real estate markets will simply run onto the rocks more quickly than in slower growing countries such as Britain. The very success of the Chinese economy requires its land use allocation system to respond systematically to price signals.

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Appendix Tables

Table A1a : Changes in prices of selected attributes: Reading housing market, 1984-93

	1984	1993	% Change
Income (pre-tax)			
from sample	£13,694	£28,969	111.5
South East (*Regional Trends*)	£12,896	£22,027	70.8
Price Level (1987=100)	91.0	141.9	55.9
Sample mean house *price*	£51,066	£94,990	86.0
Reproducible attributes			
Central heating	£4,954	£5,997	21.1
Bedrooms	£2,599	£2,801	7.8
Bathrooms + WC	£4,687	£6,229	32.9
Planning amenities			
Less industrial land	£74	£224	202.7
More open accessible land	£51	£227	345.1
More closed unbuilt land[1]	£102	£60	- 41.2
Space (price per m^2)			
Garden Space :			
at centre	£49.5	£152.3	207.9
at periphery	£4.5	£22.9	404.9
median distance	£12.8	£32.1	151.5
Internal floorspace	£171	£425	148.5
Local Public Goods			
Best secondary school	£7,090	£13,414	89.2

[1]Mainly agricultural land to which there are no significant rights of public access. [2] An estimate from data for 1999-2000 shows this price to have risen to £23,763.

Source: Reproduced from Cheshire and Sheppard 2005

Table A1b : Estimated Income Elasticities of Demand for Selected Attributes of Housing: Reading, 1984 & 1993; Darlington 1984 & 1998; Nottingham 1998

Attribute	Reading		Darlington		Nottingham
	1984	1993	1984	1998	1998
Reproducible structure attributes					
Bedrooms	1.593	1.818	1.706	2.240	2.685
Bathrooms + WC	1.585	1.822	1.705	2.212	2.835
Space					
Internal space	1.592	1.789	1.751	2.249	2.518
Land area (size of garden)	1.678	1.791	3.755	1.973	2.592

Source: Reproduced from Cheshire and Sheppard 2004.

Table A2 : Reading Urban Land Prices: 1984

Land Use	**£ 000's per acre Current**	**£ 000's per acre 2002 prices**
Office use		
Zone 1	7 964-13 241[1]	15 748-26 183
Zone 2	3 806-8 370[1]	7 526-16 551
Zone 3	2 621-5 103[1]	
Zone 4	602-1 308[1]	1 190-2 586
Retail		
Zone 1a	28 779-34 151[2]	56908-67 531
Zone 1b	24 467-27 818[2]	48 382-55 008
Zone 2	12 807-15 794[2]	25 325-31 231
Zone 3	9 786-12 458[2]	19 351-24 635
Zone 4	8 941	17 680
Zone 5	3 020-3 927[2]	5 972-7 765
Zone 6	5 688	
Zone 7	2 539	5 021
Industrial		
Zone 1	400*	791
Zone 2	500*	989
Zone 3	450*	890
Residential		
Edge of existing urban area	120-205	237-405

Source: Cheshire and Sheppard (1986)

*Estimated variance ± 5%

[1] Range of observations

[2] Range of estimates varying with exact location and floor plan size/access/permitted structure type

Table A3 : Some Residential Land Sales 1999-2002: Reading Area

Address	Size (Acres)	Land Sale Price £/m	Price Acre £/m	No of Units	Contract Date	Distance from Centre in metres
READING, Addington House, 67-73 London Street	0.56	0.750	1.34	n.a.	June 1999	600
READING, London Road/Silver Street (CITY POINT)	1.34	5.025	3.750	102 Flats	Sept 2000	600
READING, Shinfield Road, Met Office	44.6 Gross 19.37 Net	30.00	1.50	310 Houses	n.a.	2400
READING, 29 Queens Road,	0.53	2.12	4.00	46 Flats	Jan 2001	450
READING, 4 Gas Works Rd	1.03	3.60-4.12	3.50-4.00	86 Flats	Feb 2001	900
READING, 105/123 Queens Road	1.00	3.250	3.250	100/120 Flats	Spring 2001	450
READING, Berkeley Avenue, (CAPITAL POINT)	1.45	2.175	1.5	80 Flats	Oct 2001	1000
READING, Shinfield Church Farm	13.89 Gross 10.07 Net	24.3	1.750	140 Houses	Sept 2001	3000
READING, Shinfield, Hollow Lane	10.625 Gross 9.79 Net	19.58	2.00	105 Houses	Oct 2001	3000

Source: Campbell Gordon, Reading

[1] As recently shown by Bertaud and Brueckner (2005) restrictions on land availability or building heights are analytically equivalent.

[2] Although the Dutch have been moving towards a more restrictive stance over recent years, historically their system was strongly regulatory but non-restrictive and space costs were low relative to incomes. Needham (1992) explained this in terms of the historic obligation on local authorities, as responsible for drainage, to supply land. As a consequence planning in Holland had developed with a strong function of facilitating the supply of land for all uses - including development - but at the same time the system was firmly regulatory.

[3] Since economic theory tells one that the price of housing land will vary systematically with distance from employment centres it is not possible to estimate the price of garden space without also including the exact location of the house with respect to centre(s) of employment. This also means that in any urban area there is not one price of land but a price function with respect to distance/location. It is consequently far more demanding to estimate the price of garden space in terms of both data requirements and estimation techniques. Since moreover the price paid for space is non-linear with respect to quantity, the hedonic price also varies with lot size and even shape.

[4] Far higher than estimates for the US. However it must be appreciated that U.K. households are reacting to a market in which the supply of space is severely constrained. In so far as this is also the case in China – as it appears to be – then

British estimates of income elasticities for space are likely to correspond better to the Chinese situation than to the US one.

[5]Conversation with Ian Campbell FRICS of Campbell Gordon 22 8 2003: price quoted for land on the Wokingham/Bracknell border then zoned for industrial - if re-zoned for residential.

[6] There is an endemic problem in the planning process of internalising externalities. The cost of new residential development, for example, will include disruption during construction plus loss of amenities for existing residents if, for example, they lose views or access to open space. These are not just losses of amenities but financial losses too since these values are capitalised into house prices. As Fischel (2001) argued, the fact that houses are non-liquid, immobile but major components of most individuals' asset structures makes the defence of their value very important. Benefits from development will be widely spread in slightly lower regional house prices and a more competitive regional economy. In some cases (Terminal 5 at Heathrow might be an example) benefits are geographically even widespread than the sub region or region.

[7] At least an embryonic version of this exists in China. For example the Shanghai Real Estate Appraisers Association has published information on sales of individual parcels of land, including designated use, FAR permit, location and price since 2003.

[8] Cheshire *et al* (1999) modelled the effects of land supply policies on house prices in some detail. Their simulations - made in 1998 - suggested that if land release followed the pattern then set out in planning policy but household numbers rose as forecast by 4.4 million and incomes rose in real terms at their historic rate, then by 2016 house prices would have risen in real terms by 132 percent. If, however, the other factors stayed the same but real incomes remained at 1998 levels, then house prices were estimated to rise by only 4.4 percent. In other words if land supply is constrained the effective driver of house prices is rising real incomes and the effect that has on the price of housing space.

[9] Private communication to author.