



NEW ZEALAND INSTITUTE FOR THE STUDY
OF COMPETITION AND REGULATION INC.

Current Comment

2010 No. 1: March 25

Will Abolishing the Telecommunications Service Order Compensation End Universal Service Pricing in New Zealand?

Bronwyn Howell and Dave Heatley

Current Comment is an occasional series providing economic commentary on topical issues. The views expressed are solely those of the authors and do not necessarily represent those of ISCR's constituent members or affiliates. Any errors or omissions remain the responsibility of the authors.

“Competition is the enemy of cross-subsidies”¹

Ever since 1854, when the embryonic Colonial government, as one of its first independent actions, introduced universal service pricing for postal services, New Zealanders have become accustomed to paying the same price for their residential communications services (e.g. post, fixed and mobile telephony, television, radio and broadband) regardless of whether they reside in sparsely-populated rural areas or in densely-populated urban centres². As the cost per subscriber is substantially higher in sparsely populated areas, such ‘universal service pricing’ represents a substantial cross-subsidy from urban consumers paying prices above the cost of service delivery to rural consumers, whose costs are above the ‘universal’ price paid.

However, Communications and Information Technology Minister Steven Joyce announced on March 16³ that Telecom will no longer be compensated under the Telecommunications Service Order (TSO) for meeting its obligations under the Kiwi Share arrangements⁴ agreed when the firm was privatised in 1990. Telecom is obliged under these arrangements to provide a basic level of telecommunications services (including ‘free’ local telephone calls) at no more than a capped price (in real terms) to all New Zealanders, regardless of their physical location. The March 16 decision militates against principles of competitive neutrality and may actually undermine the long-held artefact of retail telephony pricing equity in New Zealand, as the abolition of the TSO compensation imposes upon Telecom a cost of meeting a government-imposed social redistribution amongst its customers that none of its rivals is required to undertake⁵.

¹ Farrell, J. (1996). Creating local competition. Available on

<http://law.indiana.edu/fclj/pubs/v49/no1/farrell.html>

² Howell, B. (2007). A Pendulous Progression: New Zealand’s Telecommunications Regulation 1987-2007. *ISCR Working Paper* available from

http://www.iscr.org.nz/f378,10548/10548_Pendulous_Progress_v_4_12_Nov.pdf

citing Wilson, A. (1994) *Wire and Wireless” a history of telecommunications in New Zealand 1860-1987*. Palmerston North, New Zealand: Dunmore Press.

³ <http://www.beehive.govt.nz/release/rural+telecommunications+plans+finalised>

http://www.med.govt.nz/templates/StandardSummary_296.aspx

⁴ The Kiwi Share binds Telecom to charge residential consumers no more for their local telephony connections than prevailed (in real terms adjusted by the CPI) at privatisation (forcing a continuation of the long-standing equalisation of prices between rural and urban consumers) and to offer ‘free’ local calling tariffs. In addition the Kiwi Share requires government approval for any single shareholder to own more than 10% of the company’s shares. (Howell, 2007, *ibid*).

⁵ The newly announced Rural Broadband Initiative levy does not replace the function of the TSO compensation. It is imposed on all industry participants and consequently does not create a competitive advantage or disadvantage for any specific player.

Consequently, Telecom's average cost of supply will rise to a level higher than that of its competitors, who face no obligations to serve unprofitable customers.

Indeed, competitors can accelerate the rate at which Telecom's average costs per subscriber will rise by 'cherry-picking' the most profitable customers from Telecom's existing customer base, thereby depriving Telecom of the revenues it has historically used to subsidise its high-cost customers. Telecom's competitors can choose to service only profitable geographical regions and profitable customers within those regions, and offer only profitable technological options to those customers. However Telecom must continue to provide its legacy copper-based telephony services across the whole country, and finance that national network (the costs of which are largely fixed, so do not vary greatly with varying subscriber numbers) from an ever-decreasing number of customers, even though that technology may not be the most cost-effective means of serving customers, especially those in sparsely-populated rural areas.

The following discussion explicates how selective competitive entry, Telecom's higher average cost of supply and the 'Kiwi Share' principle that urban and rural prices will be approximately equal⁶ may ultimately drive Telecom out of the urban telephony market at the same time as the universal service pricing objective is effectively undermined, to the detriment of both rural consumers and the economy as a whole. As competitors lever off the differential costs of service provision Telecom's prices must rise, granting either higher profit to competitors (and hence higher prices charged to customers) in urban areas or rendering Telecom uncompetitive in the lucrative market segments. In the former case, it is likely that there will be more investment in competitive entry in the urban telecommunications market than is efficient, to the detriment of total welfare in the sector. If the latter case prevails, the outcome will likely be a two-price equilibrium (the antithesis of universal service pricing). Initially, Telecom will serve the high-cost customers at a high price, and competitors the low-cost ones, but in the long run, technological changes will see alternative technologies replace Telecom's fixed-line services, albeit with the social redistribution obligations disadvantaging Telecom and its remaining

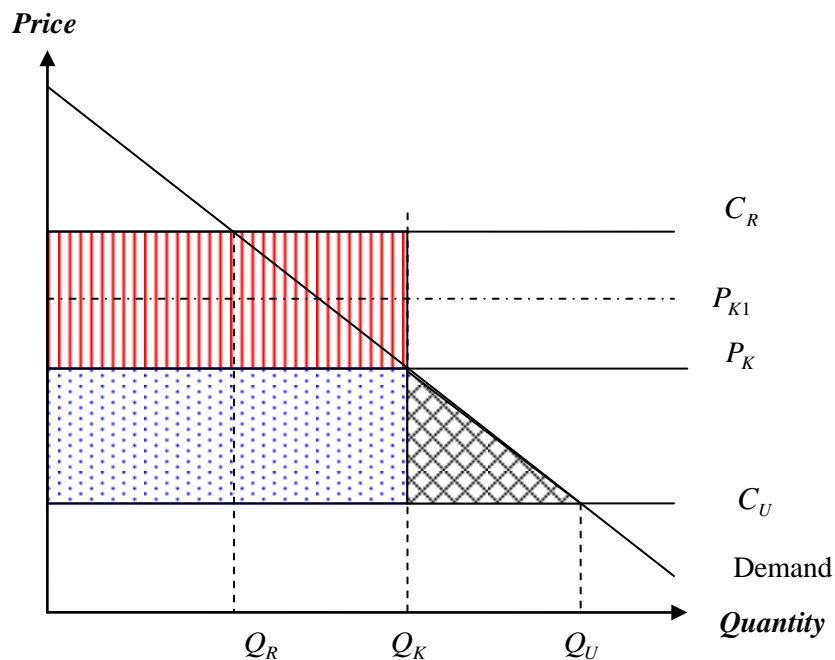
⁶ Principle 3 of the TSO Deed (which lists the Kiwi Share obligations) states "the line rental for local residential telephone service for Telecom residential customers in rural areas will be no higher than the standard residential rental" (http://www.telecom.co.nz/binaries/kiwi_share_deed_final.pdf). However it is noted that under the Kiwi Share, prices have not always been perfectly equal across urban and rural regions for two reasons: firstly, urban subscribers sometimes historically paid more than rural consumers for local calling due to the higher value conferred by a larger number of callers in the local zone; and secondly, as it has faced competitive entry, Telecom has selectively reduced tariffs in the areas where competitor networks exist in order to maintain market share.

customers relative to its competitors and their customers even in the deployment of these alternative technologies. Notwithstanding, the long-standing socially-motivated redistribution from urban to rural consumers will be undone. Neither outcome appears to serve the overall long-term interests of New Zealand consumers.

Competitive Processes and Socially-Motivated Redistributions

The fundamental ‘problem’ with the TSO revisions is that using product market pricing to deliver wealth redistributions results in substantial distortions in competitive processes when only one firm is required to set its prices to achieve the socially-motivated objectives and its competitors are not⁷. The firm undertaking the redistribution is required to charge prices higher than cost in its low-cost (urban) markets in order to subsidise the low price charged to its high-cost (rural) markets, which is necessarily below actual cost. Figure 1 illustrates.

Figure 1. The Basic Model



Presume there is one network operator, serving two customer groups – a densely-populated urban market, where the long-run incremental cost of adding a new connection is C_U , and a sparsely-

⁷ See Howell, B. (2008) Strategic Interaction Under Asymmetric Regulation: the 'Kiwi Share' in New Zealand Telecommunications. *ISCR Working Paper*. Available at: <http://www.iscr.org.nz/f467.13555/13555 ITS Strategic Interaction Under Asymmetric Tariff Regulation.pdf>.

populated rural market, with long-run incremental cost C_R . Also presume that the consumers in each area have the same demand for connections⁸. If the operator charges each customer group a price equal to cost, then Q_U connections will be sold in the urban area and Q_R in the rural area. However, if the network operator is required to charge the same price to both populations, then it will set the price at P_K . At this price it will sell Q_K connections in each area. As the profits made from selling above cost in the urban area (the blue-dotted rectangle) equal the losses incurred from selling below cost in the rural area (the red vertically-striped rectangle), the firm will break even, and the socially-motivated distribution has been achieved. In essence, the $Q_U - Q_K$ urban consumers who would have purchased had the price been at cost C_U rather than P_K , and the Q_K consumers who now pay P_K rather than C_U , lose out to the $Q_K - Q_R$ rural consumers who would not have purchased at cost C_R , but who do purchase at P_K , and the Q_R rural consumers who would have willingly paid C_R but who now pay the lower price P_K (i.e. a wealth transfer from urban to rural consumers – for example, from low-income city-dwellers to wealthy farmers and ‘lifestyle farmers’ living in rural areas but working in urban areas).

As long as the network operator faces no competition, the equalised price is sustainable. However, when the firm faces competition, equalised pricing becomes economically unsustainable for the network operator, and leads to inefficient entry decisions by competitors. Assume a second firm enters the market using the same technology as the incumbent firm. Rationally, it will enter only in the urban market, where its cost is C_U . If the entrant also charges P_K , it will take a proportion of customers off the incumbent. Assuming that the market is evenly divided at price P_K , then the entrant will take half the urban market, and hence half of the profit available (half the blue dotted rectangle), leaving the incumbent unable to fully subsidise its rural consumers (i.e. it now makes a loss, as half the funds previously transferred from urban consumers to rural consumers are now transferred instead to the competitive entrant, where they can be extracted as pure profit, as the entrant does not have to use them to meet the social transfer obligation).

⁸ In practice these demands will be different – rural consumers have steeper demand curves as their substitute communications methods are fewer and more costly than those of urban consumers. The assumption of equal demands simplifies the diagrams but does not alter the principal argument that the size of the surplus from charging above cost in the urban markets must compensate the losses incurred in the rural markets.

In order to recover the losses arising as a consequence of the cross-subsidy obligation, the incumbent must raise its prices in the urban market (e.g. to P_{K1}). Its urban prices are now uncompetitive, so it loses all of its urban customers to the entrant (which, if it continues to charge P_K , now extracts as ‘free’ profits’ the entire blue-dotted rectangle). With only rural customers remaining, the incumbent must raise its rural price to C_R (with a commensurate reduction in the number of rural consumers to Q_R). If it fails to do so, it will make losses so must exit the rural market as well, leaving rural consumers with no service provision. The resulting two-price equilibrium, with high rural prices and low urban ones, with the entrant serving all urban consumers and the incumbent all rural ones, violates the primary social objective of having equalised prices in the first place.

It is noted that a two-price outcome will also emerge if multiple entrants come into the market and compete the urban price down to C_U – the only difference being that the profits the entrants previously extracted when charging P_K are now transferred, along with the ‘deadweight welfare loss’ arising from the subsidy (the black cross-hatched triangle in Figure 1), to urban customers who now purchase Q_U connections at C_U ⁹. If the entrants charge prices any price between C_U and P_K , the incumbent firm must match it in order to receive any surplus at all from the urban market to offset rural subsidy costs (selective price reductions in markets where competitive entry occurs is not predatory pricing but a defensive reaction to normal market pressures). When the price reaches C_U there is no surplus left, and even though the urban market is divided amongst multiple entrants, rural prices must rise to C_R .

Competitiveness in the Face of Entry and Technological Change

The two-price equilibrium, where urban consumers face price C_U while rural consumers pay a higher price C_R , exposes Telecom to competition in the rural market from providers of alternative technologies whose actual costs fall below C_U (e.g. mobile, satellite and wireless). From a welfare perspective, this is a desirable outcome, as the artificial price signals sent under the ‘Kiwi Share’ price P_K mean such entry would only occur if a further explicit subsidy was provided by government (e.g. under the Rural Broadband Initiative and its predecessors such as

⁹ Thus competition increases efficiency in the overall market, albeit as a consequence of the rural consumers forfeiting the subsidy and paying their actual costs.

Project Probe). If the alternative technologies can provide the same service at lower cost, then the most efficient outcome is for Telecom to exit the rural market.

However, the Kiwi Share arrangements bind Telecom to continue providing a basic level of copper-based services¹⁰ across the entire country, regardless of the actual patterns of competitive entry it faces, in both rural and urban markets (i.e. Telecom faces a barrier to exit). Most of the costs of providing a nationwide service are fixed (e.g. maintenance of wires, costs of providing and maintaining exchanges). The more consumers Telecom loses to competitors, the smaller becomes its own customer base over which it can spread the fixed costs, and the higher the average cost per remaining subscriber will become. Even if Telecom itself chooses to provide the alternative technologies because they are more cost-effective than the current technologies, and even if it can manage the migration of consumers to the new technologies in the least costly manner, the barrier to exit it faces in respect of its legacy technology precludes it from closing the costly network at the optimal time.

The effect becomes most marked in rural areas, where the customer base is smallest. Any competitive entry in these areas resulting in defection of customers to alternative providers will thus likely cause Telecom's costs per subscriber to rise. As costs rise, so must prices, exacerbating the pattern of customer defection to other providers. Whilst Figure 1 shows an average cost per rural consumer, in practice, some rural consumers are more costly to service than others. Competitive entrants will likely enter by 'cherry-picking' the lower-cost rural market segments, as they do not have an obligation to serve the most costly consumers. Telecom's ability to cross-subsidise amongst even its existing rural consumers is thus eroded. Telecom must raise its prices to its remaining rural consumers even higher, simply to continue to meet its Kiwi Share obligations. Revenues will fall as the average costs per remaining consumer rise, leaving Telecom with only the most costly-to-serve consumers that no other provider is willing to serve.

It is noted that the 'adverse selection' problem induced by the combination of the elimination of TSO compensation and technological substitution is not limited to rural areas. Telecom must continue to provide copper services in urban areas, even though consumers no longer purchase their telecommunications services from a copper-based provider (i.e. Telecom and its unbundling and wholesale customers). Technological substitution (e.g. from copper to wireless-only or fibre

¹⁰ While the Kiwi Share obligation allows Telecom to use "use any method or any technology in providing the services it is obliged to provide", the requirement to provide for voice, fax and dialup internet calls constrains the use of options other than fixed-line copper.

households) will lead to an increase in the firm's urban costs as well. As long as the Kiwi Share obligations remain in place, Telecom must continue to provide an option for consumers to connect to copper technologies, even though many consumers have willingly substituted to alternative technologies. The provision of this option is not costless – and in the absence of any compensation it is borne by one firm and its ever-decreasing number of customers (many of whom have no choice but to bear these costs as they cannot easily substitute to alternative technologies simply because they are not economically viable in some market segments), while the benefits are accrued by consumers of alternative technologies (they can revert to using Telecom's copper connections at any time – for example, if their alternative technology provider fails and exits the market). These arrangements appear neither efficient nor equitable. They violate principles of competitive neutrality and result in an effective reverse subsidy from Telecom's remaining (predominantly rural) customers to (predominantly urban) customers of its competitors.

Correcting with a TSO 'Tax' in a Competitive Market

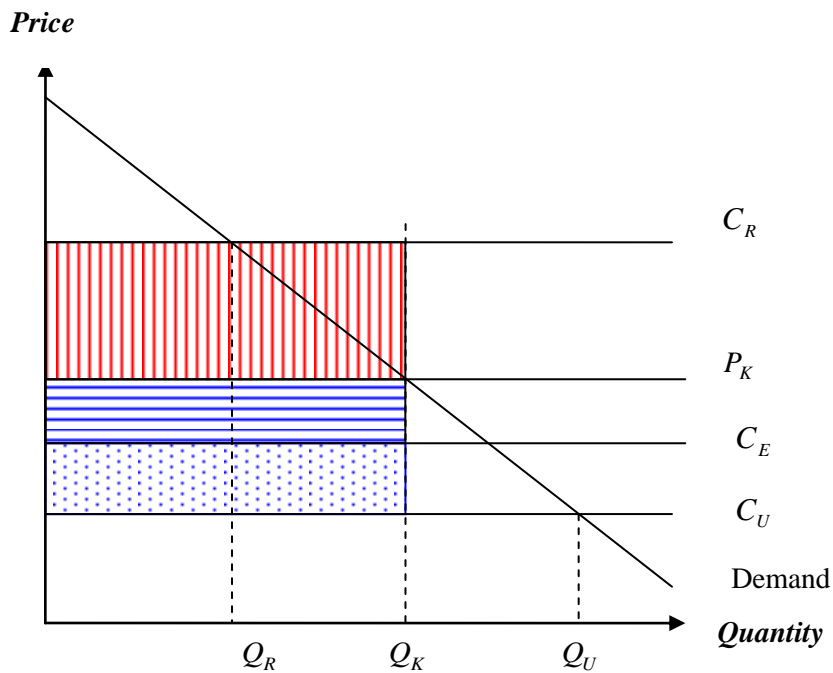
If policy-makers still wish to retain equalised pricing in the face of competitive entry, with limited distortion in the incentives for entry that might be otherwise inefficient (i.e. by entrants with costs higher than the incumbent), then the 'solution' is to tax the profits (above costs) that entrants extract from entering the urban market and pay this to the incumbent to offset the cross-subsidy revenues lost as a consequence of competitive entry¹¹. This is precisely what the compensation provision in New Zealand's Telecommunications Service Order (TSO), instituted in the Telecommunications Act 2001, was designed to achieve.

Each year, the Telecommunications Commissioner has assessed the size of the subsidy required to maintain equalised urban and rural charges at no more in real terms than the 'Kiwi Share' price agreed when Telecom was privatised in 1990. The amount has varied between \$40 million and \$90 million. This cost has then been apportioned amongst all market participants (including Telecom) based upon their shares in each of the contested markets. The effect has been to take from the entrants in taxes the equivalent of the profits Telecom would have earned in the urban markets without entry (i.e. the entrants' share of the blue dotted rectangle in Figure 1) in order to ensure that Telecom can maintain the rural price at P_K . Thus neither Telecom nor the entrants

¹¹ Armstrong, M. (2001). Access pricing, bypass and universal service. *The American Economic Review*, 91(2): 297-301.

can afford to compete the urban price down below P_K (i.e. shrink the size of the blue-dotted rectangle), as they would not have the funds available to pay either the subsidy (Telecom) or the requisite TSO tax. The TSO tax thus maintains universal service pricing, even with competitive entry¹². As the TSO tax was calculated annually, it enabled factors such as the rising costs to Telecom as consumers substituted to new technologies to be taken into account, and potentially would have enabled compensation to have been awarded for the costs of the option Telecom must offer all New Zealanders to be able to connect to a copper network.

Figure 2. Competitive Entry-Urban ($C_E > C_U$)



The TSO tax also performed another crucial role in ensuring that firms whose cost structure is higher than Telecom's do not inefficiently enter the urban market. Assume that an entrant has a cost in the urban market of $C_E > C_U$ (Figure 2). If the entrant charges P_K , and takes half the market from Telecom, it receives profits of only half the blue horizontally-striped rectangle, rather than half the blue dotted rectangle in Figure 1. Absent the TSO agreement, the competitor would be able to extract the sum as pure profits, even though its profit is only half what Telecom

¹² It is acknowledged that there are high transaction costs associated with the current TSO compensation scheme (Howell, 2007). The authors contend that these transaction cost issues are better dealt with via changes to the scheme (for example the use of simpler proxies in the determination of compensation) rather than abolition of the scheme.

would have made if it served the customers the entrant takes. Whereas an entrant with Telecom's cost structure has actually earned profits equivalent to what Telecom would have earned, and can therefore meet the TSO tax obligation, the higher-cost entrant cannot. Under the TSO tax, the higher-cost entrant would be levied a tax obligation equivalent to half the blue dotted rectangle in Figure 1 – more than it stands to gain from entry. The presence of the tax obligation should thus dissuade an entrant with higher costs than Telecom entering the market in the first place¹³. If the tax is not levied, then the firm can still enter, but total profits (and hence welfare generated from the market) are less than if Telecom (with its lower cost) had continued to served the whole market. Such entry is thus leads to lower efficiency and a net detriment to the economy in aggregate.

Consequences

The implications of removing the TSO tax obligation from Telecom's competitors should now be obvious. Competitors will selectively enter the urban market (and those with higher costs than Telecom who previously refrained will now enter) and the urban price will be competed down to C_U . Telecom must raise the rural price to C_R , regardless of whether or not it stays in the urban market, ending the 130 year tradition of universal service pricing in New Zealand telecommunications services. The welfare effects are twofold: entrants using their own technologies will be able to enter the urban market, even though this may be more costly than Telecom continuing to serve customers; and any such entry reduces the scale effects available to Telecom from serving the larger market, raising Telecom's costs faster than under the counterfactual of efficient entry

Ironically, under wholesale reselling and unbundling obligations introduced in 2001 and 2006 respectively, some of the competitors to whom Telecom will lose customers (and who now do not have to pay a TSO tax) will actually be providing services using Telecom's own infrastructure. Whilst competition from other technologies will lead to decreases in scale for Telecom and inevitable increases in the cost of the (regulated) services Telecom is required to provide to its competitors, the absence of the social obligation on entrants means Telecom will always face higher costs than its unbundling and wholesale competitors to serve otherwise equivalent retail customers in its own exchanges.

¹³ Albeit that in practice, the tax was levied ex post, so the firm had to estimate ex ante what its likely TSO obligation would have been in order to make the decision about whether entry was likely to be profitable after the tax was paid (Howell, 2007).

Moreover, the inevitable ‘cherry-picking’ by entrants of lucrative consumers, leaving Telecom with a disproportionately large share of the more expensive telephony consumers, is exacerbated by the mandatory continuation of the ‘free local calling’ obligation. Telecom’s mandated ‘free local calling’ tariff results in a monthly charge for fixed line telephony services of around \$47 per month, regardless of the number of calls made or the length of those calls. This has led to very high levels of dial-up internet usage in New Zealand, with data traffic substantially exceeding voice traffic for most dial-up consumers¹⁴. When dial-up internet users substitute to broadband, their dial-up usage falls dramatically. Even though the cost of calling is small compared to the fixed costs of connection, it is still positive, with more minutes of usage leading to higher total costs of providing the traditional (Public Switched Telephone Network – PSTN) services. On average, therefore, broadband internet users will have lower demands on the PSTN than dial-up internet users. Furthermore, it is cheaper for broadband internet service providers to deliver fixed line voice telephony services using Internet-Protocol services than via traditional exchange-based PSTN services.

As long as Telecom must provide a flat-rate, free local calling option as part of the ‘Kiwi Share’, its price for this service becomes the benchmark for what other providers can charge for an equivalent service, regardless of the technology over which the service is provided. Telecom’s competitors face strong incentives to attract a disproportionate share of consumers whose PSTN (traditional voice telephony) demand is lower than average, in order to procure the full Telecom-equivalent monthly line rental for lower average servicing costs. Telecom will thus likely be left with a disproportionately large share of the more costly high-demand PSTN consumers. The higher average costs of Telecom’s remaining users also impede the firm’s ability to earn profits to subsidise rural consumers, further accelerating the pace of change towards a two-price equilibrium. This further exacerbates the urban-rural problem as, due to geographical and technical constraints limiting the extent to which rural consumers can access DSL technologies, a larger proportion of rural users are also dial-up internet users.

¹⁴ i.e. those who have not already migrated to broadband

Conclusion

In summary, the removal of the TSO tax obligation by the Minister supports none of the objectives of promoting a level competitive playing field in the New Zealand telecommunications market, encouraging efficient and appropriate entry decisions by owners of alternative and newer frontier telecommunications infrastructures or socially-motivated distributions aimed at equalising telecommunications prices throughout the country. Rather, the policy pushes in the diametrically opposite direction of all three of these aspirations, with especially costly consequences for Telecom and those of its remaining customer base with few options to substitute to other providers or technologies.

Of course, it is quite possible that policy-makers are cognisant of the likely systemic effects of removing the TSO tax, and would actually prefer a rural-urban price bifurcation, as described above, to emerge ‘naturally’, than to confront the inevitable political consequences of explicitly removing the long-standing cross subsidy from urban to rural users. However, if this is the intention, it comes at the expense of distorting the allocation of consumers amongst market participants, with substantial negative consequences for Telecom, distortions in the investment incentives faced by providers of alternative technologies, and likely a less efficient outcome overall for the industry than under the counterfactual of retaining a TSO tax instrument. It would also be mendacious to portray the mechanism ultimately leading to the dismantling of equalised pricing as part of a ‘universal service obligation’ policy.

In the final analysis, universal service pricing obligations are an object of politically-motivated social policy delivery that sits somewhat uncomfortably in a market where predominantly private sector operators compete. To impose the obligation on one firm alone is distorting enough in its own right, but selective use of a TSO-type tax to compensate the encumbered firm for the additional costs it must bear can militate against some of the worst distortions that emerge, for both the firm concerned and the efficiency of the market. To impose the obligation, but deny the encumbered firm any compensation would appear not only unduly punitive to the firm concerned, but also unwise as the competitive distortions and further inequalities that will likely emerge may not be easily remediable.