Agenda, Volume 10, Number 2, 2003, pages 163-178

Access Holidays for Network Infrastructure Investment

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National Competition Policy is approaching its ten-year anniversary. In August 1993, the independent committee of inquiry on National Competition Policy released its final report (Commonwealth of Australia, 1993). This report, commonly known as the Hilmer report, set in train reforms that have changed the landscape facing Australian industry. In telecommunications, electricity, gas, ports, railroads, airports and other utility sectors, the past decade has seen industry restructuring, corporatisation and privatisation. Monopoly bottlenecks, such as electricity transmission grids and rail networks have been subject to access regimes to open these facilities to competing service providers.

For existing facilities, regulated infrastructure access is relatively easy. The key bottleneck infrastructure in telecommunications, energy and transport largely pre-dates the Hilmer reforms. Even if regulators set the 'wrong' access prices, this infrastructure was not going to go away. Over time however, as bottleneck infrastructure requires major renewal, or new infrastructure needs to be built, the effects of regulated access pricing on infrastructure investment becomes critical.

Traditionally, economic analysis of infrastructure investment and regulation has focussed on time consistency. How does a regulator commit not to effectively expropriate an investment by setting a low allowed price or rate-of-return after the infrastructure expenditure is sunk? This research has highlighted the importance of legal constraints on regulators, the design of appropriate regulatory institutions and the potential for a regulatory 'contract' to form between infrastructure owners and regulators (Newbery, 1999:chapter 2; Sidak and Spulber, 1997).

With access regulation, however, there is an additional problem for high-risk projects. Intervention to guarantee regulatory access is generally only required if a project is at least reasonably successful. If a project is a failure, for example due to low realised retail demand, then there will be little if any wholesale demand for facility access. But in these circumstances, investors bear all the project costs. In contrast, if the project is highly successful, regulatory access most likely will be sought. Even if regulators allow investors a 'reasonable rate of return' in these circumstances, unless this return fully compensates investors for the *ex ante* risk associated with project failure, access regulation will mute investment incentives. Put simply, investors will bear all the down-side risk of the investment and face a truncated up-side return due to access regulation.

The potential problem of project failure is most relevant for high-risk infrastructure investments. Augmentations to existing gas pipelines or fixed

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telephone systems often carry little risk. But investments in infrastructure facilities that involve new products or service new areas may involve considerable risk; for example, the Alice Springs to Darwin rail project or the building of new gas pipelines to previously unserviced regions. King and Maddock (1999) and National Competition Council (2000) discuss regulatory risk for the Alice Springs to Darwin railway.

In its recent review of the National Access Regime, the Productivity Commission (PC) paid close attention to the investment issue. Most interestingly, it investigated the notion of an 'access holiday'. This would be a period of time (in the PC's assessment, 15 to 20 years), under which an investor would be free from access regulation. The idea is that such a holiday will increase investment incentives by allowing investors a period in which to 'prove' their investment and gain profits unhindered by regulatory intervention. The concept of an access holiday (or a 'null undertaking') to both promote investment incentives and reduce regulatory uncertainty has been floated since the mid-1990s (King and Maddock, 1996). In the end, the PC fell short of recommending the use of access holidays; suggesting instead some measure to reduce regulatory uncertainty.

We believe that the case for adopting an access holiday approach is stronger than the PC has indicated. The need for an access holiday to spur investment arises from the *ex ante* inability of regulators to commit to access prices that adequately reward investors for all relevant risks. A well designed access holiday can partially overcome the problem of regulatory commitment, and represents a second-best solution to this problem, by limiting regulatory intervention for a number of years. In this paper, we consider the underlying problem of investment incentives and access regulation. We also highlight precisely what an access holiday can and cannot do. In particular we highlight important practical issues that need to be considered regarding access holidays.

Access Regulation and the Truncation Problem

Why might access regulation lead to a reduction in infrastructure investment? To answer this question, consider a simple example. Suppose there is a single firm that can build a new infrastructure facility that might be subject to declaration. For example, the facility might be a cable network in a country town that is to be used for pay-TV distribution. Such an investment is likely to involve significant *ex ante* risk. While the cable firm can carry out market research to try and estimate the demand for pay-TV and other services that will use the cable, any estimates of future demand and revenues will be uncertain. The services provided by the cable may be a success, reaping significant revenue, or they may flop, leaving the investors with a large debt and a cable of little value.

For the purpose of this example, suppose that the cable network will cost $51m to install. If the pay-TV services carried by the cable are successful, then the firm will be able to set a relatively high price and to make significant sales. It will receive (in present value terms) $100m. If the pay-TV service is moderately successful then the firm will set a lower price and receive $60m. If, however, the

pay-TV service is unsuccessful then the firm receives only $20m. Suppose that the probabilities of each of these outcomes are 25 per cent, 50 per cent and 25 per cent respectively. Then the expected return to the investor is $60m, less the $51m cost of the investment. So the firm expects to make $9m on average and (if risk neutral) will invest in the cable network.

Now, suppose that after building the network, the pay-TV distribution services provided by the network could be subject to regulated access. Given that the cable is already built, allowing access would appear to be socially desirable. Alternative pay-TV operators will be able to use the cable and competition in the provision of pay-TV will lead to lower prices for customers. A potential access seeker, however, can wait until it has observed whether or not pay-TV is successful before it decides whether or not to buy cable access and enter the retail market. In general, the access seeker will find it most desirable to enter into retail competition if the retail profits from pay-TV services are high. This is the situation when pay-TV is a successful product in the town. But in this case, entry by the pay-TV competitor using a regulated access price will tend to push down total industry profits. After all, that is the whole point of the infrastructure access regime: to facilitate downstream entry and competition, lower prices to customers and eliminate monopoly profits. So when pay-TV is most successful, entry by access seekers is most likely to occur, reducing the total profits of the industry and, as a result, reducing the profits of the cable investor.

In contrast, if pay-TV is unsuccessful, then entry by an access seeker is less likely. Rather, the investors in the cable are left bearing all the losses associated with their investment.

To see the effect of this *ex post* regulated access, suppose that an access seeker only finds it worthwhile to enter the market and compete in the supply of pay-TV services if demand is high in the town and, in the absence of declaration, the incumbent would receive $100m. Further, suppose that in this situation competition from the access seeker lowers the return to the network owner to $60m. *Ex post* this leaves the network owner receiving $9m more than the cost of the network. But *ex ante*, the investment in the network is no longer viable. The network owner now expects to receive $60m if pay-TV is successful, $60m if pay-TV is only moderately successful and $20m if pay-TV is unsuccessful. Using the same probabilities as before, this gives an expected return of $50m, less than the capital investment of $51m. The expected return from the investment is now negative one million dollars. Hence, if the network owner believes that its cable will be subject to a regulated access regime after it is built, then the owner will not bother to invest in the network in the first place.

This example illustrates a general principle. Access regulation is an *ex post* decision that affects the *ex ante* expected return from an investment. Further, access is most likely to be sought when the downstream returns from the investment are high. This means that *ex ante* the potential for declaration will limit the returns from an investment in those situations where it is most successful and might make socially desirable investment privately unprofitable.

This problem — where the potential for *ex post* access regulation 'truncates' the high end of the distribution of the possible returns to an investor in an essential infrastructure facility and so reduces the *ex ante* incentive to invest in the facility — is called the *truncation problem* by the PC.

Can Access Prices Fix the Truncation Problem?

The potential for regulatory truncation depends on the access regulation imposed on investors *after* they make their investment. If a regulator could, *ex post*, set access prices that allow an investor an appropriate return to cover all relevant *ex ante* risk, then regulatory truncation need not arise.

To see this, consider the example above. If the regulator *ex post* was able to set an access price that guaranteed the cable investor profits of at least $64 if pay-TV is successful, then the project would remain *ex ante* viable. More generally, if regulators can set access prices that allow investors relatively high profits when risky projects are successful, then the truncation problem can be avoided for all but the most marginal projects.

Regulators, however, do not have absolute discretion over access prices. Regulators are constrained by legislated pricing rules that limit the range of access prices that they can set *ex post*. Even in the absence of such legal constraints, regulators face strong economic and political pressures to limit access prices. After all, the essential facility has been built and *ex post* it is efficient to set price at a low level to encourage socially efficient use of the facility. Further, if the regulator did set relatively high access prices in those situations where the essential facility investment was successful, the returns received by the essential facility provider would appear 'excessive' *ex post*. Of course, this ignores the possibility that the investor could have lost significantly on the project. However, after the investment has been made, regulators, politicians and the public only see the actual return.

Even if the regulator could impose *ex post* access prices that fully compensated the infrastructure investor for *ex ante* risk, there are formidable information barriers in its way. Regulators do not know the true *ex ante* project risk and investors will tend to exaggerate their claims of such risk in order to boost the regulated access price. Access seekers will argue that such risks are overstated or non-existent. The regulator will almost certainly lack the information necessary to set the appropriate access price.

In summary, the truncation problem for essential facility investment is directly related to the issue of regulatory commitment. If the relevant regulator was able to commit *ex ante* to access prices that would apply *ex post* and would fully compensate for project risk, then the truncation problem would disappear. However, such commitment is unlikely in practice due to legal, political and practical constraints on the regulator.

It was argued to the PC that the truncation problem could be avoided by simply adding a 'truncation premium' to the access price and the PC appeared to favour such a premium in its report. Of course, if regulators could commit to an

adequate premium then the truncation problem would go away. The source of the truncation problem is the inability of regulators to commit to such access prices *ex ante*. Saying that the problem can be avoided if regulators could commit to such prices is true but trivial.

Regulatory Instruments

The truncation problem arises because of the inability of regulators to commit *ex ante* to access prices that compensate for all relevant investment risks. But access prices are only one of the regulatory tools available to deal with essential facilities. A second regulatory tool is the right of a seeker to gain access to an essential facility. Once a facility is built, a seeker might be granted access quickly. Alternatively, access might be delayed for a period of time.

There is an interplay between the two instruments in determining the incentives of industry participants. In particular, the access pricing terms may be 'high' or 'low'. Less familiar is that access rights are a matter of degree. Such rights may be 'sooner' or 'later'.

In simplistic terms, the impact of these regulatory decisions on incentives can be summarised as in Table 1.

Table 1: Instruments and Investment Incentives

		Access Price	
		Low	High
Commencement of Access Rights	Sooner	Low provider/ High seeker incentives	Medium provider/ Medium seeker incentives
	Later	Medium provider/ Medium seeker incentives	High provider/ Low seeker incentives

Table 1 illustrates how changing the mix of access pricing and the commencement of access rights alters the balance of incentives along the vertical production chain. If access prices are relatively low and a seeker can gain access quickly then potential access seekers have strong incentives to try and enter the downstream market by gaining access to the services provided by the essential facility. But the infrastructure investor has weak incentives to build the essential facility in the first place. The investor will have little time to seize monopoly profits from the investment and will be subject to strong competition from access seekers. The converse holds if access prices are high and there is a significant delay between the time a facility is completed and the time that seekers are able to gain access.

Table 1 captures the essence of the truncation problem — regulators cannot commit not to set low access prices and if investors expect to receive low access

prices then they will be reluctant to invest in the first place. However, Table 1 also suggests a way out of this problem. If regulators are expected to set low access prices *ex post* but, at the same time, there is a commitment that any new essential facility will not be subject to infrastructure access for a significant period of time, then this will raise investor incentives. It is this *ex ante* commitment to delay access *ex post* that is the basis of an access holiday.

Access Holidays

What is an 'access holiday'?

An access holiday is simply a period of time during which a new infrastructure facility would not be subject to any access regulation. During this time, the owners of the relevant facility could charge monopoly prices or deny access to competitors. Thus, during the access holiday period, the owners of the infrastructure would be free to exploit their investment in any way that they chose.

An access holiday helps to avoid the truncation problem because it can be granted before the relevant facility is built. To see this, consider the example of a cable network discussed above. The parties who are planning to build this network can approach the authorities before any significant investment has been made in the infrastructure and request to receive a period of exemption from regulated access that will begin after the project is completed. Regulatory authorities can commit to this holiday *ex ante.* After all, they simply have to state a relevant period of time for the access holiday — whether it is five years or fifty years. The investor then knows that any profits (or losses) made during the holiday period accrue to them alone.

For example, suppose in the cable network example that half of all returns (in present value terms) accrue in the first fifteen years. Remember that if the facility is subject to access as soon as it is complete, then the facility is *ex ante* uneconomic to the investors despite it being socially worthwhile. What happens if the regulator *ex ante* can commit to a fifteen-year access holiday?

Assume that after the holiday is finished, the regulator simply imposes the old access regime. As before, if the project is either unsuccessful or only moderately successful, then no party seeks access to the cable. The investors make either \$20m or \$60m with probabilities ¼ and ½ respectively on the \$51m investment. If, however, the cable is highly successful, then access will be sought as soon as the holiday is complete. In the absence of any access regime, the present value of profits to the investors is \$100m. This falls to \$60m if access occurs as soon as the cable is complete. But if there is a fifteen-year access holiday, during which time half of the life-time returns from the cable are realised by the investors, then (in present value terms) the investors now receive \$50m during the holiday and \$30m after the holiday finishes. In total they receive \$80m when the project is highly successful.

The access holiday has increased the return to the investors in those situations where an immediate access regime would have undermined profits. Because the

access holiday is only finite in duration, it does not restore all monopoly profits to the investors. However, in this example, the holiday restores enough profits to ensure that the cable network will go ahead. The present value expected returns for the investors under the access holiday have risen to $55m (that is, ¼ times $80m, plus ½ times $60m, plus ¼ times $20m). Given the cable cost of $51m, the project will now go ahead. The access holiday has enabled the regulatory authorities to overcome their inability to commit to *ex post* access prices and enabled the socially-desirable investment to proceed.

In terms of Table 1, the access holiday is simply a delay in the commencement of access rights. Given that regulators will set low access prices (at least from the investors' perspective) once the facility is built, we are caught in the left-hand-column of Table 1. The access holiday moves us to the bottom row of that table, raising the incentives to invest in essential infrastructure facilities.

It is important to note that the granting of an access holiday on an infrastructure investment does not mean there will be no access given to the relevant facility. Rather, it means that there is no *right* to access. However, it is still open for the provider to negotiate access terms with potential seekers. During the holiday period, the bargaining power of the access provider is clearly strengthened relative to a regulated access regime as the provider can choose not to allow access unless the access price is favourable enough. Indeed, in situations where the provider and seeker are not directly competing with one another or where the access seeker is more efficient in downstream operations than the upstream infrastructure owner, we would expect access to be granted resulting in private as well as social benefits.

Access Holidays and Patents

As noted above, an access holiday is a second-best solution to the *ex post* constraints that limit regulated access pricing. In this sense, access holidays play a role similar to a patent in innovative activity. Patents encourage innovations by conferring on the inventor temporary monopoly profits. Similarly, access holidays encourage infrastructure investment by allowing investors to temporarily exploit any market power associated with their facility. Both patents and access holidays are second-best solutions in that they impose a temporary monopoly cost on society. Both an optimal patent and an optimal access holiday needs to be designed to trade-off this temporary loss with the increased incentive to invest.

The analogy between a patent and an access holiday raised some concerns, summarised by the PC in its report. A patent, like the access holiday proposed above, is a fixed period of time and does not attempt to vary — becoming longer if the inventor has not accrued enough return or shortening if the investor has accrued too much return. The access holiday, like a patent, would start from the time the investment 'comes on line' rather than from the time it generates 'positive revenues'.

These features, in our opinion, are strengths, not weaknesses of an access holiday. The length of the holiday is determined before investment and fixed. It

is not altered after the investment is made and is not revisited by the regulators when market information on project success or failure becomes available. In other words, it solves the regulatory commitment problem. If the access holiday was variable *ex post* at the discretion of the regulator then it would simply suffer from the same commitment problems that face access prices.

Allowing a regulator to *ex post* revisit the length of the holiday would not only raise the spectre of regulatory commitment, it would also create severe moral hazard problems of the sort that exist in all price regulation. For example, suppose the holiday included all time up until an investment became 'cash-flow positive' then lasted for a fixed time after this date. This would provide strong incentives for investors to delay the date at which their investment becomes cash-flow positive. They would have an incentive to artificially inflate the variable costs associated with the project, particularly in the short-term. This could be achieved in a variety of ways: substituting variable factors for fixed factors, bringing expenses forward in the project life to keep down cash flows, structuring debt so that it is biased towards short-term payments and so on. A fixed length access holiday that applies from a specified date (for example, a certain time after construction commences, or the date on which the project comes 'on line') will minimise the incentives for costly manipulation of cash flows and information by the investors.

In summary, like a patent, a fixed term access holiday provides a relatively simple regulatory procedure that avoids the problem of regulatory commitment and is relatively free of manipulation.

Criteria and Length of Access Holidays

In its report, the PC noted that there are different types of infrastructure investment. For example, some investment can only be undertaken by one firm because it involves existing infrastructure or easements associated with that firm. Other infrastructure is contestable in the sense that a number of firms might all find the investment feasible and may even race to be the first to build. Similarly, different investment faces different levels of *ex ante* risk. While a new cable network in a previously unserved country town may be highly risky, an augmentation to an existing cable network in a metropolitan area with a long history of service demand might have little risk. When judging both whether an access holiday should be granted to a facility and the length of any holiday, these differences need to be considered.

Risky Monopoly Investment

We begin with the example that has implicitly motivated our discussion so far. Suppose that the relevant infrastructure investment can only be undertaken by one group of investors and that this investment is highly risky *ex ante*. In fact, the risk associated with this investment is such that, in the absence of any access holiday, the investment will not go ahead despite it being socially desirable.

In this situation, an access holiday can overcome the truncation problem, but how long should the holiday be? At a minimum, the holiday must be long enough to overcome the truncation problem. In other words, the access holiday must be of sufficient length so that, given the post-holiday regulatory regime, investors still find it profitable to invest in socially desirable infrastructure *ex ante*. For example, with infrastructure with a life-span of 30 to 50 years, the relevant minimum holiday might be between 10 and 20 years for high-risk projects.

At the same time, additional factors come into play when determining the optimal length of the access holiday. The underlying idea of a holiday is to improve investment incentives. But this has two parts. First, the access holiday overcomes the truncation problem and leads to privately profitable investment in situations where investment would otherwise not be privately profitable at any time. This can be achieved by the minimum holiday that makes investment profitable. However, once private investment is going to take place, it is desirable to align the timing of this investment with socially optimal investment timing. In general, a monopoly investor will tend to delay investment relative to socially optimal timing. The reason for this is simple. When a firm invests, it bears all the costs of that investment but does not reap all the social returns. Even a monopoly leaves some consumers' surplus that cannot be seized by the firm so that social benefits tend to exceed private benefits from investment. Thus, when a private firm considers whether to invest today or wait until tomorrow, it considers all the benefits of waiting, in terms of reduced investment costs and improved technology, but it does not consider the full social cost of the surplus foregone by waiting. The firm only considers the loss of profits due to delayed investment, and ignores the lost consumers' surplus. The result is that the firm will tend to wait too long to invest from a social perspective.

The tendency for a monopoly investor to delay means that it may be optimal to extend the access holiday beyond the time that just makes the investment profitable, so long as this will lead to investment being brought closer to its socially optimal time. This in turn depends crucially on the project's life-cycle.

Increasing the length of an access holiday allows investors to earn monopoly profits for a longer period of time. If an access holiday ends when per period monopoly profits are relatively high, then increasing the length of the holiday will encourage earlier investment. In such a situation, increasing the access holiday beyond its minimum length will tend to accelerate investment in a socially desirable way.

On the other hand, if the profits at the end of an access holiday are relatively low, the benefits of increasing the length of the holiday may also be low. In that situation, it could be the case that the minimal length access holiday that just avoids the truncation problem is also socially desirable.

Two lessons flow from this. First, while at a minimum the access holiday must be long enough to overcome the truncation problem, so that investment is just privately profitable, it might be socially desirable to go further and create an access holiday long enough to leave some *ex ante* expected economic rents with the investor. Put simply, socially optimal access holidays need not, in general,

force private expected profits to the minimum that is just needed to allow investment. Leaving rents with the investors can be socially beneficial.

Second, it is only beneficial to leave rents with the investors if this promotes earlier investment. This in turn depends on the project life-cycle of the investment. The regulator needs to be cognisant of the likely timing of the flows of returns to the project when setting the length of the access holiday.

Low-Risk Monopoly Investment

Our discussion so far has centred on the truncation problem facing high risk investment. Because regulators cannot commit to access prices, private investment might be rendered unprofitable. At the heart of this problem is the *ex ante* project risk and the failure of regulators *ex post* to fully compensate investors for the *ex ante* risks of project failure.

This suggests that there would be no role for access holidays in situations where infrastructure investment is low risk, so that even with *ex post* regulated access pricing the investment is privately profitable. However, this is false. Access holidays can play an important role even when infrastructure investment is privately profitable, because it can alter the timing of this investment.

Consider the case where only a single group of investors can make the infrastructure investment. The investment is low risk, for example, an augmentation or an extension to an existing network. As noted earlier, in this situation investment will tend to be undesirably delayed from a social perspective. While the monopoly investors will invest, they delay the investment relative to the social optimum. An access holiday can help to deal with this problem.

To see this, suppose the monopoly investors have to decide when to invest in a project that will generate a social surplus of $53 per year for ever or $530 in present value terms where the discount rate is 10 per cent. Also, imagine that due to technological change, real investment costs are declining. These are depicted in the second line of Table 2. The third line of the table presents the net present value of the social value of the investment if it occurs in a particular year. Thus, if the investment occurs in year 1, total social benefits are $530 and the cost is $350. So the net social benefit is $180 in year 1, or $164 today at a 10 per cent discount rate. Notice from the table that the net present social value of the investment is maximised if the investment takes place in year 2.

Now consider a scheme (first derived by Sappington and Sibley, 1988) — which can be termed the ‘incremental surplus subsidy’ scheme or ISS — in which the investors are paid the social surplus created by the investment for one year. During that year, the investors must also pay the costs of the investment. Once the year is over, the firm is then compensated for the actual costs of its investment in each successive year.

This regulatory scheme perfectly aligns social and private incentives over investment timing. When the monopolist invests it receives the social benefit of $53 for one year. But they must pay the capital cost of the investment for that year. Given the 10 per cent discount rate this capital cost is just one tenth of the

total investment cost; $54 if they invest today, $35 if they invest in year 1, and so on. The monopolist will not invest immediately because the annual capital cost of $54 for one year outweighs the payment of $53. The monopolist will also not invest after one year. While they make a profit of $18 if they invest after one year (that is, $53 minus $35), they make a profit of $25 (that is, $53 minus $28) if they invest after two years. Discounting these profits back so that they are expressed in 'current' dollars, the monopolist makes approximately $21 by investing after two years rather than $16 by investing after one year. The monopolist's present value of profits under the ISS scheme are presented in the final row of table 2.

The monopolist, however, will not wait for three years. Investing after three years makes the monopolist a once off profit of $26. But in terms of current dollars this is just under $20. The provider prefers to invest after two years as this maximises its profit. This is also the socially optimal investment timing.

Table 2: Relevant Investment Outcomes

Year	**Today**	**1**	**2**	**3**	**4**
Social Benefit	530	530	530	530	530
Investment Cost (Current)	540	350	280	270	260
Net Present Value at 10% discount rate	-10	164	206	195	184
ISS	-1	16	**21**	20	18

Source: Gans and King (2000)

The intuition behind this optimal regulatory scheme is straight forward. The pricing formula for investment gives the monopoly one period of social surplus but requires them to bear the investment costs for one period. The difference between the one-period social surplus generated by the investment and its one-period cost provides a rent for the investors. If this rent is increasing (in present value terms) over time, then the investors will prefer to wait and defer the investment. The investors will maximise this rent by investing when the difference between social surplus and investment cost is at its greatest (taking into account impatience). Hence, the investors' incentives over investment timing are perfectly aligned with the social incentives.

A problem in applying the ISS scheme is that it will often be difficult, if not impossible, to measure the social surplus. Sappington and Sibley suggest, however, that by letting the monopolist have free-reign and be unregulated for a year, then at least the monopoly incentives to invest can be generated without having to grant the provider a life-long monopoly. This suggestion, of course, is simply a short access holiday.

A short access holiday may help to align private and social investment incentives even when there is little project risk and the truncation problem is absent so that private investment will occur at some time. In such a situation, the short access holiday will tend to promote earlier private investment in a way that is socially desirable. However, the access holiday also creates a period of monopoly pricing with its associated loss of social surplus. The length of the holiday needs to trade-off the investment timing benefits of a short holiday with the monopoly pricing distortion that arises during the holiday. The access holiday needs to be sufficient to allow the investors to reap some rents from the project. But (given that these are for low-risk projects) this need not be long; perhaps five years or less.

Contestable Investments

The discussion above has concentrated on the situation where only one group of investors can make the relevant infrastructure investment. But, as the PC points out, in many situations there are multiple potential investors. If investments are contestable, then investment incentives change substantially.

Suppose an investment is low risk, but contestable. If there is no access regime but the investment is profitable then there will tend to be a 'race' to invest. The first firm to invest in the facility will win the race and own the essential facility with all related monopoly profits. The result is investment too early from a social perspective. Firms will invest as soon as there are any profits to be seized, because they know if they wait then another firm will invest and leave them empty handed.

This situation is modified by access pricing. Suppose that after the essential facility is built it will be subject to an access regime. Then firms have a choice between investing and being the access provider and waiting. If they wait until another firm invests then they become the access seeker. The outcome is a 'game of patience' that depends on the expected profits from being an access seeker relative to the expected profits from being the access provider. In the short term, while investment costs are high, all firms will want to wait. As investment costs fall and technology improves over time, the benefits of being the access provider rather than the access seeker rise. At some time, the profits from being an investor just equal those of being an access seeker and at this point the game ends with one firm investing.

The game of patience will depend on the access price. The higher the access price, the more profits will flow to the access provider and the earlier the investment. The reverse holds for low access prices. This means that well designed access prices can shift the timing of investment, potentially aligning private investment timing with socially optimal timing. A general approach to this problem is presented in Gans (2001) with Gans and Williams (1999a, b) providing a regulatory solution to a specialised case.

A problem with this approach, however, is the ability of the regulator to commit to the desirable access pricing rule. If this is impossible, then an access

holiday may help to provide socially desirable incentives *so long as investment is delayed relative to the social optimum*.

Thus, again, an access holiday has two potential benefits for contestable investments. First, it can overcome the extreme truncation problem, where in the absence of a holiday no private investment would be forthcoming. Further, for low risk projects it may also help to align privately profitable and socially desirable investment timing. But its role here is muted relative to a direct approach that uses investment pricing. Further, an access holiday is less likely to align timing than in the case of a monopoly investment. This is because the holiday, in general, cannot overcome an investment race — it can only help to speed up delayed investment.

The reduced efficacy of an access holiday for contestable investments runs counter to the PC's conclusion. The PC argued that an access holiday was most useful for contestable investments. In fact, our analysis suggests the opposite. While an access holiday can overcome the truncation problem for either monopoly or contestable investment, it can also help offset the delay associated with monopoly investment. But it cannot in general offset the race that is associated with contestable investment and may, in fact, undesirably exacerbate this race if a holiday were misapplied.

Adjustments for Investment Value

Thus far, we have considered access holidays that are of a fixed length and perhaps industry specific. It is conceivable, however, that the holiday length could be related to information about the value of the investment taking place.

The PC received several submissions arguing that the length of a holiday should alter along with the evolving realised value of the investment. The most notable was from the Network Economics Consulting Group (NECG) who recommended an endogenous time for the access holiday: that is, it would last until the net present value (NPV) of the investment becomes positive. What this appears to mean is that the holiday will end as soon as the investment costs have been recovered according to some *ex ante* agreed rate of return. Regulation after the holiday will then involve some form of profit sharing modelled on a resource rent tax.

Before evaluating this NPV approach it is useful to reflect on what a 'state-contingent' access holiday would look like. The principle that drives the length of an access holiday is simple: extend it only if the social loss from monopoly is low relative to the improvement in investment incentives over the extension period. So an optimal access holiday regime would shift profits to those states where monopoly behaviour had a relatively low social cost and away from those states where it is relatively costly.

In practice, this counters the NPV proposal. That approach would tend to equalise investors' profits regardless of the state realised. This runs counter to the socially optimal state-contingent holidays that involve higher profits in states where monopoly behaviour creates less social deadweight loss.

The problem with an endogenous approach to the length of an access holiday is that it creates exactly the type of issues that the access holiday was designed to overcome. We noted this above. A regulator rarely has the necessary information to accurately judge NPV for the unregulated investment. That information usually lies with the investors. However, this is where private and social incentives conflict. When NPV is high, the investors have a greater incentive to conceal information about the desirability of the investment. The investors will expend effort in arguing and establishing that an NPV is low when it is high. As a result, the regulator will not be able to rely on any information from investors when determining whether a holiday should continue or be terminated. All of the information will have to come from its own information and the information it can extract from other market participants (Caillaud and Tirole, 2000).

Further, a state-contingent approach like the NPV proposal reintroduces the issues of regulatory judgment and commitment that an access holiday is designed to eliminate. It simply moves the commitment problem from one based on *ex post* access prices to one based on *ex post* regulatory judgment about NPVs or other industry variables. As such the NPV proposal would appear to be a step backwards.

Conclusion

Access holidays are a second-best solution to the investment problem created by regulatory pricing. An access holiday can improve the timing of infrastructure investment from a social perspective, albeit at the cost of creating a deadweight loss of surplus due to temporary monopoly pricing.

Access holidays are clearly not the only way to improve infrastructure investment incentives in the presence of regulated access pricing. For example, a preferred outcome would involve regulators using optimal state-contingent access pricing. But this outcome is unlikely due to the legislative rules that bind regulators, political constraints that limit regulator discretion and the practical problems associated with optimal regulatory pricing. Alternative price-based solutions also face the problem of regulatory commitment. For example, Evans and Guthrie (2002) consider how alternative approaches to constructing price caps can alter investment incentives. However, such caps (or at least the key values to be used *ex post* to construct the caps) still need to be set in advance and may be more open to regulatory opportunism than a simple access holiday.

In our opinion, access holidays are a regulatory concept whose 'time has come' in Australia. Access holidays provide a way to overcome regulatory risk and to improve investment incentives for essential infrastructure. They are relatively simple, with the relevant authorities determining the length of the holiday in advance of any investment and then leaving the investors to act in their own interest. Further, access holidays simplify the task facing regulators after the holiday ends. Because the holiday compensates the investors for *ex ante* project risk, regulators do not need to try and evaluate this risk after the holiday ends. As such, a holiday removes one of the most contentious problems of access pricing.

This said, access holidays will not be the same for all investments. In particular, the appropriate length of the holiday depends on the risk facing the project and the contestable nature of the project. The lower the risk and the more contestable the investment, the shorter should be the relevant access holiday. However, as our analysis shows, even for low risk monopoly investment, a short access holiday can provide benefits, accelerating socially desirable investment.

It is sometimes argued (by regulators or access seekers) that access holidays are addressing a non-existent problem. In particular, it is claimed that there is no evidence that investment is deterred by post-investment regulatory opportunism. Of course, it is difficult to show instances of something that does not occur, and the experience with access regulation in Australia is relatively short. But overseas experience provides ample evidence of the potential for regulation to deter investment. One well-known example was the development by AT&T of the Picturephone in the 1970s. Support for this highly risky (but potentially highly socially desirable) was withdrawn by AT&T, in part because of regulatory opportunism.

> [T]he regulatory regime provided strong disincentives for AT&T to incur initial losses to solve the start-up problem. If the service had been successful, AT&T's profits would have been limited by rate-of-return regulation. … On the downside, it is clear that Picturephone costs would be disallowed (as indeed 'Heads, I gain a little; tails, I lose big time'.) Given these odds it is understandable that AT&T made only a half-hearted attempt to solve the start-up problem and fairly quickly cut its losses. (Rohlfs, 2001:86).

Access holidays provide a way of avoiding the problem of regulatory commitment, but they do not solve all issues relating to investment timing. For example, access holidays cannot retard investment in the case of contestable investment and an investment race. In such a situation, alternative solutions need to be considered. This is clearly an area for future research.

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We would like to thank Warwick Tudehope, Darryl Biggar and two anonymous referees for their helpful comments on an earlier version of this paper. Responsibility for all views expressed lies with the authors. A more technical presentation of many of the issues considered in this paper is provided in Gans and King (2002).