



Mobile in South Africa – contributing to improved economic and social outcomes

A Report for Vodacom

8 September, 2005



CONTENTS

Executive Summary.....	2
1 Introduction	5
2 ICT, Economic Growth and the Role of Mobile.....	7
2.1 Developed country evidence regarding ICT use and growth	7
2.2 ICT and economic growth in South Africa	8
3 Performance of the Mobile Market.....	11
3.1 Objectives of the Telecoms Act 1996.....	12
3.2 Economic outcomes	13
3.3 Health of the sector	21
3.4 Social and distributional objectives	23
3.5 Conclusion.....	25
4 When is Regulation Appropriate?.....	27
4.1 Introduction.....	27
4.2 Competition assessment	28
4.3 Identify possible remedies	39
4.4 Cost benefit assessment	40
5 Implications for Regulation.....	42
5.1 Introduction.....	42
5.2 Licensing an additional operator.....	42
5.3 Retail price regulation.....	43
5.4 Regulation of call termination	46
Appendix A: Competitive developments: Vodacom initiatives and responses.....	48
Appendix B: Potential sources of bias in assessing profitability and in cost modelling.....	55
Appendix C: Unintended consequences – the interaction of asymmetry and uncertainty	60
Appendix D: Legend for Abbreviations in Figure 2.....	64



Executive Summary

Mobile is doing a good job in providing what the market wants

- Mobile penetration is at 50% and continuing to grow rapidly above 25% p.a.¹
- Relative to income per capita the performance of mobile in South Africa is exceptional by international standards. Mobile penetration rates in South Africa are 60% above what would be expected based on South African incomes.

In this report, we show that mobile is doing a good job of achieving many of the objectives of the Telecommunications Act. Prices should not be the only criteria for assessing markets, as is recognised by the 19 objectives of the Act.

High levels of use mean mobile is making a substantial contribution to the South African economy.

- Use of mobile phones makes businesses more efficient and allows them to reach more customers. Use of mobile phones helps individuals save travel time and costs, undertake job search and maintain family relationships
- An extra ten mobile phones per 100 people in a typical developing country increases GDP growth by 0.6 percentage points
- For South Africa to benefit from international outsourcing of business processes good fixed international call and data services are the primary requirement. But mobile has a limited role, if any, to play in this regard.

Mobile operators have provided innovative tariff offerings and pre-pay tariffs are low by international standards

- Per second billing, subsidised pre-pay starter packs at R3.50, and “Call-me” and “Call sponsor” – a world first – have substantially lowered the costs of mobile ownership and use for low income consumers.
- Vodacom’s 4U Pre-Paid tariff plan ranks 13th out of 61 operators in the OECD.

There is vigorous competition in the retail market

- The extent of tariff innovation and the recent market changes in tariffs are indicative of a competitive market
- Access to mobile network infrastructure has been provided voluntarily on commercial terms, and exclusive arrangements in relation to distribution channels were removed by Vodacom when Cell C entered the market. These are further indications of a healthy competitive market.
- The provision of high levels of coverage (96% of the population) and the supply of community telephone services in excess of levels required by licence obligations also indicate operators are competing vigorously for customers
- Fixed services, VoIP and new wireless services such as WiFi and nomadic broadband wireless access could offer significant competition to mobile services

¹ EMC Cellular Database, August 2005



Call termination also faces competitive pressures

- The Call Sponsor service gives users the choice of receiving party pays (RPP) in addition to the standard calling party pay (CPP) option. RPP means subscribers directly face the cost of terminating calls on their chosen network and so they are more sensitive to the level of termination rates than under CPP.
- The cost to terminate a call on fixed networks is lower than that on mobile networks in South Africa, just as it is around the world, because of differences in network cost levels and cost structures. The ratio of mobile to fixed call termination rates in South Africa is low by international standards – a factor of five compared to fifteen in Europe.

The mobile market is already heavily regulated

Any extension of regulation needs to take account of the fact that the mobile sector in South Africa is already heavily regulated. In particular, operators

- Interconnect with other licensees on non-discriminatory terms and conditions
- Must provide COA/CAM reports which effectively require full cost accounting separation at the wholesale level
- Retail tariff plans are subject to a CPI price cap

In addition, mobile carrier pre-selection and number portability have been proposed, though are not yet implemented.

Future regulation of the mobile sector should be based on sound market and competition analysis

To determine whether regulation is required or not telecoms regulators are increasingly use tools derived from competition policy analysis. This involves the following three steps

1. **Competition assessment:** The relevant economic market must first be defined. Then an assessment of whether any operator in the market is dominant and is likely to or has abused its dominant position is necessary. If no operator is dominant (and operators are not jointly dominant) then regulatory intervention need not be considered. If an operator is found to be dominant and has or is thought likely to abuse this position then remedies need to be identified.
2. **Identify possible remedies:** A range of alternative actions should be identified taking account of market circumstances and international experience. The alternatives should include the option of waiting, particularly given the rapid changes in telecoms markets.
3. **Assess costs and benefits of alternative remedies:** The costs and benefits of all possible regulatory options (including no regulation) need to be assessed to measure the extent to which the remedies meet the objectives of regulation, and considering explicitly any trade-off between objectives. The analysis of costs and benefits should also consider in detail the complexities that arise from the dynamic nature of communications markets and the uncertainty of market outcomes. As a general rule, any regulation applied should be proportionate and the minimum necessary to address the identified market abuse.

Examples of countries where this approach has been adopted include Australia, Canada, the European Union, Hong Kong, Malaysia, New Zealand and the United States.



Regulation of call termination would undermine social objectives

In developed countries, regulation of call termination has been justified in terms of the fact that it removes an unfair subsidy from fixed to mobile users. In developed countries people who are fixed only customers tend to be poorer/older than the rest of the population. This is not the case in South Africa where a possible cross subsidy from relatively wealthy fixed/mobile customers to poorer mobile only customers is likely to be viewed as desirable.

Regulation of call termination rates could have the following adverse impacts

- Low income individuals would be less able to afford mobile services since termination revenues would no longer support otherwise marginal customers
- Maintenance and extension of services in rural areas might no longer be profitable.

Given that commercial arrangements have worked well and led to pro-poor innovations, any proposed intervention should be carefully assessed in relation to its possible distributional impacts.

In deciding whether to licence a fourth operator or regulate tariffs there are important trade-offs to consider

Regulation is an imperfect substitute for competition. Competition promotes consumer welfare by offering choice, variety, attractive prices and innovation; whereas regulation is often associated with lack of choice, uniformity, high costs and disincentives to innovate. In addition, it is increasingly recognised by regulators (e.g. in the UK and the US) that infrastructure competition has the potential to offer more benefits than service based regulation. Service based competition in which competitors do little more than resell the incumbent's services fails to provide the benefits of innovation and service variety.

This suggests that if there is a problem of monopoly abuse in the mobile market then licensing an additional operator may be the best way forward. In deciding whether to licence a fourth operator the trade-off between the competitive benefits from having one or more additional operators, the sustainability of competition (e.g. impact on Cell C and USALs) and the implications for industry costs will need to be considered. However, as noted above a full market analysis would first be required to establish whether there was a problem of monopoly abuse and then to assess remedies using a cost benefit test.

Similar trade-offs apply when considering additional regulation of retail charges. Consumers and some service providers may benefit in the short term. But in the longer term such regulation could

- harm the prospects for further market growth by reducing supplier incentives to grow the market
- reduce incentives to supply services to marginal low income consumers and higher cost rural consumers.
- jeopardise the financial viability of Cell C and USALs thereby undermining competition.

A careful assessment of any proposed intervention against the objectives of the Telecommunications Act 1996 and against relevant experience elsewhere is therefore called for. Policies which continue to support innovation in the market and high and growing levels of coverage and penetration are most likely to further economic growth, distributional and empowerment objectives.



1 Introduction

In Gazette notice 1327 “Review of Mobile Prices” published on 28 July 2005, ICASA argues that retail prices for mobile services in South Africa are too high and that regulatory intervention is justified to reduce prices. In making its case ICASA

- Assumes that the relevant market is the market for mobile voice services (pages 6 and 7), although there is reference to competition from VoIP
- Notes that Vodacom and MTN each have a large share of this market
- Presents information on price changes over time, from which it concludes that competition is not effective despite the licensing of a third operator
- Presents information on prices as compared with selected other countries and from this concludes that prices in South Africa are not cost reflective
- Presents recent profits data for the operators which it suggests indicate that prices are not cost reflective
- Notes the general economic importance of mobile telephony and the role it can play in reducing the “digital divide”, and suggests this gives further reasons for reducing retail mobile prices.

This report assesses the case made by ICASA based on evidence supplied by Vodacom and collected from published sources. We have not undertaken a rigorous analysis of the market according to competition policy principles or a full appraisal of ICASA’s regulatory proposals, but we have indicated what such an analysis should involve and the factors that should be taken into account by ICASA.

In Chapter 2 we first discuss the role of mobile services in contributing to overall economic development and the well-being of all South Africans.

Next we set developments in the mobile market in context by evaluating the performance of the sector against ICASA’s objectives under the Telecommunications Act 1996 (Chapter 3). We suggest that ICASA’s focus on price neglects other important criteria for judging the success of the market as is recognised by the 19 objectives in the Telecommunications Act. For example, mobile networks have delivered access to communications services to an extent that has exceeded operator expectations, and exceeds levels in most other countries given the level of GDP per capita in South Africa. These are not outcomes that would be expected in a poorly performing market. Possible future regulatory intervention in the mobile market should be considered against this baseline.

In Chapter 4, the conditions under which regulatory intervention might be justified to address competition concerns are set out. The general approach to analysis of issues is described with reference to international best practice. In addition, we discuss some of the complexities that can arise when applying a standard regulatory framework to the telecommunications sector. In such cases regulatory intervention may, indeed, and typically does, have unintended consequences. Such unintended consequences arise because factors such as costs, likely consumer responses and likely supplier responses are only known very approximately. Possible future market developments will also only be known approximately – the unanticipated growth of mobile and the internet both being good examples.



In Chapter 5, we comment on ICASA's regulatory proposals and discuss the trade-offs that need to be considered when assessing the case for further regulation or licensing a fourth operator.



2 ICT, Economic Growth and the Role of Mobile

“Plenty of evidence suggests that the mobile phone is the technology with the greatest impact on development. A new paper finds that mobile phones raise long-term growth rates, that their impact is twice as big in developing nations as in developed ones, and that an extra ten phones per 100 people in a typical developing country increases GDP growth by 0.6 percentage points.”

The Economist, 10 March 2005

Mobile access and use generates direct benefits for customers, but is also part of a wider story in terms of the benefits that Information and Communications Technology (ICT)² can bring in terms of growth, jobs and new opportunities for individuals and communities.

We consider the evidence in relation to ICT and economic performance generally (which is clearest in some, but by no means all developed economies), the role that ICT – and mobile in particular - can play in economic growth and development in South Africa. This evidence shows that

- access to and use of mobile services can raise significantly long term GDP growth rates
- use of mobile phone services increases the efficiency of businesses and helps individuals to reduce travel time and costs, to improve their ability to find a job and to maintain family relationships
- unnecessary regulation can inhibit the development and extension of ICT network services and the productive use of ICT.

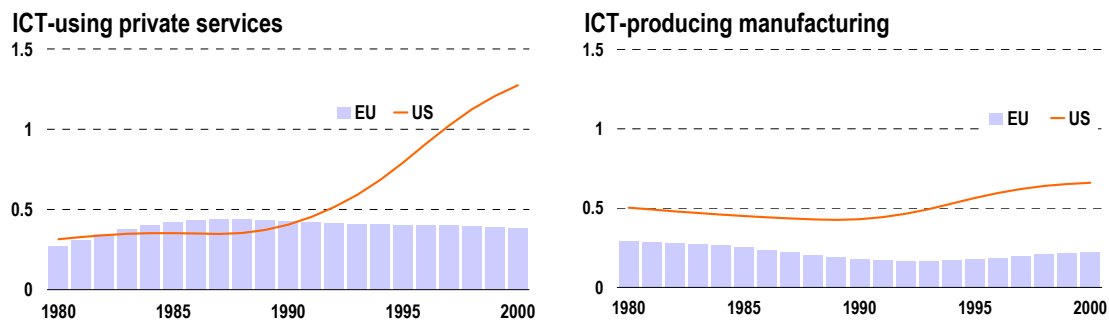
2.1 Developed country evidence regarding ICT use and growth

The benefits of ICT have shown up most clearly at the macro-economic level in some developed economies, but not others. For example, ICT is estimated to have contributed 80% of US productivity growth between 1996-2000 leading to an acceleration in economic growth (IMF, 2004). The contribution of ICT to productivity growth tends to be the focus of studies since productivity growth is the only long term source of per capita income growth, and also supports employment growth for the economy as a whole. Figure 1 shows this contribution for the US and the European Union (EU).

² ICT comprises computer hardware, computer software, computer services, telecommunications equipment and telecommunications services. Telecommunications generally comprises over 50% of the ICT sector when measured in terms of end user spend.



Figure 1 Contribution to total change in labour productivity growth from ICT in the EU and the US



Source data: Directorate-General for Economic and Financial Affairs, European Commission (February 2005)

ICT clearly has the potential to make a very large contribution to productivity growth, and in turn GDP growth, though only if the environment is right. The contributions from ICT production and use in the EU and US differ greatly, particularly from the mid-1990s on, though the ICT sectors themselves are approximately the same size in both economies at around 6% of GDP. The key difference between the US economy and the EU appears to be economic flexibility, and the extent of investment in communications networks. These lessons are also likely to be relevant in developing countries. In short, unnecessary regulation can inhibit the development and extension of ICT network services and the productive use of ICT.

As the OECD (2004) noted, having a large ICT sector is neither necessary, nor sufficient, to achieve high productivity growth:

“Several countries ... that are characterised by high ICT investment and use, as well as high ... productivity growth, do not have a large ICT sector. In addition, one or two countries that do have a large ICT sector have not been among the high growth countries of the 1990s.”

The largest payoff from ICT has been in the intensive ICT-using services sectors such as finance, wholesale trade and retail trade. Countries do not need to be substantial ICT producers to reap these benefits, though the development of communications network infrastructure is a key enabler. Some countries have however benefited substantially from the production of ICT manufacturing and services, for example, Ireland, Hungary and India.

2.2 ICT and economic growth in South Africa

ICT is increasingly seen as a key enabler of economic growth in developing economies.³ The use of ICT by all sectors of the economy has the potential to contribute to growth and employment in South Africa.

South African consumers can buy computer hardware and software from global suppliers, but they must buy the telecommunications component of ICT locally. This component is

³ Regulatory Reform as a Tool for Bridging the Digital Divide, OECD, 2004



substantial and in most developed countries it represents over 50% of end user spend on ICT.⁴ So the quality and reach of local telecoms networks is important.

Fixed line communications has developed slowly in all markets, taking over a century to reach near universal service levels in developed countries. Where fixed line communications have been relatively under-developed when mobile services were introduced, fixed communications have been rapidly overtaken, for example in Africa and Eastern Europe. Mobile is increasingly seen as the technology likely to have the greatest near term impact on development.⁵

A recent paper finds that mobile phones raise long-term growth rates, that their impact is twice as large in developing nations as in developed ones, and that an extra ten phones per 100 people in a typical developing country increases GDP growth by 0.6 percentage points.⁶ Not only has mobile growth been linked to national income growth in cross country studies, but there is also evidence that mobiles have produced significant benefits for small businesses and disadvantaged groups within South Africa. For individual users, use of a mobile phone resulted in savings in travel time and costs, improved job search and improved contact with family and friends. In the case of business users, use of a mobile phone helped save costs, reduced travel time, improved sales (by being in contact with clients all the time) and allowed better deployment of resources.⁷

There is also a view that South Africa is well placed to benefit from the trend of firms shifting business processes, such as customer care and payroll administration, to cheaper locations. This, says McKinsey, could create 100,000 jobs in South Africa as well as attracting \$90m-175m in foreign investment by 2008.⁸ However, these services are primarily dependent on good fixed telecoms services. The Economist notes that:

“As well as speaking English and being in a time zone close to Britain's, South Africa offers sophisticated insurance and banking sectors; a (modest) pool of qualified people; well-developed telecom and IT infrastructure; and good business services. British and American firms could cut the cost of some services by 30-40% by providing them from South Africa. That is why IBM has decided to open a global call-centre for international corporate clients in Johannesburg. Merchants, a subsidiary of Dimension Data, a South African IT firm, runs a call-centre for a big international media and communications company.

Yet much needs to be done if South Africa is to win a lot more business from abroad. There is no lack of competitors, from India to Malaysia and Singapore. South Africa has yet to market itself well as an offshoring centre. Other countries offer bigger investment incentives and make setting up shop far easier. The body that represents call-centres, the South African Contact Centre Community (SACCOM), lacks the

⁴ P74, “Achieving the Lisbon Agenda: the contribution of ICT, Indepen and Ovum, A report for the Brussels Roundtable, January 2005.

⁵ Economist, 13 May 2004. http://www.economist.com/displaystory.cfm?story_id=2670587

⁶ Waverman et al note in relation to South Africa that while real incomes declined over the period 1980-2003, the regression analysis implies that the income decline would have been 0.3% per annum greater had it not been for the relative success in terms of mobile penetration. “The impact of telecoms on economic growth in developing countries, L Waverman, M Meschi and M Fuss, March 2005

⁷ “Mobile communications in South Africa, Tanzania and Egypt: Results from community and business surveys”, J Samuel, N Shah and W Hadingham, March 2005

⁸ The Economist. 25 August 2005. “Into Africa – can South Africa ride the outsourcing and offshoring wave?” http://www.economist.com/displaystory.cfm?story_id=4324938



resources to drive the development of the sector—in sharp contrast to, say, India's highly effective NASSCOM.

South Africa is also far pricier than the likes of India and the Philippines. Labour regulations are too rigid, raising the cost of doing business. The staggering price of telecoms is an even bigger problem. According to Genesis Analytics, a consultancy, a firm in South Africa will pay over nine times more than one in Singapore for ADSL broadband internet service, almost twice as much as in Malaysia for a domestic leased line, and 11 times more than in India for a local call. An international phone call costs 70% more from South Africa than India; leasing an international line to America costs ten times more.”

The problems identified do not relate to the mobile sector, but to international call and data services and the fixed line market. Mobile has a limited role, if any, to play in this regard.



3 Performance of the Mobile Market

“The wireless market is generally in good shape. Despite limited regulatory intervention, real competition exists, and this has led to real choice for consumers. South Africa’s MNOs are delivering significant social benefits for the country, both in terms of the services they offer and the employment opportunities they created.”
Yankee Group, December 2003⁹

Any intervention in the mobile market must promote the objectives of the Telecommunications Act. An assessment of the performance of the market against the objectives of the Act is therefore a necessary step in deciding whether any further intervention or relaxation of existing regulation is appropriate. In this Chapter, we undertake such an assessment, grouping the objectives under three main headings: economic outcomes, health of the sector and social and distributional objectives. We conclude that the mobile sector is doing a good job of achieving the objectives of the Telecommunication Act.

Economic performance

- Access to and use of mobile services can significantly increase long term GDP growth rates. Survey evidence from South Africa shows that use of mobile phone services increases the efficiency of businesses and helps individuals reduce travel time and costs, improve their ability to find a job and maintain family relationships (see Chapter 2).
- The performance of the sector is exceptionally good when measured in terms of mobile take-up and use relative to other countries with similar or higher incomes.
- There is a wide range of innovative tariffs on offer and pre-pay tariffs for low users are low by international standards (i.e. when compared with OECD countries). Telecommunication services have developed in a manner that is responsive to the needs of consumers.
- The mobile market in South Africa is subject to healthy competition at the retail level and in call termination. Overall retail competition will increase further with the removal of requirements to use Telkom leased lines from February 2005, and the licensing of a second fixed line operator. In addition, emerging technologies and services such as WiFi, VoIP, and broadband wireless access (e.g. WiMAX), could in future increase competitive pressures in the market.

Health of the sector

- Profitability of the mobile sector overall is good with Vodacom and MTN profitable and Cell C expecting to make an operating profit by the end of 2005.
- Network investment is strong. Vodacom’s cumulative capital expenditure reached more than R20bn by the end of the 2005 financial year. Capital expenditure for the year end March 2005 was R2.7bn and is expected to increase further in the next financial year.
- The stable development of the sector depends importantly on having a predictable regulatory regime. It is important that when developing its policy in respect of the mobile market ICASA seeks to encourage efficient entry by infrastructure and service providers so that competition is sustainable.

⁹ “South African Communications, 2002-2008: Market Review and Analysis, Yankee Group for the Department of Communications, South Africa, December 2003



Social and distributional objectives

- Economic growth arising from the efficiency gains provided by the use of mobile phones increases the size of the “cake”, enabling redistribution and development objectives to be supported. In this way mobile indirectly supports social and distributional objectives.
- A wide range of social and distributional objectives have also been met directly by the mobile sector through
 - The introduction of innovative tariffs which have given low income consumers access to mobile phone services
 - Coverage levels of 96% (of the population) greatly exceeding licence obligations (70% coverage)
 - The provision by Vodacom of 26,000 community telephones at a discounted rate of R0,90 per minute, again exceeding the obligation of 22,000 phones.
 - The “Call Sponsor” package which allows post-paid customers pay for calls made by pre-pay customers.

The universal fund to which operators contribute 0.2% of turnover also has the potential to extend mobile services to unserved groups.

3.1 Objectives of the Telecoms Act 1996

The primary objective of this Act is to provide for the regulation and control of telecommunication matters in the public interest. There are 19 objectives under the Act to achieve the primary objective. These objectives are mutually reinforcing in many respects, but may also involve conflicts in practice. For example, encouragement of investment and innovation in the industry is best achieved through a liberal regime in which firms have pricing flexibility and can freely enter and leave the market with minimal if any regulatory intervention (e.g. minimal licensing requirements). Such an environment may not best promote certain social objectives, such as universal service and ownership and control by persons from historically disadvantaged groups. Hence the right balance between potentially conflicting objectives needs to be found based on a thorough examination of the consequences for each objective of possible regulatory interventions.

To help structure our discussion we group the objectives into three broad areas; economic outcomes, health of the sector, and social and distributional objectives as follows (with the alphabetic prefix given in the Act shown in brackets):

Economic outcomes

- promote the provision of a wide range of telecommunications services in the interest of the economic growth and development of the Republic (b);
- encourage investment and innovation in the telecommunication industry (d);
- promote the development of telecommunications services which are responsive to the needs of users and consumers (f);
- ensure fair competition within the telecommunications industry (j);
- protect the interests of telecommunications users and consumers (m);
- ensure efficient use of the radio frequency spectrum (p);



Health of the sector

- encourage the development of a competitive and effective telecommunications manufacturing and supply sector (e);
- ensure compliance with accepted technical standards in the provision and development of telecommunication services (i);
- promote the stability of the telecommunications industry (k);
- encourage the development of human resources in the telecommunications industry (n);
- promote and facilitate convergence of telecommunication, broadcasting and information technology (r);

Social, distributional and empowerment objectives

- promote the universal and affordable provision of telecommunication services (a);
- make progress towards the universal provision of telecommunication services (c);
- ensure that, in relation to the provision of telecommunication services, the needs of the local communities and areas are duly taken into account (g);
- ensure that the needs of disabled persons are taken into account in the provision of telecommunication services (h);
- encourage ownership and control of telecommunication services by persons from historically disadvantaged groups (l);
- promote small, medium and micro-enterprises within the telecommunications industry (o);
- promote the empowerment and advancement of women in the telecommunications industry (g);
- develop the Information, Communication and Technology (ICT) strategy for the Republic, in order to bridge the digital divide (s).

3.2 Economic outcomes

Achieving good economic outcomes involves meeting consumer interests and contributing to economic growth and development through investment and innovation, efficient spectrum use and competition. In Chapter 2, we provided evidence of the ways in which mobile contributes to economic outcomes through income growth. In this section, we consider the take-up of mobile services, pricing and competition.

3.2.1 Mobile take-up

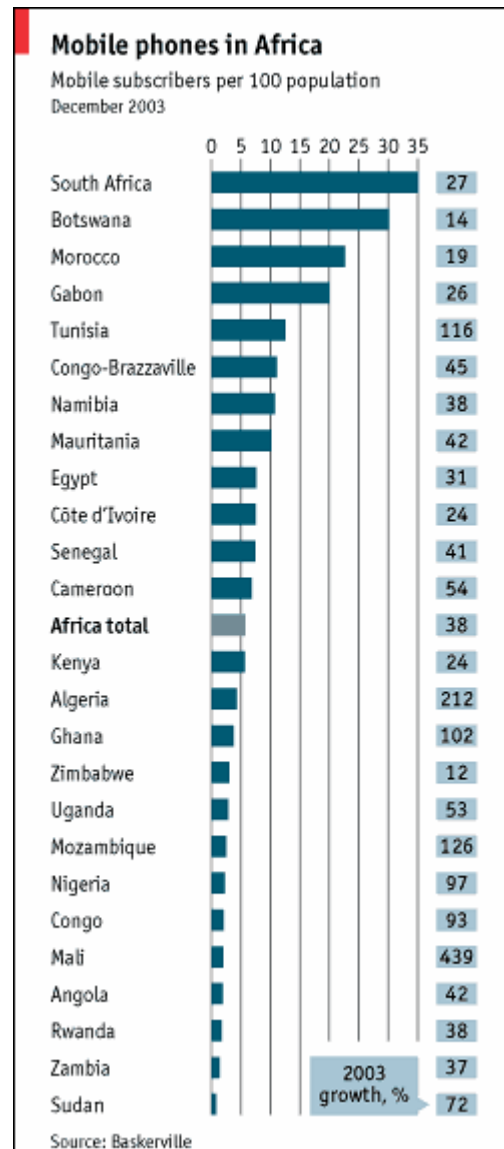
Arguably a key indicator of the performance of the mobile market and the benefits to the economy as a whole, is the number of mobile subscribers. If services are of poor quality or over priced, consumers will not use them, hence take-up is a good indicator of a successful market and of the responsiveness of service providers to the needs of consumers.

The high take-up of mobile in South Africa implies that the overall combination of service quality and coverage, pricing and tariff offers are relatively attractive to consumers compared to the overall service available in other countries with similar or higher per capita income levels to those in South Africa. (See Figures 2 and 3 below). This conclusion is even stronger



given South Africa has high levels of inequality, yet mobile penetration has reached over 50% on a population basis.¹⁰

The following figure from the Economist shows that South Africa has exceptionally good mobile penetration relative to other African countries.



Source: The Economist. 13 May 2004. http://www.economist.com/displaystory.cfm?story_id=2670587

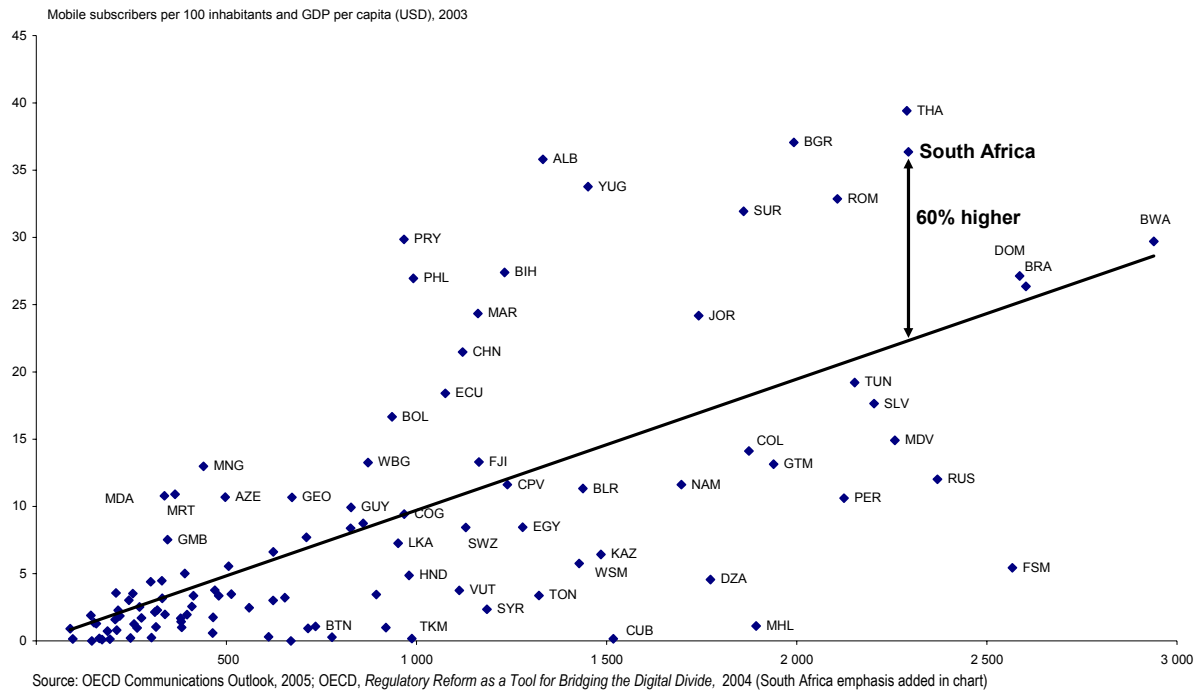
Penetration is a good indicator of the contribution of the sector for several reasons. First, use of ICT, including mobile services, is a key driver of overall economic benefits (see Chapter 2). Second, high penetration implies that the combination of availability, service bundles and service quality meet individuals' needs. Third, high penetration implies that a wide cross section of individuals have access to mobile services either through handset ownership or access to a handset.

¹⁰ South Africa has a high level of inequality as measured by the Gini coefficient. See OECD. July 2005. "Africa Economic Outlook – Country Study for South Africa." <http://www.oecd.org/dataoecd/41/41/34873439.pdf>



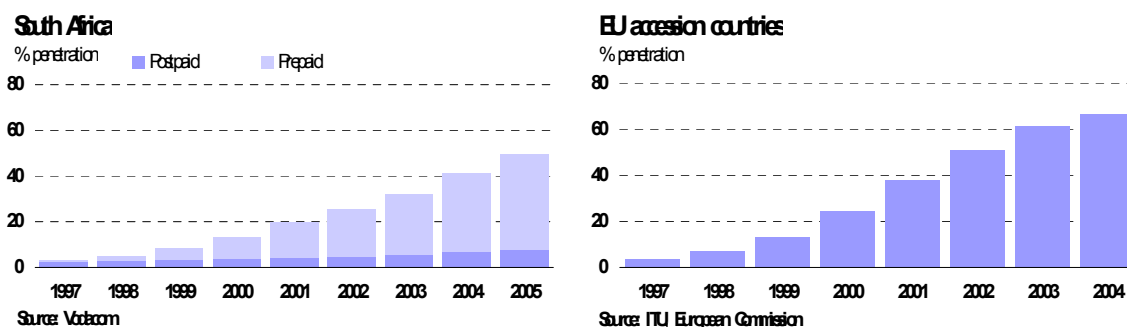
One factor that may explain such different outcomes is national income. However, Figure 2 shows that relative to income per capita South Africa has performed well. As can be seen, South African penetration is 60% higher than the level that would be expected based on its income per capita.

Figure 2: Mobile penetration rates and income per capita¹¹



Penetration in South Africa has also continued to grow, and has reached levels only a little short of those in European accession states, where the median per capita income is approximately twice that in South Africa (see Figure 3 below)

Figure 3: Mobile penetration in South Africa and EU Accession Countries.



3.2.2 Pricing

Competition has prompted the introduction of a wide range of innovative tariff plans to capture market share, and grow the low use/low income market segment as penetration reaches higher levels. These changes mean that a focus on tariff rates alone provides an incomplete

¹¹ A legend giving the country names is given in Appendix D.



and misleading picture. Divergent pricing structures are indicative of a market where tariff and service innovation, and not only pricing, have captured market share. A summary of the range of innovative tariff plans introduced since 1996 is provided in Appendix A. The following list gives examples taken from Appendix A of tariff plans or their features that have helped grow the market:

- handset subsidies, which benefit not only post pay customers but also prepay customers via the second hand handset market. There is also the opportunity to obtain subsidised handsets via hybrid post and pre-pay plans.
- discounted starter packs for pre-pay down from R149 to R0,39
- increased bundled minutes (from 100 to 120 and 200 to 240) for the same price when Cell C entered the market. This highlights the importance of looking at packages rather than simply looking at tariff rates.
- pricing structures which make it economic to supply low income/low usage customers and for such customers to afford mobile services, namely
 - free “call-me” service (February 2001)
 - per second billing (October 2001)
 - “call sponsor” which allows post-pay customers to select and pay for calls made by pre-pay customers (November 2003)

Furthermore, recent price announcements by Vodacom and MTN will further substantially reduce tariffs. For example

- Vodacom has reduced peak tariffs between 17.00 and 20.00 by up to 50% giving a standard on-network rate of R1,49 per minute for pre-pay and contract customers during that period. This is expected to give over 13 million pre-paid customers a saving on their current monthly spend of between 4% and 9%.
- Vodacom has reduced its per second pre-pay tariff from R3,60 to R2,99 per minute for all calls from 7am to 8pm, representing a possible reduction of up to 17%
- MTN has offered a new pre-paid starter pack of R59 which includes free bundled SMS, MMS and call back services, 50% call discounts for on-net and calls to fixed phones and up to 37% discounts for calls to mobile on other networks between 17.00 and 21.00.

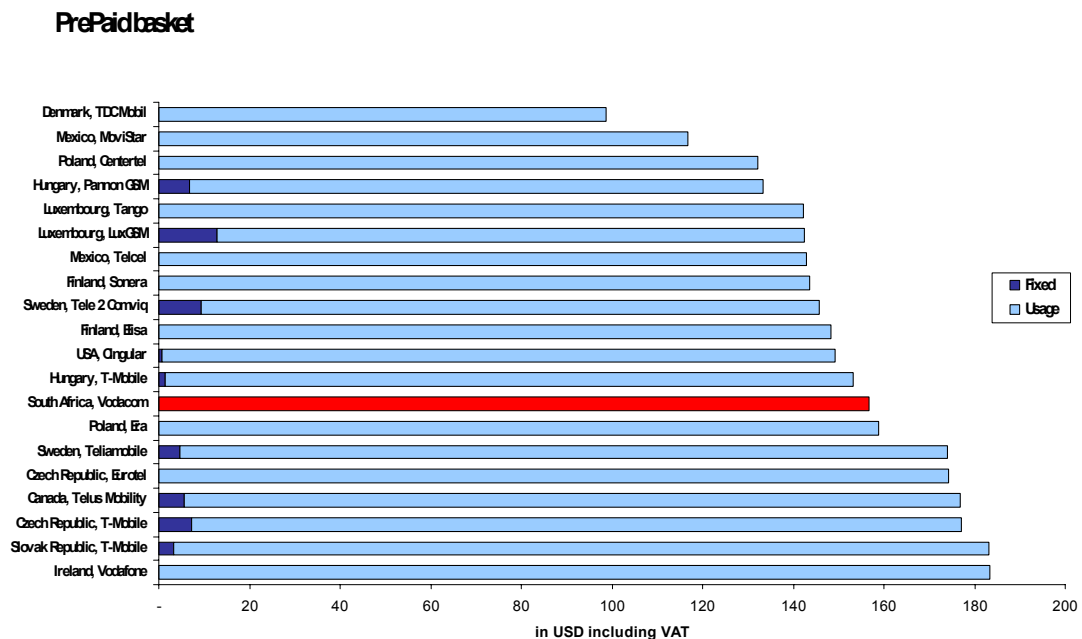
This is further evidence of a vibrant competitive mobile market.

Mobile price benchmarks are published by the OECD, European Commission and others. These comparisons attempt to compare tariffs on as close to a like-with-like basis as possible, though this is far from straightforward with different packages on offer in different countries, variations in exchange rates, and differences in calling patterns. In some countries, for example Brazil and Malaysia, tariffs also differ regionally. Even for a comparison between two countries, there is a question as whether to use country A or country B's calling pattern in calculating a basket of tariffs. Price comparisons also provide no information over what tariffs should be, only what they are. Not only will costs differ in different environments due to factors such as population density, but tariffs and revenues may be higher or lower than actual costs in different countries.



Nevertheless, given the focus on tariff levels in the Gazette Notice, Vodacom commissioned an independent analysis of mobile prices in the OECD compared with those in South Africa using the OECD's benchmarking methodology i.e. using average OECD calling patterns. The results for low user pre-pay tariffs are shown in Figure 4 where it can be seen that Vodacom's 4U Pre-Paid tariff plan ranks 13th out of 61 operators in the OECD.

Figure 4: Top Twenty Pre-Paid low user tariff plans for the OECD including South Africa



3.2.3 Competition in the mobile market

While ICASA questions whether there is sufficient competition within the mobile sector, they note the positive impact of competition in the mobile market (page 9 of the Gazette notice):

“In South Africa, this [competitive pressure] has facilitated mobile operators creatively bundling voice with data and traffic load management pricing plans, as well as developing a wide array of tariff plans and tariff structures which provide flexibility and create a perception of value for money.”

In the following sections, we review indicators of competition in the retail and termination markets and comment on points made by ICASA in this respect. We have not undertaken a full market assessment using the methodology outlined in Chapter 4, though ideally such an analysis would be undertaken by ICASA to support its recommendations.

It is important to note that price levels are not the only indicator of competition in a market. Price and service innovation, and service quality are also important factors to take into account. This view has also been stated by the Competition Tribunal¹²

¹² National Association of Pharmaceutical Wholesalers and others/Glaxo Wellcome and others, Case no 68/IR/Jun2000



" Great companies have frequently been victims of ... the competitive process. Still greater companies, spurred by the competitive process, have repositioned themselves – they have found new value-adding services to offer their customers, they have developed new products, and, at times, they have entered new markets. However the matter before us represents an effort by a group of companies which, when confronted by market dynamics, turn to regulation, rather than innovation to rescue them."

We conclude that the mobile market is subject to healthy competition, and also offers substitute for fixed voice, and increasingly data, services. There is evidence of competition in the retail and termination segments of the market. Overall retail competition will increase further with the removal of requirements to use Telkom leased lines from February 2005, and the licensing of a second fixed line operator. In addition, emerging technologies and services such as WiFi, VoIP, and other wireless technologies such as broadband wireless access could in future increase competitive pressures in the market.

3.2.3.1 Competition in the retail market

In the retail market, there are three operators with network infrastructure: Vodacom, MTN and Cell C, and the intention is that USALs will also develop their own network infrastructure. As discussed in the previous section, the three infrastructure operators have introduced a range of innovative tariff plans in response to competitive pressure, and these plans have improved value for money to consumers. This is a clear indication of a healthy competitive market in operation.

In addition to competition in the mobile sector itself, fixed voice services compete in the provision of access and calls. In developing countries, it can be demonstrated that mobile and fixed line services are substitutes, and therefore competitors, for low income households. A study for South Africa by Hodge (2005) found that:¹³

"...due to the fact that prepaid mobile has no monthly fees (but only some once-off startup costs), its average call rates are lower than fixed line up to a calculated mobile-fixed line switching point. Consumers whose monthly expenditure falls below this point (estimated at \$11.94 for South Africa) would prefer mobile to fixed line on price alone. While this switching point is low relative to monthly communication spends by households in developed economies, it is high for the vast majority of households in developing countries. It can therefore be expected and demonstrated that low-income households in developing countries are substituting mobile access for fixed line access on a larger scale."

Elsewhere in the world, Voice over IP (VoIP) is used extensively by telcom operators' corporate customers to make voice calls and is increasingly used by residential customers. For example, Skype software which allows computer users to make free phone calls has been downloaded by 140m users in the last year.¹⁴ Broadband service providers in Europe and North America are offering VoIP to complement internet access services and major companies, such as Google¹⁵ and Microsoft¹⁶, have recently announced their intentions to

¹³ James Hodge. 2005. "Tariff structures and access substitution of mobile cellular for fixed line in South Africa." *Telecommunications Policy*, Volume 29. Page 504.

¹⁴ "Start-up slashes cost of international wireless", Boston Globe, 1 August, 2005

¹⁵ Pages 14 and 20, Financial Times, 25 August 2005

¹⁶ P1, Financial Times, 31 August, 2005



enter the VoIP market. The potential for growth in the VoIP market is also indicated by News Corporation's recently reported bid of \$3bn to buy the two year old VoIP provider Skype. In addition, software is now available that runs over Skype to offer VoIP calls over mobile networks.¹⁷ These developments will soon put competitive pressure on mobile services in South Africa.

In addition, WiFi provides broadband access for users on the move and so has the potential to substitute for data and voice services (by use of VoIP) that might otherwise be carried by a mobile network. High value mobile traffic at locations such as airport terminals could face strong competition from this platform. Broadband wireless access services offer wide area coverage for nomadic broadband access and are offered in a number of countries, including South Africa.¹⁸ The degree of mobility offered will increase in the next few years when WiMax (IEEE801.16x) services are launched enabling high speed portable internet use and voice calls using VoIP when on the move, further increasing the competitive pressure on mobile services.

ICASA has questioned a number of aspects of the pattern of prices in the retail market, suggesting these may indicate a lack of competition. We now address each of these points in turn.

ICASA has suggested that similar prices are evidence of a lack of competition in the market. It is important to recognise, however, that in a perfectly competitive market – where by definition all firms are “price takers” – one would not expect to see differences in tariff levels. The fact that offers and counter-offers lead to prices and plans that have common, though by no means identical, elements is consistent with healthy competition. Evidence of such behaviour, indicating that one operator cannot act independently of another, is shown by current price competition in the market.

ICASA also question why mobile pre and post pay tariffs differ. There are good technical and business reasons for this. Technically, the intelligent network processes for handling post pay and pre-pay calls differ in terms of checking whether a call may be made and in terms of roaming. In business terms, contract customers are more active (i.e. have higher calling rates), generate higher revenues overall and make a guaranteed up front payment for the service which gives a benefit to the mobile operator (a guaranteed cashflow) and so reduces the costs of serving the customer. It is also important to look across the range of tariff options such as the free “call me” and “call sponsor” services which shift responsibility for the payment of tariffs to those best able to afford the call.

Finally, ICASA has question whether mobile to mobile on-net and off-net call rates should differ. There is a good technical reason why these call rates should differ, namely that off net calls involve an additional trunk segment to achieve a connection between callers on different networks.¹⁹ Furthermore, we note that a recent review of on net call discounts in Austria, Belgium, Germany, Italy, the Netherlands, Norway, Spain, the UK and the US found that

¹⁷ “Start-up slashes cost of international wireless”, Boston Globe, 1 August 2005

¹⁸ For example, IPWireless offers services in 18 countries. www.ipwireless.com

¹⁹ An on-net call involves two access segments one at the start and one at the end of the call) and a core trunk segment to transport the call between the two parts of the access network. An off-net call involves two access segments and two core trunk segments – one for each operator.



fifteen of the eighteen operators surveyed offered an on-net discount on one or more of the pre-pay or post pay packages surveyed.²⁰

3.2.3.2 Competition in the call termination market

Termination rates have been determined by commercial agreement. The question to be considered here is whether termination rates are subject to sufficient competitive pressure. It has been argued in a number of countries that under a calling party pays system there is insufficient competitive pressure on termination rates because the user has no choice about the network used to terminate a call to a particular person. Against this, it can be argued that competitive pressure is applied as follows

- Many consumers take account of termination charges when choosing a mobile network, because they make repeated calls to a small calling group and care about the costs paid by other members of the group
- Competition is offered by SMS and call back options

In markets where there is receiving party pays (RPP) there is considerable competitive pressure on termination rates. RPP means that subscribers directly face the cost of terminating calls on their chosen network and so they are more sensitive to the level of termination rates than under CPP.²¹ The market in South Africa offers a novel hybrid of CPP and RPP. The introduction of free “call-me” service in February 2001 and “call sponsor” in November 2003, which allows post-pay customers to select and pay for calls by pre-pay customers, mean that consumers at the calling and receiving end have a choice about whether the caller or recipient pays i.e. there is competitive pressure on termination rates.

ICASA question why fixed and mobile termination rates differ. Fixed termination rates would be expected to be lower than mobile termination rates because²²

- fixed rates only include core network costs. The access network costs are recovered through the line rental. Mobile access network costs, which are traffic sensitive, are included in the mobile termination rate.
- fixed networks can route calls directly to customers without incurring the costs of locating them. This is not the case for mobile
- there are fewer scale economies in mobile as compared with fixed networks
- fixed networks have longer asset lives

Furthermore, a study by the World Bank also noted there are good reasons for differences in fixed and mobile termination rates. It stated that:²³

“Almost all fixed-mobile network interconnection agreements are asymmetric in nature, although rarely geographically disaggregated within the same country. The

²⁰ “On-net call discounts”, A report to Vodafone, Ovum, September 2004.

²¹ The arguments are set out fully in Stephen Littlechild. April 2004. “Mobile termination charges: calling party pays vs receiving party pays. CWPE 0426.

²² These points were made by the UK Competition Commission in an inquiry into fixed to mobile termination rates. Competition Commission. December 2002. “Reports on reference under section 13 of the Telecommunications Act 1984 on charges made by Vodafone, O2, Orange and T-Mobile for terminating calls from fixed and mobile networks.” Volume 2. Paragraph 7.196.

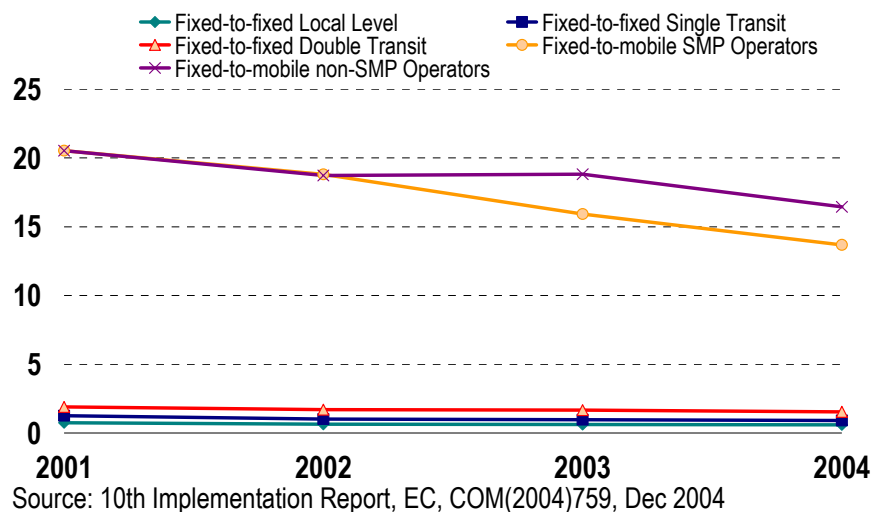
²³ Andrew Dymond. March 2004. “Telecommunications challenges in developing countries – asymmetric interconnection charges for rural areas.” The World Bank. Page 8.



cost structure of mobile networks is very different from that of fixed networks. In particular, a mobile operator has lower fixed costs, while its access network (the radio interface) is almost totally traffic sensitive and is therefore a variable cost within a ceiling determined by traffic capacity per cell."

Evidence of this asymmetry in interconnection agreements can be seen for the EU in Figure 5, where average fixed-mobile interconnection rates are roughly fifteen times the fixed-fixed interconnection rates. By contrast, the ratio in South Africa is much lower with fixed-mobile interconnection rates about five times those for fixed-fixed interconnection.

Figure 5: Fixed-mobile and fixed-fixed interconnection rates in the EU (cents per minute)



In summary, call termination in South Africa is more competitive than in other countries with CPP because of the presence of tariff offerings that provide consumers with the option of receiving party pays. In addition, the ratio of fixed-mobile to fixed-fixed interconnection charges is low by international standards. Inappropriate regulation of call termination rates could have an adverse impact on marginal subscribers. This issue is discussed further in Chapter 5.

3.3 Health of the sector

Factors that are important for promoting the development and stability of the communications sector are the opportunity for profitable operation, the efficient provision of services and a predictable regulatory regime.

3.3.1 Profitability and efficiency

The opportunity for profitable operation is crucial. Without investment in network expansion new services will not be forthcoming and businesses will quickly enter and leave the market, causing disruption and poor service for customers. This does not of course mean that inefficient businesses or businesses that are sub-scale should be propped up by regulatory intervention or that, conversely, regulatory intervention (e.g. tight controls on mergers) should inhibit the formation of efficient businesses. Those firms that do operate efficiently should have the opportunity to make returns commensurate with the risks they take.



The profitability of the mobile sector is good. As ICASA has noted Vodacom and MTN are profitable, and Cell C is expected to make an operating profit by the end of 2005.²⁴ As a consequence, network roll-out is high (up to 96%) and cumulative capital investment reached 20bn in 2005. Capital expenditure for the 2005 financial year was R2.7bn (R1.65bn in 2004).

As a general point, high profits are not necessarily an indication of insufficient competition or abuse of market power. This can be seen from consideration of the following points

- In competitive markets, prices and costs vary over time and there will be times when high profits can be made. This is an important part of the competitive process as high profits attract market entry and so stimulate competition.
- In competitive markets the most efficient and innovative firms will make higher profits than others. There is considerable research evidence to show that differences in profitability across firms will persist over large periods of time.²⁵
- For services, such as telecommunications, where large upfront costs are incurred in order to launch the service profitability will vary over the product/service lifecycle – with losses made at the outset and high profits made later on to recoup the earlier losses. Hence, profitability over the whole product lifecycle should be taken into account, and not just profitability at a point in time.
- The competitive benchmark commonly used by regulators does not take account of the impact of changes in asset prices over time and the possibility that investments will fail. These factors mean that regulators will estimate costs below those observed in the market and will not allow sufficient returns to fully compensate for market uncertainty. (See Appendix B)

These points have been recognised by competition authorities. For example, in South Africa the Competition Tribunal has stated that²⁶

"low returns are not necessarily indicative of robust competition".

3.3.2 Regulatory certainty

The importance of a predictable regulatory regime for the stability of the sector cannot be underestimated. If the regulatory regime is not predictable investment risk will be increased and this will result in higher prices and, if higher prices are not allowed, reduced investment. This could mean that in South Africa new services will not be forthcoming and marginal customers will not be served.

In a review of the performance of telecommunications sectors in a number of developing countries Levy and Spiller found that²⁷

"...performance can be satisfactory with a wide range of regulatory procedures, as long as arbitrary administrative action can be restrained. We find also that regulatory

²⁴ Business Day, 2 September 2005

²⁵ "Entry and Market Share Mobility" P Geroski in Current Issues in Industrial Economics ed. John Cable 1994; "An Applied Econometrician's View of Large Company Performance", P Geroski, Review of Industrial Organization, 13: 271-293, 1998; Mueller, D. (1986) 'Profits in the Long Run', Cambridge University Press, Cambridge; Mueller, D. (ed.) (1990) 'The Dynamics of Company Profits', Cambridge University Press, Cambridge

²⁶ National Association of Pharmaceutical Wholesalers and others/Glaxo Wellcome and others, Case no 68/IR/Jun00

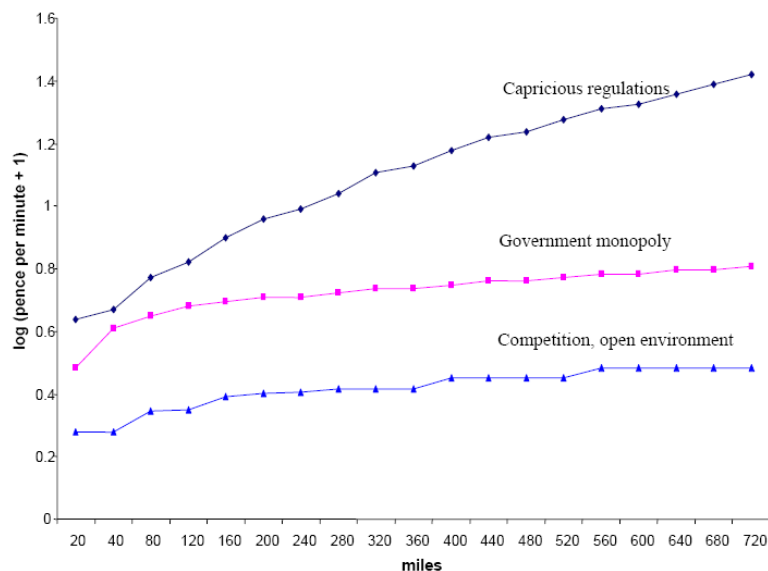
²⁷ Brian Levy and Pablo Spiller. 1994. "The Institutional Foundations of Regulatory Commitment: A Comparative Analysis of Telecommunications Regulation." Journal of Law, Economics and Organisation, Volume 10(2).



credibility can be developed in not very propitious environments, that without such commitment long-term investment will not take place, that achieving such commitment may require inflexible regulatory regimes...”

Further evidence is provided by a study of regulation of the initial deployment of fixed voice networks across Europe from the 1870's onward.²⁸ In this study, countries were grouped according to whether services were provided in a competitive environment, by government monopoly, or were subject to “capricious” regulation (with a risk of expropriation) showed marked differences in terms of average long distance prices for 1895 (see Figure 6). In particular, countries with capricious regulation performed worst in the sense that prices were higher and, although not shown on the graph, had poor service roll-out and take-up. In the countries that fared best, namely those in Scandinavia, were those where there was competitive provision and less regulation. By the beginning of the 20th century these countries were global leaders in voice telephony.

Figure 6: The impact of regulation and competition on the prices of long distance fixed calls in Europe in the nineteenth century



Source: Wallsten (2003)

3.4 Social and distributional objectives

“It is increasingly clear that, when it comes to bridging the “digital divide” between rich and poor, the mobile phone, not the personal computer, has the most potential.”

The Economist, July 2005

Evidence points to income differences as perhaps the key determinant of the global digital divide.²⁹ One would therefore anticipate lower levels of use of ICT in South Africa. However, as far as access to mobile is concerned, outcomes in South Africa are remarkably good given existing levels of income inequality.

²⁸ Scott Wallsten. March 2003. “Returning to Victorian Competition, Ownership, and Regulation: An empirical study of European Telecommunications at the Turn of the 20th Century”. http://www.wallsten.net/papers/wallsten_europe_telhist.pdf

²⁹ The Determinants of Digital the Global Digital Divide, M Chinn and R Fairlie, IZA DP No 135, September 2004



As incomes grow – and GDP growth of around 4% per annum is expected over the next two years – use of communications services will also grow. It is estimated that a 1% increase in GDP per capita will increase mobile penetration by around 2% in developing countries.³⁰ Coupled with the fact that mobile penetration is a cause of GDP growth a virtuous circle is created – with the availability of mobile services first stimulating GDP growth and this in turn leading to further mobile take-up and so forth. Over time, this can be expected to reduce inequality of access.

Existing government policy interventions to promote more universal and empowerment access include:

- obligations on mobile operators which include population coverage obligations, community service telephone obligations and discounted services for schools and other institutions
 - Vodacom has rolled out services beyond its 70% population coverage obligation to give 96% coverage
 - Vodacom has provided 26,000 community service telephones at a discounted rate of R0,90 again exceeding the obligation of 22,000 phones. The latter have proved enormously popular and monthly call volumes are around a third of the volumes for all Vodacom's pre-pay customers.
- a universal service fund to which mobile contributes 0.2% of annual turnover
- the identification of underserved areas and granting of Under Served Area Licences (USALs). Since the definition of under serviced areas is driven mainly by consideration of fixed coverage the policy will do little if anything to extend overall coverage, and the focus on promoting infrastructure competition in areas where it is least likely to be viable will undermine the viability of USALs if enforced.

Also contributing to social and empowerment objectives are a number of private initiatives motivated by profitable opportunities in the “fortune at the bottom of the pyramid” as management scholar C.K. Prahalad put it. Examples of such private sector initiatives include

- The introduction of pre-pay mobile which has paved the way for widespread access to telecoms by low income groups
- The introduction of a range of tariff options in South Africa (“Call-me” and “Call sponsor” in particular) which enable the costs of making calls to be shifted to those that can afford to pay for them, and so support provision of services to low income customers
- The tender to provide low cost – less than US\$40 – mobile handsets organised by mobile operators under the auspices of the GSM Association. The tender was won by Motorola.³¹

Existing interventions and initiatives by mobile operators have proved successful in meeting objectives in respect of the universal availability of affordable telecommunications services, and in helping to bridge the digital divide. Any proposed further intervention, such as price

³⁰ “The impact of telecoms on economic growth in developing countries, L Waverman, M Meschi and M Fuss, March 2005.

³¹ “GSM Association Defines ‘Ultra-Low Cost’ Handset Segment to Connect the Unconnected”, Press release, GSM Association, 14 February, 2005



regulation, should be carefully assessed in relation to its impact in terms of the achievement of social, distributional and empowerment objectives by the three existing mobile operators. In particular, the possibility that intervention could remove existing cross subsidies that enable operators to extend service to low income and rural communities will need to be avoided.

3.5 Conclusion

We conclude that the South African mobile sector appears to be performing well against ICASA's statutory objectives in respect of economic outcomes, the health of the sector and social, and distributional consequences.

We have not considered the future viability of USALs and value added network service operators. This will obviously be of concern to ICASA given its objectives in respect of empowerment and fostering small businesses. Nevertheless, it is important that future regulation of the sector is not developed with only the desire to meet these objectives in mind. There are important trade-offs with other objectives. For example, favourable treatment of service providers through discounted network access arrangements is unlikely to provide a sustainable basis for the development of the sector. If network costs are not fully remunerated then investment will be deterred. Furthermore, the expectation of regulatory support will attract ever more marginal businesses, can inhibit efficient sector consolidation and will deter service providers from making necessary investments themselves.

Recent experience in Europe and the US has shown this to be the case. In the UK, Ofcom has recognised that regulation designed to promote competition risks creating damaging market distortions including the creation of artificially constructed business opportunities.³² Ofcom has stated that infrastructure competition, if it flourishes, offers the prospect of far greater competition across the value chain if competition was limited to resale of wholesale access facilities (i.e. service competition).³³

In the US, the 1996 Telecommunications Act created a regime in which new entrants were given mandated access to incumbent operators' networks.³⁴ The Federal Communications Commission (FCC) has reviewed its policies towards mandatory access and has decided to pursue a policy of encouraging more infrastructure competition. As a result of two recent decisions, the Triennial Review Order of 2003³⁵ and the review of Section 251 unbundling obligations of December 2004³⁶, together with the findings from a court case on the Triennial Review Order, the FCC now rules that:

- there is no requirement for an incumbent fixed operator (termed an ILEC) to supply unbundled elements from its fibre to the home or fibre to the kerb facilities³⁷
- ILECs are no longer obliged to supply unbundled network elements (platform) offerings
- ILECs are not required to preserve existing rented local loops or offer rivals substitute products when they replace their copper loop access network with fibre

³² Para 3.35, Strategic Review of Telecommunications, Phase 1 consultation document, Ofcom, April 2004

³³ Para 4.10, Strategic Review of Telecommunications, Phase 1 consultation document, Ofcom, April 2004

³⁴ Unbundled network elements-platform or UNE-P consists of use of both the access network and the facilities of the local switch run by the ILEC

³⁵ Review of Section 251 Unbundling Obligations, NPRM, FCC Rcd 16978, 2003

³⁶ Review of Section 251 Unbundling Obligations, Order on Remand, FCC, 04-290. December 2004

³⁷ Except in the latter case to provide a voice path to an end user if requested. This obligation has no practical relevance since it is not commercially viable for a CLEC to supply end users with voice telephony using such a path



- there is a requirement for ILECs to supply rivals with access to all except the largest office blocks using DS1 or DS3 circuits. However, there is no requirement to offer dark fibre or interconnect links.

It is important therefore that, in developing its policy in respect of the mobile market, ICASA seeks to encourage efficient entry by infrastructure and service providers so that competition is sustainable. This requires that

- any regulated prices include an appropriate allowance for risk
- regulation is focussed only on facilities that cannot be economically or technically replicated by competitors, as regulation of other facilities is unnecessary and risks introducing damaging market distortions
- regulation does not seek to remove or neutralise an incumbent's inherent cost advantages, as these are benefits which can be passed on to consumers
- new entrants are not able to simply cherry pick the most profitable customers leaving the incumbents to serve all other customers. All operators should contribute to the funding of social obligations, otherwise market decisions will be distorted.



4 When is Regulation Appropriate?

4.1 Introduction

"If an economist finds something – a business practice of one sort or another – that he does not understand, he looks for a monopoly explanation."

Ronald Coase, 1972 (Nobel Laureate)³⁸

Before looking for a monopoly explanation of business practices that appear to depart from a competitive ideal it is important to be clear about what competition implies, and the costs and benefits of regulation versus imperfect competition. Competition is arguably the most effective means to pursue market growth, value for money for consumers, investment, innovation and overall economic benefits. Most markets would be judged imperfect, yet few markets are subject to *ex ante* regulation. The relevant question in deciding whether to regulate is a comparative one. What will work best acknowledging the imperfections of markets - competition law remedies or *ex ante* regulation?

In this chapter we focus on the role of regulation in addressing competition issues and consider when it is appropriate to regulate in order to promote competition and/or deal with actual or potential abuse of a dominant market position. Put simply, regulation is appropriate when the benefits are expected to exceed the costs compared to the next best alternative action.

In the sections below, we suggest that when deciding whether or not to regulate the mobile sector ICASA should use an analytical approach that involves the following three steps

1. **Competition assessment:** The relevant economic market must first be defined. Then an assessment of whether any operator in the market is dominant and is likely to or has abused its dominant position is necessary. This assessment should draw on methods that are commonly used in competition policy analysis and are now used by telecommunications regulators in many countries. If no operator is dominant (and operators are not jointly dominant) then regulatory intervention need not be considered. If an operator is found to be dominant and has or is thought likely to abuse this position then remedies need to be identified.
2. **Identify possible remedies:** A range of alternative actions should be identified taking account of market circumstances and international experience. The alternatives should include the option of waiting given the rapid changes in the telecoms market.
3. **Assess costs and benefits of alternative remedies:** If regulatory interventions are favoured, the costs and benefits of all possible regulatory options need to be assessed to measure the extent to which they meet the objectives of regulation, and considering explicitly any trade-off between objectives. The analysis of costs and benefits should also consider in detail the complexities that arise from the dynamic nature of communications markets and the uncertainty of market outcomes. It is important to recognise that in these circumstances regulatory interventions may have certain unintended consequences. We provide examples of such consequences that have arisen from regulatory actions in South Africa and elsewhere in the world.

³⁸ Ronald H. Coase. 1972. "Industrial Organization: A Proposal for Research". Reprinted in Coase 1988. "The firm, the market, and the law." Chapter 3, page 67.



4.2 Competition assessment

The regulatory model used by sector specific regulators starts from the premise that the relevant companies, being privatised monopolies, will abuse their monopoly positions and, if unchecked, will earn excessive profits. Regulation is therefore imposed in advance (i.e., it is *ex ante*) of any evidence of abuse of a dominant position.

The growth in competitive provision of traditional telecommunications services and the advent of new competitive services now means telecommunications regulators also need methods and procedures to determine

- whether regulated markets might be deemed to be sufficiently competitive to reduce or remove regulation
- whether in unregulated markets regulation is required to protect consumers against an abuse of market power.

In most unregulated markets in the economy decisions about whether markets are sufficiently competitive to prevent an abuse of market power are made by competition authorities. These decisions are based on a well-developed and internationally recognised economic framework. This framework involves the following elements

1. Defining markets in product and geographic terms
2. Analysing markets to determine the degree of competition
3. Analysing markets to determine whether any single entity or group of entities does or can exercise market power (i.e. are regarded as dominant)
4. Identifying cases where abuse of market power is identified
5. Identifying a range of appropriate remedies (which include the do nothing option)
6. Determining which remedy offers the greatest net benefits and applying that remedy. As a general point, remedies should be proportionate to the detriment being addressed.

Telecommunications regulators are increasingly adopting this framework in their analysis of competition issues. This means that their decisions are based on a well founded economic approach and helps ensure a consistent approach to addressing competition issues in converging IT, telecoms and media sectors. (Competition issues in the IT and media sectors are often dealt with under competition law whereas competition issues in telecoms are often addressed by the telecoms regulator). This framework is recommended in the Telecommunications Regulators Association of Southern Africa (TRASA) report on fair competition which provides the basis for the implementation of competition guidelines in the Southern Africa Development Community. The report stresses *“the importance of defining the relevant market, before any determination can be made with respect to which company or companies have market power”*.³⁹

Examples of countries and regions where telecommunications regulators have adopted an economic approach to the analysis of markets, namely Australia, Canada, the European Union, Hong Kong, Malaysia, New Zealand and the United States, are discussed briefly in the next section.

³⁹ p26, Study Report on Fair Competition, Final Draft July 2002, TRASA



In all of the countries discussed, including those where communications sector regulation is undertaken by the competition authority, the communications regulator's objectives and duties are set out in law specific to the communications sector. This means that, while analytical tools used in competition policy have been adopted, sector specific regulation continues to be governed by a range of economic and social policy objectives that include but are not limited to the promotion of competition.

4.2.1 Approaches used elsewhere

Australia

The Australian Competition and Consumer Commission provides economic regulation of the telecommunications sector as well as being responsible for administering competition policy. It applies competition policy principles in its market analysis while also taking account of a range of wider social objectives as is required under the Telecommunications Act 1997. These include the short and long term community and economic benefits and costs.

The application of a competition policy approach to the analysis of competition issues is illustrated for example by

- a recent review of Telstra's price control arrangements which included an assessment of the state of competition in relevant markets and
- the Mobile Services Review which included assessments of the relevant market, the current state of competition in the market and whether mobile termination services should become a "declared" service and so potentially subject to regulation

Canada

The Canadian Radio-television and Telecommunications Commission's approach to determining whether to apply regulation is set out in the 1994 Review of the Regulatory Framework. Under the Telecommunications Act 1993, the regulator has powers to determine which entities and services are to be regulated and under Section 34 of the Act the regulator may forbear from regulation. The criteria used to determine whether to refrain from regulation reflect themes common in competition policy. Specifically⁴⁰

- the Commission should forbear when a market becomes workably competitive
- a market cannot be workably competitive if the dominant firm possesses substantial market power
- market power is a function of a) market share held by the dominant firm; b) demand conditions affecting responses of customers to a change in the price of the product or service in question; c) supply conditions affecting the ability of other firms in the market to respond to a change in the price of the product or service
- high market share is a necessary but not a sufficient condition for market power; other factors must be present to allow a firm to act anti-competitively

An example of the application of this framework is given in the regulator's notice on Forbearance from Regulation of Local Exchange Services⁴¹ in which the regulator is seeking to determine benchmarks which if met would lead to forbearance from regulation. It is

⁴⁰ Section III, B, Review of Regulatory Framework, Telecom Decision CRTC 94-19, September 1994

⁴¹ Forbearance from regulation of local exchange services, Telecom Public Notice CRTC 2005-2, April 2005



expected that this approach will provide an efficient approach to removing regulation where appropriate.⁴²

European Union

All 25 countries in the European Union must comply with European legislation and associated guidelines that set the framework for telecommunications regulation in Europe. The key elements of the framework are⁴³

- *Ex ante* regulatory obligations should only be imposed in markets where three conditions are met: barriers to entry are high; the market is not tending to effective competition; and competition law alone is insufficient to deal with the competition problem identified. Within markets that meet these conditions the regulator then considers whether there are operators with significant market power (i.e. that are dominant)
- The national markets that may be subject to regulation are listed in a European Commission Recommendation and national regulators are expected to take the utmost account of the Recommendation.⁴⁴
- National regulators are also to take utmost account of guidelines⁴⁵ issued by the European Commission for assessing the relevant market and, within that market, whether an entity has significant market power in accordance with the principles of competition law⁴⁶ (see box below)
- A finding of significant market power in the one of the markets listed in the Recommendation on Relevant Product and Service Markets is a necessary condition for the application remedies
- Guidance on the remedies that may be appropriate is given in the European Regulators Group (ERG)⁴⁷ position paper on this issue. A range of remedies is possible, including requirements for transparency, non-discrimination, accounting separation, access, carrier pre-selection and price regulation for operators with significant market in the supply of wholesale services
- There is a presumption against regulating emerging markets.
- National regulators must submit their draft market analyses and conclusions to the European Commission for comment.

⁴² Canadian Telecommunications Policy Review, Discussion paper, CRTC, August 2005

⁴³ See Articles 14, 15 and 16 of the Directive on a common regulatory framework for electronic communications networks and services, Official Journal of the European Commission, 7 March 2002

⁴⁴ The Recommendation lists 18 markets but these are to be reviewed in 2006. Commission Recommendation on Relevant Product and Service Markets, European Commission, C(2003)497, 11/02/2003, Brussels

⁴⁵ Explanatory Memorandum to the Commission Recommendation on Relevant Product and Service Markets, European Commission, C(2003)497, 11/02/2003, Brussels

⁴⁶ Commission guidelines on market analysis and the assessment of significant market power, 2002/C 165/03, Official Journal C 165/6, 11 July 2002

⁴⁷ Heads of the telecommunications Regulators from all 25 member states belong to the European Regulators Group. It was established under the Commission Decision establishing the European Regulators Group for Electronic Communications Networks and Services, 29 July 2002, 2002/627/EC. For more information see http://europa.eu.int/information_society/policy/ecomms/committees_working_groups/index_en.htm#erg



European Commission Guidelines: assessing significant market power (dominance)

The purpose is to determine whether one or more entities can behave independently of competitors, potential competitors, customers and ultimately consumers

Criteria listed in the Guidelines include

- Market share: <25% not likely to be dominant and >40-50% likely to be dominant. Market share is not sufficient by itself. Other criteria must also be used including the following.
- Stability of market share
- Countervailing market power
- Scale and scope economies
- Barriers to entry
- Potential competition
- Technological and other advantages (e.g. access to capital)

While, *ex ante* remedies may only be applied by regulators if an operator is dominant in any of the markets identified in the Recommendation on Relevant Markets, the Framework Directive states that:

“It is essential that ex-ante regulatory obligations should only be imposed where there is not effective competition, and where national and Community competition law remedies are not sufficient to address the problem.”⁴⁸

While this may be the intention of the law, we note that in practice many regulators have not undertaken a comparison of their regulatory proposals with the option of using remedies under competition law.

Since coming into effect in 2003, the EU regulatory framework has been applied in most Member States. The Commission’s comments on analyses undertaken by national regulators can be found at http://europa.eu.int/information_society/policy/ecom/article_7/index_en.htm

Hong Kong

The approach taken by the regulator OFTA to competition issues is described in the Guidelines to Assist the Interpretation and Application of the Competition Provisions of the FTNS Licence (1995) which will soon be replaced by Guidelines for Anti-competitive Conduct in Hong Kong Telecommunications Markets.⁴⁹

An example of the application of the Guidelines is given in OFTA’s consultation on the issue of whether PCCW-HKT Telephone Ltd should be declared non-dominant in the market for residential direct exchange line services. In this consultation the regulator⁵⁰

- Defines the relevant market with reference to demand substitutes such as mobile and broadband services and supply substitutes such as the joint provision of business and residential services

⁴⁸ EC Directive on a Common Regulatory Framework for Electronic Communication Networks and Services, Recital 27.

⁴⁹ A consultation on these guidelines was initiated in 2004.

⁵⁰ Application for a declaration of non-dominance for PCCW-HKT Telephone Limited in the market for residential direct exchange line services. OFTA, November 2003



- Assesses dominance with reference to market share and market concentration, power to act independently in making pricing or other decisions, barriers to entry, the extent of product differentiation and sales promotions, the degree of vertical integration in the supply of services and the impact on the universal service policy.

Malaysia

The approach to analysing competition issues used by the Malaysian Communications and Multi-media Commission (MCMC) is described in the Guideline on Dominant Position in a Communications Market and in the Guideline on Substantial Lessening of Competition. The approach mirrors that described above.

The MCMC has applied the approach to fixed and mobile telecommunications services in its recent public inquiry on the Assessment of Dominance in Communications Markets.⁵¹ This inquiry was undertaken to support the MCMC functions under section 139 of the Communications and Multimedia Act 1998 under which the MCMC may direct a licensee in a dominant position in a communications market to cease conduct which has or may have the effect of substantially lessening competition in any communications market and to implement appropriate remedies.

It is important to note that the Act is clear there is nothing objectionable about a licensee being in a dominant position. Only if there is abuse of a dominant position may the MCMC intervene to apply remedies.⁵² For example, in its Guideline on a regulatory framework for 3G mobile virtual network operators (MVNOs), the MCMC concluded that it⁵³

“does not intend to regulate the terms and conditions of access for MVNOs due to the lack of evidence of market failure. The MCMC will only intervene if it is satisfied that such intervention is necessary to ensure long term benefits to end users and growth in the industry.”

New Zealand

The approach used by the New Zealand Commerce Commission to promote competition in telecommunications markets for the long-term benefit of end-users of telecommunications services within New Zealand⁵⁴ is set out in specific investigations - for example in its investigation into local loop unbundling⁵⁵ - and its Merger and Acquisitions Guidelines.

The approach used by the regulator is described as follows in the local loop unbundling decision where it is stated that:⁵⁶

“Making this assessment requires examining the existing market structure and the degree of competition in relevant markets. If competition is workable or effective in those markets, intervention is unlikely to promote competition further and it could impose costs without commensurate benefits. Conversely if competition is not workable or effective, it is possible

⁵¹ The analysis supporting the inquiry is given in Assessment of Dominance in Communication Markets, MCMC, August 2004. For the conclusions of the inquiry see A Report of a Public Inquiry: Assessment of Dominance in Communications Markets, MCMC, December 2004.

⁵² See the introduction to A Report of a Public Inquiry: Assessment of Dominance in Communications Markets, MCMC, December 2004

⁵³ Para 9.1, Guideline on Regulatory Framework for 3G Mobile Virtual Network Operators, MCMC, 16 February 2005.

⁵⁴ Section 18, Telecommunications Act 2001.

⁵⁵ Section 64 Review and Schedule 3 Investigation into Unbundling the Local Loop Network and Fixed Public Data Network, Final Report, Commerce Commission, New Zealand, December 2003

⁵⁶ Para 305, *ibid*



that appropriate regulation could promote competition, but this must be subject to an overall assessment of the net costs and benefits of action and the potential indirect costs of regulation.”

The United States

The approach used by the Federal Communications Commission to analyse competition issues is described in “Competition policy in telecommunications: The case of the United States of America, ITU, CPT/05, November 2002. It involves defining markets, analysis of the degree of competition and whether any entities have market power. Decisions concerning the extent and nature of regulation are made taking account of the impact on the overall public interest.

Examples of the approach taken include the AT&T Non-Dominance Order, the FCC’s proceeding on the treatment of incumbent local exchange carrier broadband services and the FCC’s annual report and analysis of competitive market conditions in the mobile market.⁵⁷ The latter, for example, includes an analysis of the market definition, market structure, operator and consumer behaviour and market performance (in terms of price, quantity, service quality, and service innovation).

4.2.2 Issues in defining the relevant market

Defining the relevant market is an essential step in the analysis of competition issues wherever market shares or market structure are used. If markets are wrongly defined then market share information will not convey any useful information about market competition. A rigorous approach to market definition using economic criteria provides the foundation for the subsequent competition assessment.

Relevant markets need to be defined by product or service and by geography and the analysis of what constitutes the relevant market should be forward looking. As indicated by the summary below of the European Commission (EC) Guidelines, the key factors in defining the relevant market are substitutability from the demand and the supply side, and the potential for competition from new entry.

European Commission Guidelines: market definition

- The purpose is to identify the services/products that make up the market and the geographic the scope of the market
- The analysis should take a dynamic approach and be forward looking
- The analysis starts with a given product/service and geographic area (e.g. cable access to the Internet) and examines whether there are competitive constraints from demand side substitutes (Internet access over other technologies e.g. DSL, satellite, broadband wireless access), supply side substitutes (supply of DSL by fixed telephone companies) and potential future competition (powerline access).
- Products/services and areas are added until no further substitute products/services are found

A test that is commonly used to identify substitution effects involves assessing whether a hypothetical monopolist of a certain product or set of products, which might constitute a

⁵⁷ “Annual Report and Analysis of Competitive Market Conditions with respect to Commercial Wireless Services”, Ninth Report, September 2004, FCC 04-216.



market, could profitably impose a small but significant non-transitory increase in price (SNNIP). The SNNIP test is commonly applied assuming a 5 to 10% price increase. To apply the SNNIP test the key parameter that is required is the price elasticity of demand for the good or service in question.⁵⁸ If the price elasticity is greater than minus one, then revenues will fall as a result of a price increase. This is the combined effect of consumers purchasing less of the product and switching to other products. For a price increase to be unprofitable it is necessary for the loss of revenues to exceed any associated reduction in costs. Data on the variability of costs is required to determine whether this is the case or not.⁵⁹

To implement the SNNIP test price elasticity estimates are required.⁶⁰ In practice, these estimates are often not available and, even if they are, they are necessarily based on historic data and so are not forward looking. This is a particular issue in new telecommunications markets that are growing rapidly and where price elasticities may also be changing. For example, Crandall (2005)⁶¹ reviews empirical US work on the demand for broadband which shows price elasticities range between -1 and -2 but appear to be falling over time. This would be expected as services move from being luxuries to normal goods.

Market definition assessments undertaken by telecommunications regulators therefore rely on more indirect evidence including

- **Survey evidence on consumers' choice patterns**, including information on whether they regard different goods/services as substitutes or not; whether they would switch between different goods if relative prices changed; whether they have switched between goods and why. Evidence on the scale of switching costs customers face when switching between different products/services is also collected. Consumer awareness and knowledge of relative prices is also regarded as indicative of consumers' ability to make effective choices between different products.
- **Customers' reactions to actual changes in market conditions** The way customers have reacted to changes prices, quality and availability of services is assessed based on survey data and historical aggregate market statistics.
- **Price correlations**. If two products/services are in the same market then price movements would be expected to be positively correlated. In the case of demand side substitution, price divergence will lead consumers to switch to the good whose price has fallen (in relative terms). In the case of supply side substitution, producers would switch production to the good whose price has risen (in relative terms).
- **Operators plans and market behaviour**. This information may indicate which products and firms are regarded as rivals and the ease with which firms producing other goods/services could switch to producing the good/service in question
- **Product characteristics**. Products/services are often classed as being in the same market if they have similar characteristics in the sense of providing similar functionality or

⁵⁸ The price elasticity of demand for A = percentage change in quantity A resulting from a change in the price of A/percentage change in price of A.

⁵⁹ $(p-c)/p < -1/\text{elasticity of demand}$, where p= price; c=marginal cost so that $(p-c)/p$ is the margin made on an incremental unit of output. See Kamerschen, *Testing for Anti-trust Definition Under the Federal Government Guidelines*, Journal of Legal Economics, Spring 1994.

⁶⁰ In particular the elasticity of demand for the product/service under consideration.

⁶¹ Crandall (2005) Broadband Communications, forthcoming in The Handbook of Telecommunications Economics Vol II, Cave, Majumdar and Vogelsang eds. North Holland 2005.



if similar competitive conditions apply in the supply of the products/services to different user groups.

Not all of this evidence is directly relevant to the issue of market definition – for example consumers may regard two services as being substitutes even if their functionality differs (e.g. mobile and fixed calls) – and in most cases there is no objective measurable level which, if reached, means goods/services can be classed as substitutes. In short there is room for interpretation and discretion in the application of these indicators. However, if used carefully, they can provide useful information about the scope of markets.

In the case of telecommunications, there is a risk that the standard approach will give market definitions that are too narrow and so the approach needs to be adapted to take account of the following factors⁶²

- The analysis of demand should take account of the fact that consumers often consume bundles of services. Similarly from the supply side the importance of economies of scope in supplying services needs to be taken into account. Taking mobile telephony for example, access, call origination and termination, SMS etc are consumed as a bundle and are all supplied by each operator
- Firms often compete on new services and better performance and not just price. If this is the case the standard analysis could result in a market definition that is too narrow
- Prices set by firms in new and rapidly growing communications markets may be aimed at growing the market. In particular low prices may be offered to encourage take-up. In these circumstances consumers may be relatively insensitive to price changes and an excessively narrow market definition will result.⁶³

Finally, we note that national differences in consumer preferences, in the availability and relative prices of different products/services, and in supply conditions (say arising from differences in the size and location of countries) mean that market definitions will differ across countries.

4.2.3 Assessment of dominance

There are two issues here which need to be treated separately, namely

1. Whether an entity is dominant or not
2. Whether the dominant entity has or is thought likely to abuse its dominant position.

The regulatory model used by sector specific regulators started from the premise that the relevant companies, being privatised monopolies, will abuse their monopoly positions and, if unchecked, will earn excessive profits. However, under competition law, possession of a dominant position is a necessary but not a sufficient condition for regulatory intervention. Abuse must be demonstrated to have or be likely to occur before intervention is justified (see the Malaysian example given above). The criteria for determining whether a dominant position exists are quite different from those relevant to determining whether an abuse has occurred and we distinguish between these in the discussion below.

⁶² Market Definition in the Telecoms Industry, J Gual, Discussion Paper no 3988, centre for Economic policy research, July 2003

⁶³ Innovation and competition policy, Economic Discussion paper no 3, Charles River Associates, March 2002, Office of Fair Trading, UK



4.2.3.1 Criteria for determining a dominant position

To determine whether a firm is dominant it is necessary to assess whether it can or has acted independently of competitors and customers when making pricing and other decisions. A range of criteria have been used by telecommunications regulators (see the previous section). In all cases market share is a key factor, though it is important to stress that it is not sufficient for determining dominance. Hence markets that are viewed as effectively competitive may have few players, and involve strategic interactions. Indeed, a market subject to rapid innovation can be effectively competitive where the threat of sequential entry acts as a discipline on the behaviour of incumbents.

A company may have a high market share because it has the most attractive price/service offering and so is able to attract/retain customers despite vigorous competition from rivals (i.e. it cannot act independently of rivals). This does not mean it can act independently of rivals or customers. Customers may be able to switch easily to rivals and so the company cannot raise prices for fear of losing customers. In addition, the company may be concerned that if it raises prices new firms will enter the market and, over time, new competitive technologies and services will be developed.

We note that the South African Competition Act 1998 defines dominance in terms of market share and market power (Section 7). Any firm that actually has market power is considered dominant, regardless of its market share (Section 7(c)). The definition of market power includes concepts from the EU's definition of dominance: "the power of a firm to control prices, or to exclude competition or to behave to an appreciable extent independently of its competitors, customers or suppliers" (Section 1(1)(xiv)).

Other factors, in addition to market share information, that should be taken into account when determining whether a firm is dominant include

- **Competitive conditions:** entry barriers, the potential for competition in future from new operators, technological and other advantages that an operator may possess (e.g. access to capital); customers' countervailing market power
- **Consumer behaviour:** the extent of switching between suppliers; consumer awareness and knowledge of operators' relative tariffs; costs to consumers in gaining tariff information; the costs of switching between suppliers
- **Market outcomes:** the stability of market shares (if shares are declining quickly or vary over time then this gives evidence of competition); pricing variations and innovation (if price changes and tariff innovation give better outcomes for consumers then it is reasonable to expect that this is in response to actual or anticipated competition).

4.2.3.2 Criteria for determining abuse of a dominant position

Competition law identifies a number of potential abuses of a dominant position including excessively high prices, some forms of price discrimination (such as those that are designed to exclude competitors), discounts that are predatory or are designed to foreclose the market, predatory prices, vertical restraints that have anti-competitive effects, refusals to supply and other actions that may exploit customers or reduce competition. Here we focus on the issue of the level of prices as this is ICASA's central concern.



Prices are generally regarded as being excessive if they are above those they would apply in a competitive market. This of course begs the question of what level of prices one would expect to see in a competitive market.

The textbook model of perfect competition has firms as “price takers”, in other words individual firms do not determine prices in the market but must price according to the market. For a homogeneous service this implies that there would be a single market price. A lack of price dispersion does not therefore provide evidence of a lack of competition (though equally a single price could also result from tacit collusion or monopoly).

A second implication of the textbook model is that price will equal marginal cost,⁶⁴ or the cost of the last unit of service produced and consumed. The market price at each point in time is therefore determined by the least efficient, or marginal, producer in the market. Other producers can be expected to earn “excess” profits or “rents”. “Excess” profits are not therefore necessarily a sign of imperfect competition.

Extending the textbook model to multiple time periods introduces dynamic considerations. For example, if capital equipment costs are changing over time prices will not and cannot be “cost reflective” at every point in time in competitive markets.

Uncertainty further complicates the picture and can lead to prices above costs where the initial investment involved a risk of failure or assets may be stranded by new technology before their full value has been recovered. For example, there is generally no market based measure of the *ex ante* risk of failure for investments in new rapidly changing markets. *Ex post* the degree of success will be observed but the *ex ante* risk of failure is likely to remain unknown.

This concern arises because standard measures of the cost of capital such as the capital asset pricing model measure the compensation required for non-diversifiable risk associated with the volatility of returns once an investment is generating a return, and do not capture the return above and beyond this required to compensate for the *ex ante* risk of failure.⁶⁵ There are many examples of telecom companies entering new markets that have failed. Examples from the UK include two fixed wireless access operators, Ionica and Atlantic, and the public mobile access operator Dolphin Telecom.

Practical considerations may point to forbearance as the only feasible option if risky, but socially worthwhile projects in expected benefit terms, are not to be deterred. As Haring *et al* put it:⁶⁶

“If the regulator appropriates the gains from successful innovations or (worse) forces the firm to give those gains to its competitors, the odds become “Heads, I lose; tails I break even.”

The implications of dynamics and uncertainty are considered further in Appendix B. These considerations are important for two reasons.

⁶⁴ In practice, prices must be sufficient to recover the fixed and common costs associated with providing telecommunications services.

⁶⁵ Lawrence Kolbe and William B. Tye. May 15, 1995. “It ain't in there: the cost of capital does not compensate for stranded-cost risk.” Public Utilities Fortnightly.

⁶⁶ John Haring, Jeffrey H. Rohlfs & Harry M. Shooshan. April 2002. “Propelling the broadband bandwagon”, page 62. Prepared for United Kingdom Office of Telecommunications and Office of the e-envoy. <http://www.ofcom.org.uk/static/archive/ofel/publications/broadband/other/spr0802.pdf>



- First, they suggest that conclusions on the competitiveness of a market should be based on an assessment that takes account of changes in costs over time and the impact of uncertainty on costs.
- Second, if it is decided that regulation is appropriate, then the calculation of allowed prices should take into account the effect on prices of asset price dynamics, uncertainty and real options.

If these factors are not taken into account then regulation will be imposed where none is justified and/or regulated prices will be set at too low a level. The consequence of both these outcomes will be that investment and innovation will be deterred to the detriment of existing and potential future consumers.

4.2.3.3 Profits in a competitive market

Regulators (and competition authorities) typically focus on the level of profits made when deciding whether or not prices are excessive. This assumes that a reasonably efficient level of costs is incurred and hence the main reason for excessive profits is the level of prices.

In deciding whether a company's profits are excessive or not a competitive benchmark needs to be established. The following reasons why profits at a point in time appear high need to be taken into account

- In competitive markets prices and costs vary over time and there will be times when high profits can be made. This is an important part of the competitive process as high profits attract market entry and so stimulate competition.
- In competitive markets the most efficient and innovative firms will make higher profits than others. There is considerable research evidence to show that differences in profitability across firms will persist over long periods of time.⁶⁷
- For services, such as telecommunications, where large upfront costs are incurred in order to launch the service, profitability will vary over the product/service lifecycle – with losses made at the outset and high profits made later on to recoup the earlier losses. In this case profitability over the whole product lifecycle should be taken into account.
- The competitive benchmark commonly used does not take account of the impact of changes in asset prices over time and the possibility that investments will fail. As discussed above and in Appendix B, these considerations mean that the usual competitive benchmark used by regulators will assume costs are at levels below actual market costs and will not allow sufficient returns to fully compensate for market uncertainty and project failure.

In practice competition authorities do not intervene whenever and wherever they see evidence of dominance in a market, or returns on capital that exceed the estimated cost of capital. The South African competition authorities support this view. In assessing whether exclusionary conduct would constitute an abuse under section 8 (c) of the Competition Act, the Competition Tribunal noted⁶⁸

⁶⁷ "Entry and Market Share Mobility" P Geroski in Current Issues in Industrial Economics ed. John Cable 1994; "An Applied Econometrician's View of Large Company Performance", P Geroski, Review of Industrial Organization, 13: 271-293, 1998; Mueller, D. (1986) 'Profits in the Long Run', Cambridge University Press, Cambridge; Mueller, D. (ed.) (1990) 'The Dynamics of Company Profits', Cambridge University Press, Cambridge

⁶⁸ York Timbers Ltd and SA Forestry Company Ltd, 15/IR/Feb01



"the Act does not prevent a monopolist from setting a monopoly price. In other words setting a monopoly price does not constitute an abuse of a dominant position unless it can be shown that this also constitutes an 'excessive price' that may be impugned under Section 8(a) of the Act., what is rather at issue is whether the dominant firm ... has attempted to use - or 'abuse' - its dominance to extend or preserve its dominant position, what US antitrust jurisprudence refers to as 'monopolisation'. This caveat - that, in order to find an abuse of dominance from a refusal to supply, market power must be shown to have been extended or created - is crucial if we are to give expression to the requirement of the Act to the effect that it is a refusal to supply a 'competitor' that offends. Action against a competitor only offends when it is anti-competitive and this will be measured by its capacity to extend or create market power."

4.3 Identify possible remedies

If abuse of a dominant position is found then regulators will need to consider possible remedies for this abuse. When doing this they should also consider the full range of remedies including the option of not regulating i.e. wait and see. The reason for this is that any remedies should be proportionate to the detriment incurred and regulation often involves an element of irreversibility, at least in the short term. Regulatory decisions must also be made in an environment characterised by uncertainty and continuous learning. How will competition develop in future? What outcomes will regulation produce? Will new technology make the proposed regulatory approach redundant? What can be learned from other markets and regulatory approaches?

The combination of irreversibility and uncertainty implies there is some value attached to waiting for new information (the "real option"), and this value should be considered alongside the possible benefits of regulation. Intervention now will only be justified if the expected net benefits exceed the value attached to waiting. This approach is analogous to the approach to appraising irreversible investment and efficient pricing under uncertainty⁶⁹, which the UK regulator Ofcom has now accepted in principle:

"Ofcom concludes that, going forward, its analysis should take account of the value of real options where appropriate...."⁷⁰

In emerging markets in particular the value of waiting may be high. Time will tell whether dominance persists or emerges, a better understanding of demand and costs will emerge, and private initiatives may resolve problems that initially appear to require intervention. An example where the value of waiting may be relevant is next generation networks, where the OECD has suggested a wait and see approach before implementing regulation:⁷¹

"Policy makers and regulators also need to consider that attempts to develop and implement regulatory solutions, before any indication of a real problem exists or before market-based solutions which can adapt to meet changing needs, could inhibit the introduction of any innovative applications or limit their utility."

⁶⁹ Dixit and Pindyck. 2004. Investment under uncertainty. Princeton University Press.

⁷⁰ Ofcom. 18 August 2005. "Ofcom's approach to risk in the assessment of the cost of capital - Final Statement." http://www.ofcom.org.uk/consult/condocs/cost_capital2/statement/

⁷¹ OECD. April 2005. "Working party on telecommunications and information services policies. next generation network development in OECD countries." Page 29. <http://www.oecd.org/dataoecd/58/11/34696726.pdf>



The mobile market in South Africa is still growing and delivering substantial benefits to later adopters who tend to have lower incomes. New technologies are also being deployed or on the horizon that will compete with mobile in different segments of the market or undermine the revenue base. For example, VoIP and WiMax technologies could undermine future call revenues for mobile and fixed operators. WiMax and widespread WiFi access when on the move combined with fixed line access could provide substitutes for data services over mobile networks. In this environment the option of waiting and monitoring market developments should be considered alongside options involving regulatory intervention.

4.4 Cost benefit assessment

Regulation should only be applied if the benefits of intervention exceed the costs, where these costs and benefits need to be assessed in terms of the regulator's objectives. Furthermore, the remedy chosen should be the minimal intervention required to address the problem identified. Most telecommunications regulators are expected to promote a mix of social and economic objectives and where there are conflicts between these objectives then trade-offs will need to be made.

The regulatory interventions proposed by ICASA are intended to address what they appear to regard as excessive prices. These interventions could have a number of important consequences for the future performance of the telecommunications sector. The mechanisms by which these consequences come about need to be considered carefully, otherwise it is possible that regulation will fail to deliver its intended outcomes i.e. regulatory failure will occur. The costs of regulatory failure will be higher the more uncertain the market outlook, the less complete the knowledge of the regulator and the more complex the relationships between actions and consequences. If there is uncertainty about these relationships, which is more likely if there is competition and rapid innovation, then unintended mistakes will be made. The scope for regulation to result in adverse unintended and unanticipated consequences in the case of telecoms markets is therefore considerable.

These consequences need to be factored into the appraisal of the potential costs and benefits of regulatory intervention. The following illustrate categories of possible unintended consequences with examples:

- **Inertia and the politics of changing regulation** may result in initially desirable regulation proving harmful as markets change. In the US this occurred in relation to rail which continued to be regulated despite strong competition from road transport and this led to the demise of many railroad services:⁷²
“By the early 1980s railroads were in a dire financial situation with bankruptcies common on railroads unable to make new investments. This outcome was a consequence of ICC [Interstate Commerce Commission] established rates (prices) and its refusal to permit railroads to cease providing loss-making services along low-volume routes. The United States Congress passed legislation, the Staggers Act, in 1980 that attempted to cure this dire regulatory failure before the railroads ceased to exist.” Hausman and Myers, 2002.
- **Regulation designed to improve affordability for low income consumers may make service provision by the regulated firm uneconomic**, thereby denying

⁷² Hausman and Myers. 2002. http://econ-www.mit.edu/faculty/download_pdf.php?id=504



access to low income consumers or resulting in higher cost forms of supply. For example, under-pricing of piped water – where it results in poor network coverage – can make the poor worse off:⁷³

“In most developing countries, the poorest consumers face an appalling situation. Many lack access to potable water and any kind of sanitation. In many cities, the wealthy receive piped water at below cost, while the poor must rely on unsafe water at very high cost. In Luanda, where recipients of piped water pay less than a cent per cubic meter, people without connections may pay as much as US\$16.00 per cubic meter for untreated water delivered by tanker.”

- **Regulation to promote (service-based) competition can harm the prospects for the emergence of strong competitors and infrastructure competition.** When talking about the development of the UK telecoms industry Stephen Carter, Ofcom Chief Executive, noted that⁷⁴

“To some degree a culture of regulatory dependency has been created... one consequence of this is that the kind of rewards to scale, which ought to emerge organically from the market are retarded by regulation. We end up with a market structure in which there are many small players and not enough strong, scale-based players.”

- **Regulation can delay the introduction of new services or cost saving technologies, thereby harming consumer interests.** Delay in licensing 1800 MHz spectrum resulted in additional costs for the mobile sector and consumers in South Africa. Similarly in the US, delays in licensing cellular operators are estimated to have cost the economy \$100bn.⁷⁵

One way of thinking about unintended consequences is to consider the level of uncertainty involved in any given decision – over say costs, demand and the cost of capital – and to consider the shape of the net benefit function for outcomes either side of the expected outcome. If the benefit function is asymmetric then a decision based on central estimates will not maximise benefits and some rationale bias should be introduced. This issue is considered further in Appendix C.

⁷³ Penelope Brook Cowen. January 1997. “Getting the Private Sector Involved in Water - What to Do in the Poorest of Countries?” *Private Sector Note* 102, The World Bank. <http://rru.worldbank.org/documents/PublicPolicyJournal/102brook.pdf>

⁷⁴ January 2005, Westminster eForum

⁷⁵ Valuing the Effect of Regulation on New Services in Telecommunications, J Hausman, Brookings Papers, Microeconomics 1997



5 Implications for Regulation

5.1 Introduction

ICASA has asked whether there is a need to

- Introduce a fourth mobile cellular operator
- Regulate retail prices, through a one-off price reduction and/or through on-going regulation through an agreed methodology
- Regulate wholesale prices i.e. call termination

In coming to conclusions on these issues, the approach described in Chapter 4, which involves market analysis, assessing market abuse and identifying and appraising remedies, should be adopted. This has not been done in ICASA's consultation document and so the justification for the proposed extension of regulation is not clear.

Any extension of regulation needs to take account of the fact that the mobile sector in South Africa is already heavily regulated. In particular, operators

- Interconnect with other licensees on non-discriminatory terms and conditions
- Must provide COA/CAM reports which effectively require full cost accounting separation at the wholesale level
- Retail tariff plans are subject to a CPI price cap

In addition, mobile carrier pre-selection and number portability have been proposed, though are not yet implemented.

In this chapter, we discuss considerations that should have a bearing on ICASA's conclusions.

5.2 Licensing an additional operator

Regulation is an imperfect substitute for competition. Competition promotes consumer welfare by offering choice, variety, attractive prices and innovation; whereas regulation is often associated with lack of choice, uniformity, high costs and disincentives to innovate. In addition, as discussed in the conclusion to Chapter 3, it is increasingly recognised by regulators that infrastructure competition has the potential to offer more benefits than simply service based regulation. Service based competition in which competitors do little more than resell the incumbent's services fails to provide the benefits of innovation and service variety. This suggests that, if it is determined there is a problem of monopoly abuse in the mobile market, then licensing an additional operator may be the best way forward.

The number of operators in a market depends on spectrum availability and market characteristics. When deciding how many operators to licence within a given amount of spectrum the regulator faces a choice between licensing many operators each with a small amount of spectrum or licensing a smaller number each with more spectrum. The frequencies available for cellular mobile services are determined internationally and are limited to certain agreed bands, and handsets and network equipment are only made to operate in these bands. Within the available frequency bands there is a trade-off to be made between



- **The competitive benefits from licensing more operators:**⁷⁶ these benefits will depend in large part on whether the market can sustain additional operators. If additional operators are not likely to be sustainable then their competitive impact will be weak.
- **The increased network costs arising from licensing more operators:** If there are four operators providing a minimum level of coverage and together carrying a given level of traffic (for the country as a whole) then the total costs of network provision and operation will be higher than if there are three operators. In addition, the nature of spectrum engineering means there is a trade-off between assigning an operator more spectrum and investment in network infrastructure. If an operator is assigned more spectrum then less investment in infrastructure is required to support a given amount of traffic. Hence lower cost services can be delivered if operators have larger spectrum allocations.

This trade-off depends in part on national circumstances, for example, the size of the potential market, geography and the costs of providing national coverage, and the nature of the topography and the implications this has for spectrum re-use. Nevertheless, practice elsewhere can be instructive. In the OECD the number of 2G operators per country ranges from two to six, with most countries having three or four operators.

In deciding whether to licence a fourth operator ICASA will need to make a trade-off between the competitive benefits from having one or more additional operators, the sustainability of competition and the implications for industry costs. It will be crucial to consider the impact on the health of the sector, and possible impacts in terms of universal service and empowerment objectives. USALs have not to date invested in their own infrastructure and coverage and penetration could be compromised by changes that made servicing marginally profitable consumers unprofitable.

5.3 Retail price regulation

Mobile retail tariffs in South Africa are regulated by a CPI cap on a basket of tariffs. There are very few other countries with competing operators and that apply retail price caps to mobile services. In this section, we consider the issues raised by imposing further price regulation, in particular the potential negative implications for Cell C, USALs and value added network operators (VANs), industry network investment and the extension of services to marginal customers.

5.3.1 Impact of one-off price reductions

In simple terms, a one-off price reduction might be thought likely to result in benefits to consumers equal to the size of the price reduction multiplied by the volume of calls (pre or post the price reduction). However, such an action could

- reduce incentives on different market players to invest, and in the longer term this could have an adverse impact on consumers.
- could harm competitors, such as USALs, VANs and Cell C, as will they now have to compete against a lower regulated price

⁷⁶ The positive impact of increasing the number of operators on cellular penetration in 140 countries is shown in "The evolution of markets under entry and standards regulation – the case of global mobile communications, H Gruber and F Verboven, International Journal of Industrial Organisation, 19 (2001). Similarly in analysis of data for the former socialist countries the same results are found in "Competition and Mobile Communications in Former Socialist Countries", M Marcu, University of Florida, 2004.

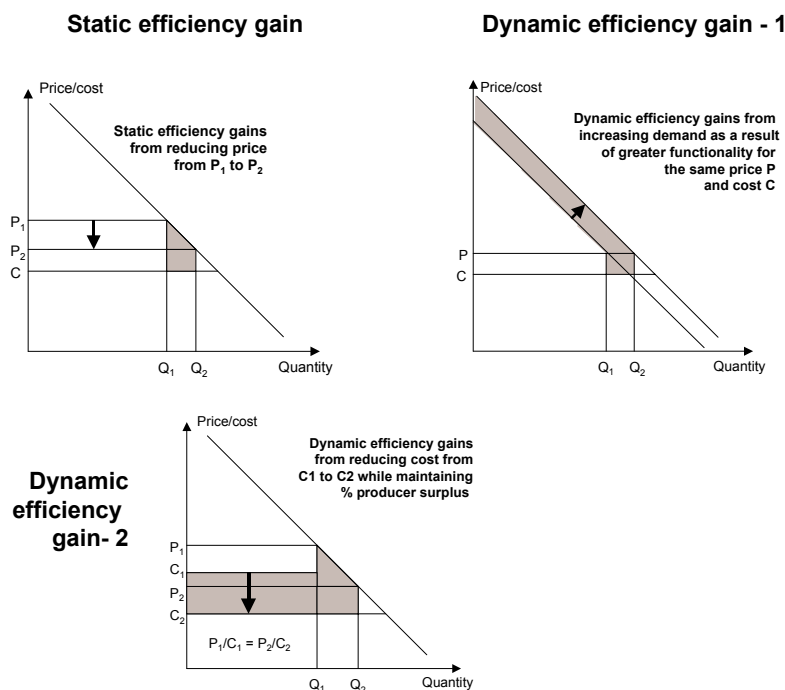


- lead to expectations of further “one-off” price reductions. If ICASA, the competition authority and government more generally cannot credibly commit not to reduce prices again some time in the future, then companies will be deterred from making future investments in the communications sector in South Africa (because the potential returns to investment may be regulated away).

5.3.2 The impact of price regulation

A simple analysis of the costs and benefits of price regulation might conclude that the benefits are considerable. However, Figure 7 shows that gains from demand growth, shown by the chart labelled dynamic efficiency gain-1, typically outweigh those from price reduction. An imposed price reduction therefore involves a risk of reducing consumer and national benefits over time if it slows growth in supply and/or demand. Whilst lower prices could increase usage, they may reduce penetration, since lower prices would make marginal customers less attractive and would reduce the prospects for competition.

Figure 7 Dynamic vs static welfare gains



Price regulation also risks undermining the viability of marginal competitors in the market (Cell C and USALs) and would also reduce incentives to extend network coverage and to increase penetration.

Even if after consideration of the static and dynamic impacts of regulation it is concluded that price regulation could deliver benefits it should be recognised that in telecommunications markets regulated cost based prices are likely to be too low. Reasons for this conclusion include

- *ex ante* regulation does not take account of the possibility of failure because it assumes normal returns for regulated entities. Above normal returns are required to compensate for the risk of failure. Failures do happen. For example, initially even 2G services failed (e.g. one UK operator gave back a licence) and we have seen the same happen with 3G licences. The difficulty is that *ex ante* returns are not observed and estimates of the cost



of capital based on CAPM do not include the *ex ante* risk of failure. However, we do know the direction of bias.

- the option value of the investment is not taken into account.⁷⁷ Many investments are irreversible and so lead to a loss of flexibility for the investor. Access users take advantage of this flexibility by not committing to their own investments. There are a number of ways in which this value might be priced, including market benchmarks, the prices of leases and creating a market for access contracts of different durations. We note that Ofcom (in the UK) is looking at including the option value of investments in its analysis.
- where assets are long lived and replacement asset prices are expected to decline over time, the efficient competitive price path will be above that which a static assessment based on either historic or replacement costs would suggest.⁷⁸ Mandy and Sharkey (2003)⁷⁹ show that static LRIC models could substantially under (over) estimate dynamic competitive prices when asset prices are falling (or rising). It is calculated that when investment costs are falling by 11 per cent per annum for switches, prices should be 50 per cent higher than those calculated using a static model. The error involved in static estimates can therefore be large.
- unrealistic network models which do not reflect that fact that real networks develop over time may be used in costing (particularly in Long Run Incremental Cost Models). In 2003 the FCC *“tentatively conclude that our TELRIC rules should more closely account for the real-world attributes of the routing and topography of an incumbent’s network in the development of forward-looking costs.”*⁸⁰

If regulated prices are too low then investment will be deterred and there is a risk services will not be provided to customers not currently served. These arguments were recognised by the US Federal Communications Commission in relation to its decision to remove requirements for shared access to infrastructure at mandated prices in relation to unbundled network elements for new fibre to the home in October 2004. In reaching its decision in relation to fibre to the home the FCC was:⁸¹

“persuaded that making such a change in our rules is necessary to ensure that regulatory disincentives for broadband deployment are removed for carriers seeking to provide advanced services to mass market customers using FTTC technology.”

Paragraph 9

The FCC decision was based on a judgement over the costs (in terms of delayed and reduced investment) versus the benefits (competitive access and lower prices) of regulation, but also reflected an acceptance that the Long Run Incremental Cost (LRIC) pricing

⁷⁷ Robert Pindyck. February 2004. “Mandatory unbundling and irreversible investment in telecoms networks.” NBER Working Paper 10287. and March 2005, “Pricing capital under mandatory unbundling and facilities sharing”, NBER 11225

⁷⁸ P Marks and B Williamson, 2004, “Profitability tests in competition law and *ex ante* regulation”, *Utilities Policy*. www.indepen.co.uk/panda.html

⁷⁹ Mandy, D and Sharkey, W, 2003. ‘Dynamic pricing and investment from static proxy models’, Federal Communications Commission OSP Working Paper Series #40.

⁸⁰ FCC. 15 September 2003. “Review of the Commission’s Rules Regarding the Pricing of Unbundled Network Elements and the Resale of Service by Incumbent Local Exchange Carriers.” Paragraph 52.

⁸¹ FCC. 14 October 2004. Review of the Section 251 unbundling obligations of incumbent local exchange carriers. http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-04-248A1.pdf



methodology used by the FCC did not provide sufficient assurance of adequate returns for investors.⁸²

Investors responded to the decision with announcements of accelerated and more ambitious plans in relation to fibre deployment which will enable access speeds of up to 100Mb/s. For example, SBC Communications has said it will:⁸³

"dramatically accelerate its plan to build a new fiber-optics network into neighborhoods, providing 18 million households super high-speed data, video and voice services in two to three years — rather than five years as previously announced."

5.4 Regulation of call termination

When considering the issue of whether to regulate call termination or not, ICASA should not simply take the approach that has been used in some countries where a regulated calling party pays approach operates⁸⁴ and apply it to South Africa. There are two very important reasons why South Africa is different

1. In developed countries, regulation of call termination has been justified in terms of the fact that it removes an unfair subsidy from fixed to mobile users.⁸⁵ In developed countries people who are fixed only customers tend to be poorer/older than the rest of the population. This is not the case in South Africa where a possible cross subsidy from relatively wealthy fixed/mobile customers to poorer mobile only customers may be viewed as desirable and indeed necessary to support the continued diffusion of mobile services to the remaining 50% of the population.
2. In South Africa, consumers may choose tariff options that offer receiving party pays. As discussed in Chapter 3, competitive pressures are stronger under RPP and this means that termination rates are not regulated in any country that has RPP (e.g. the US and Canada). The situation in South Africa is a hybrid RPP/CPP system and so the case for regulation is weak.

Regulation of call termination rates could therefore have the following adverse impacts

- Low income individuals would be less able to afford mobile services since termination revenues would no longer support otherwise marginal customers
- Maintenance and extension of services in rural areas might no longer be profitable.

Given the fact that commercial arrangements have worked well and led to pro-poor innovations, any proposed intervention should be carefully assessed in relation to its possible distributional impacts.

⁸² At a workshop on "Emerging regulatory models" at the London Business School on 6 December 2004, William Kehoe, Senior Attorney at the FCC, noted that the risk that TELRIC based prices would provide insufficient return to investors was a key motivation for the decision to forbear in relation to new fibre.

⁸³ SBC Communications. 14 October 2004. "SBC To Rapidly Accelerate Fiber Network Deployment In Wake Of Positive FCC Broadband Rulings." <http://www.sbc.com/gen/press-room?pid=5097&cdvn=news&newsarticleid=21427>

⁸⁴ For example, some countries in Europe.

⁸⁵ Competition Commission. December 2002. "Reports on reference under section 13 of the Telecommunications Act 1984 on charges made by Vodafone, O2, Orange and T-Mobile for terminating calls from fixed and mobile networks." Volume 1. Paragraph 2.428.



We also showed in Chapter 3 that the ratio of fixed-mobile to fixed-fixed interconnection rates is about five in South Africa as compared with fifteen in the EU.

Finally, we note that any attempt to regulate both retail and wholesale tariffs is likely to be problematic for both the industry and the regulator. Determining the “right” margin between retail and wholesale tariffs is technically difficult to do and involves the regulator in micro-management of the industry. Every time a retail tariff changes there will be calls for a corresponding change in wholesale tariffs otherwise competitors’ margins may be squeezed.



Appendix A: Competitive developments and tariff plan summary: Vodacom initiatives and responses

1996

November 1996 – Launched Vodago

MTN also launched a prepaid offering

1999

December 1999 – Offered SMS to prepaid customers

August 1999 – Launched Incomer voucher (365 ATW) – offering customers access to the network for R10 per month

2001

February – Launched free 'call me' service – both MTN and Cell C offer this product as well

October - Launched 4U Prepaid and 4U Contract – introduced per second billing from the first second. MTN followed with the same tariffs but customers had to pay R10 per month to have this tariff plan. Due to competition, MTN has now done away with the R10 monthly fee for the tariff

Cell C launched a similar per second tariff plan from the first second

Since the launch of 4U have continually decreased the tariff during peak periods (and marginally increasing the offpeak tariff)

October – Launched off-peak SMS tariff of 25c (peak rate remained at 75c)

MTN and Cell C followed shortly afterwards

December – Launched SmartStep – introduced lower all day tariffs for high cellular users. Cell C launched an allday tariff in competition

Vodacom prepaid customer now had 3 tariff plans to choose from

December– Launched FreeChange – offering prepaid customers the ability to switch tariff plans free once every 30 days. MTN and Cell C have similar offerings

2002

October – Launched prepaid MMS (offered free until 9 January 2003)

November – TWL rule reduced from 180 days to 94 days

November – Off-peak SMS tariff increased from 25c to 30c

2003

Launched prepaid roaming in 5 countries where the other operators have the correct technology

No other operator is offering prepaid roaming

January – Time Window Lock unlocked to allow for incoming calls – this allowed customers who did not have an active time window and therefore could not make calls to receive calls and SMSs

July – SMS tariff increase (peak: 75c to 80c and off-peak: 30c to 34c)



July – Tariff increase on 4U and differentiate on and off-net calls

September – Replacement pack promotion selling at R49 with R29 worth of airtime

October – Launched TopUp hybrid products (MTN launched a single hybrid package one month earlier. This is a unique product offering which is receiving a lot of uptake and interest among customers. Since October Vodacom have launched 4 hybrid packages

Cell C has since launched 48 hybrid packages

Have not increased the tariffs on any of the top-up packages

November – Launched Call Sponsor which enables contract customers to pay for selected calls made by selected prepaid customers. This is to ensure that prepaid customers are always in touch even if they have depleted their airtime credit.

December – Increased time window on R29 and R55 vouchers to 90 days – the time window (access to the network) was increased from 30 days to 90 days

December – Introduced the activity rule on Vodago and honoured time window

December – Activity rule increased from 3 months to 7 months. All operators have an activity rule – Vodacom has the most lenient activity rule. Essentially the requirement is for a customer to have received or made a call, SMS, data, etc over a 7 month period to remain active on the network

MTN – must make a billable one minute call to another MTN customers

Cell C – must recharge within 4 months.

2004

February – Launched Yebo 5 Voucher: 5 Pin voucher valued at R12 per PIN Introduced a lower denomination recharge voucher

In reaction Cell C launched a R5 recharge voucher. Both networks are making recharging more accessible to our customers

Cell C launched a pre-paid SMS voucher that costs R39 for 100 anytime SMS's, equating to a rate of 39c per SMS.

July – Launched commercial flexi-recharge (R29 to R1000) – this enables customers to recharge via ATMs, etc with any denomination they want.

August – Launched 30 day Itemized bill for prepaid none of the other operators are offering an itemized bill for their prepaid base

August – Launched Prepaid Passport Voucher – this voucher guarantees a customer his or her cellphone number for 2 years. These customers are not subject to the activity rule as stated previously if they are inactive.

MTN offers a similar option after Vodacom's launch.

August – Launched Airtime Transfer – this is the ability for a contract/ prepaid/ topup customers to recharge another prepaid/ topup customer. This is making it easier for customers to obtain credit.

MTN launched a similar service 1-2 months prior to us. MTN charges their customers R2.80 per transfer. Vodacom does not charge their customers to transfer airtime



August – Launched 4U Super Six Starter Pack – includes 10 free SMS’s on first recharge – launched an introductory starter pack

All operators are now moving towards offering additional incentives for customers to purchase starter packs

December – Launched SMS Voucher – offering prepaid and top-up customers the ability to purchase 150 SMS for R49 – 33c per SMS

MTN recently launched SMS bundles for their prepaid base with rates ranging from 50c to as low as 21c

2005

January – launched TopUp itemized billing

March - Launched SMS Recharge service. – the ability for customers to be able to recharge their accounts using SMS channel – customers can recharge via IVR or USSD

March – launched please recharge me service. The ability for a customer to send a message to another Vodacom customers to recharge their account. MTN launched this service when they launched their airtime transfer similar product.

April - Launched prepaid roaming for TopUp.

May – Night-Talk promotion - 6 months promotion to customers offering lower rates between 10pm-5am everyday.

August – MTN announces its WOW WOW bundle. Vodacom launches its “Happy Hours” tariff. MTN responds with changes to its WOW WOW offer

September - Vodacom announces further reductions in peak time pre-paid tariffs

SUMMARY OF VODACOM TARIFF PLANS

TARIFF PLAN	TARGET MARKET	EXPLANATION
Name of tariff plan	Target market for the relevant tariff plan: e.g. youth for 4U:	Give an explanation why this tariff is suited for the target market :
Business Call	Mostly aimed at business market, although not high cell phone users	A monthly subscription fee is charged and no free minutes are included. The call rates are relatively cheap. This plan is suited for customers who don't use their phones a lot, and make a lot of off peak calls, therefore they don't require a package with Talktime minutes.
Business Call S	Per sec version of above	As above



Family Call S	Legacy package, small monthly subscription fee and average call rates aimed at the leisure user.	Newer competitive offers are substituting this plan.
Frequent Call	Business market, with higher usage than the Business Call customers	A higher monthly subscription fee is charged than for business call, and the call rates are cheaper than business call. Suited for customers who call more than the business call customer as the cheaper rates make the package more attractive for frequent users.
Frequent Call S	Per sec version of Frequent call	As above
Talk 100 S	100 bundled minutes, for leisure or business customers who call anytime.	The lowest bundle of Talktime minutes available, this package is for customer who don't call often and therefore only require a small bundle of talktime minutes.
Talk 120	Unitised version of T100S	As above
Talk 200 S	Medium cellphone users, not heavy users, but still quite reliant on their phone.	Medium sized bundle of minutes, for regular cellphone users
Talk 240	Unitised version of T200	Unitised version of T200S, for customers who prefer not to be billed per sec, as the rates are slightly cheaper 60/30.
Talk 500	Designed for heavy business users who need to call anytime and rely heavily on their phones, billing is only per second	This is one of the most popular packages for the business market as the in bundle rates are competitive and 100 SMS is also included in the subscription
Corporate 500	Designed for heavy business users who mainly call Vodacom and Telkom	The in-bundle rate is cheaper than that of the T500, as it only applies to on-net calls.



	numbers	
Talk 1000	Users that have a requirement for more than 500 minutes per month, only per second billing	A bundle of 200 SMS is included in this package, the minutes apply to anytime, and it is well suited for a customer who spends a lot of time making calls
Weekend Everyday	Leisure, non business users who make most of their calls in cheaper off-peak time periods	The bundle of 120 minutes is only applicable for off-peak calls, thereby catering for cheaper calling rates when these customers make most of their calls.
Weekend Everyday S	Same as Weekender, but the per second option	See above.
Messenger	Users who mainly use data applications such as telemetry	A very low monthly subscription fee with SMS at 22c, and high voice rates (R4.00) as the voice service is not often used.
Data Package	Users who have a requirement for Data only, eg telemetry applications	The Data package was launched on 1 Aug 2005 as a result of customer demand for a package similar to Messenger but without the voice capabilities.
Blackberry E-mail Plus	Business contract customers requiring push e-mail.	Month on month bolt on to any existing contract package. Contract with e-mail and no voice.
Blackberry Talk 100	Business customers requiring push e-mail as well as the ability to make calls	24 month contract which provides customers with unlimited e-mail, as well as 100 anytime voice minutes. Suitable for customers requiring voice and data from the same device
3G ONE	Mobile/Corporate Professionals requiring immediate and fast access to	Focusing on providing these segments with a data-centric dedicated contract that



	<p>their corporate Intranet, email and the Internet with a dedicated and customized device suitable for this access – high volumes of data usage and demand.</p>	<p>serves their data needs, and bundles the contract with the Vodafone Mobile Connect Card for Laptop access to the internet via 3G/GPRS.</p>
3G 500	<p>Mobile/Corporate Professionals requiring immediate and fast access to their corporate Intranet, email and the Internet with a dedicated and customized device suitable for this access – medium volumes of data usage and demand without a price penalty on data cost per usage when compared to bigger 3G one package .</p>	<p>Focusing on providing these segments with a data-centric dedicated contract that serves their data needs, and bundles the contract with the Vodafone Mobile Connect Card for Laptop access to the internet via 3G/GPRS – a smaller data bundle is included with a smaller monthly commitment to suit the medium levels of data usage and provide alternative to high-end 3G one package.</p>
Corporate Direct Connect	<p>Young and up and coming target market 18-25</p>	<p>Unique tariff plan in the market that does not have a monthly subscription. Customers do not have a minimum payment 4U is a single tariff plan and customers can choose whether they want to prepay or postpay</p>
4U Contract	<p>Youth – Up to the age of 26 although the tariff plan has been taken up by all ages</p>	<p>Offering customers who are high offpeak users an extremely low tariff rate</p>
4U Prepaid	<p>Entrepreneurs</p>	<p>For customers who have a need to make calls during peak and offpeak times</p>
Vodago	<p>Business user</p>	<p>These are for prepaid customers who spend a lot of time on their phone making long calls. Reduced tariff after the first minute of the call</p>



Family Top Up	Family	For family users who want convenience of automatically being topped up and to remain in control of their spending
Business Top Up	Business user	For business users who want convenience of automatically being topped up and to remain in control of their spending.
Top Up 590	High all day business user	An all day rate. A need to remain in control of their spending
Top Up Lite	Students or Youth market	Low off-peak tariff for people who need to stay in control of their spending
BOLT-ON	TARGET MARKET	EXPLANATION
GPRS/3G	Both the individual and professional data user – with data usage demands ranging from minimal to high. A range of data bundles are available to “bolt on” to any existing contracts and customers can choose the size of the data bundle that best suits their individual needs. In addition, they can change bundles on a monthly basis to select the optimum bundle with the optimum price efficiency.	A very flexible mechanism that is added to existing contracts as and when they choose and that allows customers to select the best priced option to suit their needs without lengthy commitment to a cost.
MMS	Consumer market: teenagers and young adults.	A service that allows subscribers to send graphics, sound and video clips as a multimedia message



Appendix B: Potential sources of bias in assessing profitability and in cost modelling

Bias in assessing profitability and cost modelling can arise from assumptions concerning: asset lives and asset values; network configuration; capacity utilisation; risk and the value of flexibility. The nature of these biases is discussed in this Appendix.

Assumed asset lives and values

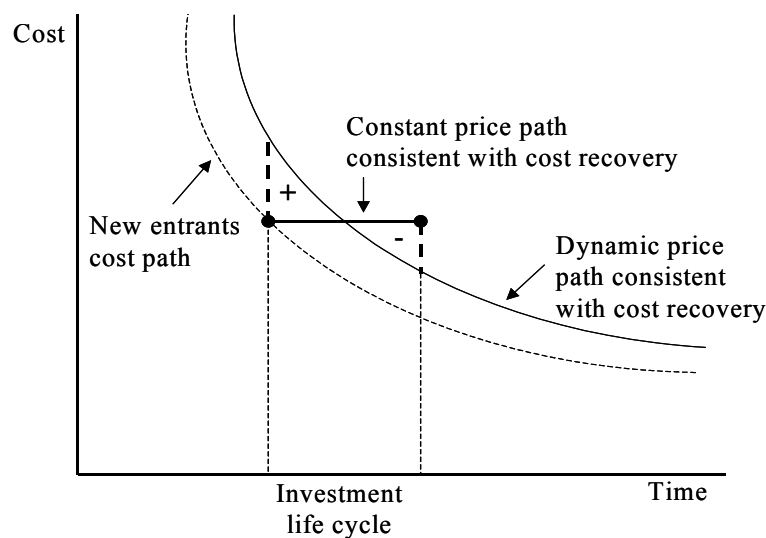
When assets are periodically re-valued, only one unique depreciation profile yields an NPV of exactly zero. William Baumol (1971) proved this result, noting:

*"we show that... is the only depreciation rule that (a) permits payments to decrease in proportion with the rate of fall of the replacement cost of the asset, and (b) permits the original cost of the asset to be recouped by depreciation payments over its n-year life."*⁸⁶

Forward looking costing methodologies (Long Run Incremental Cost or LRIC models) therefore introduce a possible source of bias in cost estimates and the NPV of returns if assumed asset lives differ from actual asset lives.

Where asset revaluation is more frequent than the life of assets, and replacement asset prices are expected to decline over time, the efficient competitive price path will be consistently above that which a static assessment based on either historic or replacement costs would suggest. Figure B1 from Marks and Williamson illustrates this.⁸⁷

Figure B1: Dynamic price path with declining asset prices



The upper curve, the dynamic price path, is always above the new entrants' cost since declining prices and negative returns, are anticipated over the latter half of the recovery period. The horizontal line spans the asset life for a new asset and illustrates the cost on an

⁸⁶ William J. Baumol. 1971. "Optimal depreciation policy: pricing the products of durable assets." The Bell Journal of Economics and Management Science Vol 2(2). Page 651.

⁸⁷ P Marks and B Williamson. June 2004. "Profitability tests in competition law and ex ante regulation." Utilities Policy, Volume 12(2).



averaged basis. Relative to an historic cost based estimate of what returns ought to be, a competitive equilibrium would initially involve returns above the estimate (the +ve region) and later below the estimate (the -ve region).

Mandy and Sharkey (2003)⁸⁸ show formally that static LRIC models can substantially under (over) estimate dynamic competitive prices when asset prices are falling (or rising), and set out how these biases might be corrected (on average).

On the face of it errors in assumed asset lives and depreciation need only involve a random error in the NPV of returns. However, unanticipated technical progress is likely to lead to bias on average, even where anticipated technical progress is taken into account on a best endeavours basis. The reason for this is that when a new technology arises that fundamentally changes the cost structure of an industry, the use of the new technology in LRIC modelling will strand the old assets unless they are fully depreciated before the switch-over occurs.

Failure to take proper account of technological discontinuities could discourage the implementation of new and more efficient ways of providing network services. In a competitive market prices will reflect the anticipated likelihood of stranding. It is difficult to mimic this under LRIC. An alternative would be to allow regulated firms only normal returns, but also to provide for recovery of assets that are commercially stranded via some mechanism e.g. levies on inelastic service charges as in energy markets in the US.

Assumed network configuration

Real networks are not continuously rebuilt, but evolve over time in responses to changes in technology and demand. Feasible network configurations will therefore appear less efficient than a hypothetical alternative optimised at a point in time. The FCC expressed the concern as follows:⁸⁹

"One of the central internal tensions in the application of the TELRIC methodology is that it purports to replicate the conditions of a competitive market by assuming that the latest technology is deployed throughout the hypothetical network, while at the same time assuming that this hypothetical network benefits from the economies of scale associated with serving all of the lines in a study area. In the real world, however, even in extremely competitive markets, firms do not instantaneously replace all of their facilities with every improvement in technology. Thus, even the most efficient carrier's network will reflect a mix of new and older technology at any given time." (Paragraph 50)

The bias this consideration introduces is conceptually similar to that introduced by technical progress in relation to individual assets, but would be harder to correct. The only practical alternative is to use a cost model that reflects the actual network under consideration. The FCC tentatively made the following conclusion in their review of pricing rules:⁹⁰

⁸⁸ Mandy, D and Sharkey, W, 2003. 'Dynamic pricing and investment from static proxy models', Federal Communications Commission OSP Working Paper Series #40.

⁸⁹ FCC. 15 September 2003. "Review of the Commission's Rules Regarding the Pricing of Unbundled Network Elements and the Resale of Service by Incumbent Local Exchange Carriers". WC Docket 03-173.

⁹⁰ FCC. 15 September 2003. *ibid*



"We tentatively conclude that our TELRIC rules should more closely account for the real-world attributes of the routing and topography of an incumbent's network in the development of forward-looking costs." (Paragraph 52)

Capacity utilisation

The optimal level of capacity utilisation over time is never 100% due to both anticipated and unanticipated demand changes. Anticipated demand growth and lumpy investment imply low capacity utilisation at the beginning of an assets life and a steady rise in utilisation until replacement or enhancement is required. Unanticipated changes in demand imply that a prudent margin of spare capacity is required since the social costs of denying service are typically very large.

Baumol and Sidak set the problem out as follows:⁹¹

"A utility's investment in seemingly "excess" capacity provides an immediate option to consumers, an option having substantial economic value if demand unexpectedly surges, supply unexpectedly collapses, or both occur simultaneously. That option is analogous to insurance. It is especially true for an outlier event like the California electricity crisis that insurance confers its greatest advantage upon the insured that are the very consumers whom public utility regulation exists to protect."

While apparently "excess" capacity is clearly likely to be socially optimal, it is difficult to second guess the optimal level of capacity for modelling purposes. The cost of providing capacity and the value of the option to use such capacity will be imperfectly known.

In competitive areas of the market rivalry between alternative suppliers offering competing price-service bundles can be expected to lead to good outcomes (provided consumers are reasonably informed). In price regulated parts of the market a pragmatic approach may be to ensure that the utility has well founded objectives (and incentives) in relation to quality of service, and to assume that the capacity choices that flow from these constraints are optimal. In other words actual capacity utilisation should be used for modelling purposes.

Risk

Non-diversifiable market risk is in principle captured by measuring or finding a proxy for the "beta" factor in the Capital Asset Pricing Model (CAPM). The beta measure captures the non-diversifiable element of returns flowing from an asset (or more usually in practice a company as a whole). This measure does not capture *ex ante* investment risk – the risk that an investment fails and produces no return or a return that is less than expected.⁹²

The appropriate margin on returns to reflect the *ex ante* risk of failure for investment is difficult to capture since it is subjective. In competitive markets rewards for *ex ante* risk show up not in the market cost of capital, but in high *ex post* returns (for example, for a successful pharmaceutical product). In the absence of a method for objectively quantifying *ex ante* risk the alternative is to allow normal returns on all prudent investment, where prudence is not judged with hindsight, but based on the information available at the time the decision to invest was taken.

⁹¹ William Baumol and Gregory Sidak. 2002. "The pig in the python: is lumpy capacity investment used and useful." *Energy Law Journal*, Volume 23.

⁹² Lawrence Kolbe and William B. Tye. May 1995. "It ain't in there: the cost of capital does not compensate for stranded-cost risk." *Public Utilities Fortnightly*.



One possible response to the failure of standard methods used to assess the cost of capital *ex ante* risk is to allow a regulatory holiday for a period of time following investment. The opportunity to earn “excess returns” during this period may compensate investors for *ex ante* risk – in an analogous manner to Patent protection for innovations.

The Australian Productivity Commission has set out the following options for regulation of access prices so as to deal with *ex ante* risk and truncation of *ex post* returns:⁹³

“If firms consider that regulators are fallible and may have difficulty separating rewards for risk from monopoly returns, then this has adverse consequences for investment. Access pricing that fully recognises regulatory uncertainty and the scope for regulatory error may be a remedy – but this may be hard to implement and may lack ex ante credibility. Access holidays, regulatory compacts and other ex ante options may provide greater certainty for carriers prior to making their investments, but they too have some practical implementation problems.”

Gans and King (2004) analysed the problem and concluded that the optimal approach is to allocate any economic profit (“excess returns”) in the telecommunications industry to the investor.⁹⁴ Gans and King also analysed the length of regulatory holidays required to deal with the problem of truncation of upside returns, concluding that optimal holidays need to be judged on a case-by-case basis. Examining a specific case they concluded that:

“for relatively high risk projects involving infrastructure with a thirty to fifty year life span, a ten to twenty year holiday would seem appropriate.”

Value of flexibility

In a competitive market the period of commitment to purchasing the services of an asset could be expected to be reflected in the price of access, with the lowest price providing a normal return to the supplier only in the case where the term of the contract matches the life of the asset. In a competitive market shorter term leases would be expected to incur higher charges.

In a regulated context access providers incur the costs of foregone flexibility when they invest, but consumers of access services do not necessarily pay a flexibility premium when they take up the offer of short term regulated terms of access.

Formally, whenever an investment is at least partially irreversible, there is uncertainty and a choice over the timing of investment where there is positive value attached to the option of waiting (known as a “real option”). Since real options can only be positive, failure to take them into account in price setting will bias allowed prices downwards wherever the underlying conditions of irreversibility, uncertainty and choice apply.⁹⁵

⁹³ Productivity Commission. September 2001. “Telecommunications Competition Regulation Inquiry Report”,. Page 294-295.

⁹⁴ J Gans and S King. March 2004. “Access Holidays and the Timing of Infrastructure Investment.” *The Economic Record*, Vol. 80, No. 248.

⁹⁵ Note that real options arise for both monopoly investment decisions and under competitive conditions, in other words competition does not eliminate the value of waiting (Dixit and Pindyck. 2004. “Investment under uncertainty.” Princeton University Press).



In a working paper published in February 2004, Pindyck discusses the implications of irreversible investment in telecoms networks with unbundling and TELRIC pricing.⁹⁶ Pindyck argues that:

"Of central importance to this arrangement [use of incumbents network elements on regulated terms] is that network owners must share their capital with rivals at the option of the rivals, who are free to utilize facilities when they desire to do so, for services of their choosing. They are under no obligation to financially support network investments. This operational flexibility is of great value to entrants, and is very costly to supply by incumbents. However, the pricing formula used by regulators to set lease rates for capital (i.e., wholesale prices for access to network infrastructure) does not compensate incumbents for these rights."

In a more recent paper in August 2005 Pindyck sets out a series of calculations in relation to real options for Regional Bell Operating Companies in the US to show that the current TELRIC formula undercompensates incumbents. Pindyck concludes that:⁹⁷

"inordinate time and resources have been spent on the question of whether an ILEC's historic average cost of capital is 12.9 versus 13.1 percent. We have seen that the correct cost of capital input for TELRIC should be significantly larger than either of these numbers; at issue is whether it should be larger by about 1 percentage point or 4 or 5 percentage points."

There are several options for dealing with this bias. First, adjust access prices upwards to account for real options (the required calculations are complex, though market proxies based on term of lease and price information might provide a rule of thumb). Second, require a long term commitment to access. Third, eliminate or reduce the impact of market uncertainty by assuring investors of a normal return irrespective of the level of demand (perhaps by allowing cost recovery in market segments where the elasticity of demand is low, such as last mile access).

While issues in relation to real options have been discussed in the literature for over a decade, and applied in commercial decision making (for example in the oil industry) they have only recently received serious consideration in a regulatory context. In what may be a first, Ofcom in August 2005 decided to take account of real options.⁹⁸

"Ofcom concludes that, going forward, its analysis should take account of the value of real options where appropriate.... Ofcom proposes to assess the value of real options on a case-by-case basis, and encourages stakeholders to make submissions to Ofcom on this subject in cases where they feel that wait and see options have a significant value. Should the theoretical case for real options be demonstrated, Ofcom would then determine in consultation with stakeholders whether and how best to put this into practise."

⁹⁶ Robert Pindyck. February 2004. "Mandatory unbundling and irreversible investment in telecom networks." NBER Working Paper 10287. Page 1.

⁹⁷ Robert Pindyck. August 2005. "Pricing capital under mandatory unbundling and facilities sharing." AEI-Brookings Joint Centre for Regulatory Studies. <http://aei-brookings.org/publications/abstract.php?pid=968>

⁹⁸ Ofcom. 18 August 2005. "Ofcom's approach to risk in the assessment of the cost of capital - Final Statement." http://www.ofcom.org.uk/consult/condocs/cost_capital2/statement/



Appendix C: Unintended consequences – the interaction of asymmetry and uncertainty

All regulatory decisions are arguably made with uncertain information, certainly in relation to future developments and most probably in relation to current circumstances.

If uncertainty had symmetric implications in terms of costs and benefits, decisions could be reversed without cost, and outcomes were not dependent on the sequence of regulatory decisions, then uncertainty *per se* would arguably have minimal implications for good decision making. In practice these conditions are unlikely to be met and uncertainty and its implications should be explicitly taken into account in regulatory decisions both as a matter of prudent decision making, and in more formal analysis of costs and benefits. A central case analysis is not necessarily the best basis for a decision.

Uncertainty may not just change a decision over whether to regulate or not, but may also alter a decision about how to regulate. There are likely to be many circumstances in which the costs of an “error” relative to the best possible decision with perfect information are greater in one direction than the other. A clear example, around which there is increasing recognition, is the costs of setting a regulated price a little too high versus a little too low.

In the former case there is a loss of consumer surplus – though this is likely to be small. In the latter case timely and efficient investment is foregone, and a new service may simply not emerge. There can therefore be a marked asymmetry in the costs of alternative “mistakes”. In the face of such asymmetry, and uncertainty over the information required to make the decision (in this case setting a price), net benefits are maximised by introducing ‘rational bias’ into the decision. In other words prices should not be cost reflective but should also reflect the costs of possible ‘mistakes’ in setting prices.

Arguments for erring on the side of caution i.e. setting regulated prices above an unbiased cost estimate, have been recognised in regulatory analysis and proceedings. For example:

“...given the asymmetry in the costs of under and over-compensation of facility owners, together with the information uncertainties facing regulators, there is a strong in principle case to ‘err’ on the side of investors...” Australian Productivity Commission, March 2001⁹⁹

“...with investment being a priority, it is preferable to set the cost of capital too high rather than too low given the downside risk.” UK CAA, February 2002¹⁰⁰

These responses are pragmatic and involve a judgement over how much to adjust prices relative to costs, or indeed in the case of new investment whether to regulate at all. One approach might be to set a certain confidence limit in setting prices in relation to costs, for example, to set prices one standard deviation above the central cost estimate. However, such a simple rule of thumb will not be right in every circumstance.

A more sophisticated approach is to consider the degree of uncertainty and the extent of asymmetry in terms of possible losses together in deciding how much to bias prices away

⁹⁹ Australian Productivity Commission. March 2001. “Review of national access regime – draft report.” Page 71.

¹⁰⁰ UK CAA. February 2002. “CAA recommendations to the Competition Commission, Cost of Capital Annex”. Paragraph 1.140.



from costs, or whether to regulate at all. Wright et al (2003) in a report for UK economic regulators and the Office of Fair Trade developed this point, noting that:¹⁰¹

“In cost of capital calculations for regulation, the loss from incorrect estimation takes the form of inefficient price setting and investment decisions. If the price cap is set too low (i.e., the cost of capital is underestimated), then the firm will make an inefficiently low investment in the market, which leads to a deadweight loss. If the price cap is set too high (i.e., the cost of capital is overestimated), then the regulator fails to restrain the exercise of market power by the monopolist; the deadweight loss in this case arises from price being set above marginal cost.”

In the following figures we develop a simple empirical model which demonstrates that optimal pricing depends on the extent of uncertainty and asymmetry, and that in some circumstances the optimal response is not to regulate at all – at least whilst uncertainty is large.

The methodology is based on the following assumptions:

- i. The potential entrant will decide to invest or not depending on their expected returns, and will have a threshold price in mind that would make entry profitable.
- ii. The regulator has an unbiased estimate of expected costs as a basis for setting a regulated price, and knows that this estimate is drawn from a distribution with a given variance. For simplicity we assume the underlying distribution is normal.
- iii. The regulator has a view of the relationship between the allowed price (relative to the price required for entry) and welfare. For simplicity we assume that the relationship is based on an assumption that the supply curve is horizontal at a price of 0.5, and that demand is linear with a slope of -1 and price intercept of 1 (as illustrated in Figure 1).

The shift in the cost distribution that maximises welfare then provides an estimate of the adjustment that should be applied to the cost estimate in setting prices in order to maximise expected welfare. In Figure B1 a standard deviation of 0.15 is used, and an adjustment of 0.168 is calculated i.e. allowed prices should exceed the cost estimate by 34%.

In Figure B2 the welfare function is modified to allow for the possibility that a monopoly will maximise profits and that in the case considered the profit maximising price is 0.75, a mark-up of 50% on costs. This puts a ceiling on prices and a floor on welfare shown by the horizontal line to the right of a price of 0.75. The calculated adjustment in this case is 0.265, which implies a regulated price of 0.765.

This is above the price a monopoly would set to maximise profit, and therefore corresponds to full forbearance. In other words the optimal price cap would have no impact on the market under these assumptions.

¹⁰¹ Wright, Mason and Miles. February 2003. “A Study into Certain Aspects of the Cost of Capital for Regulated Utilities in the U.K.” Report commissioned by the U.K. Economic Regulators and the Office of Fair Trading.



Figure C1: Biasing pricing decisions to maximise surplus – price cap with high variance

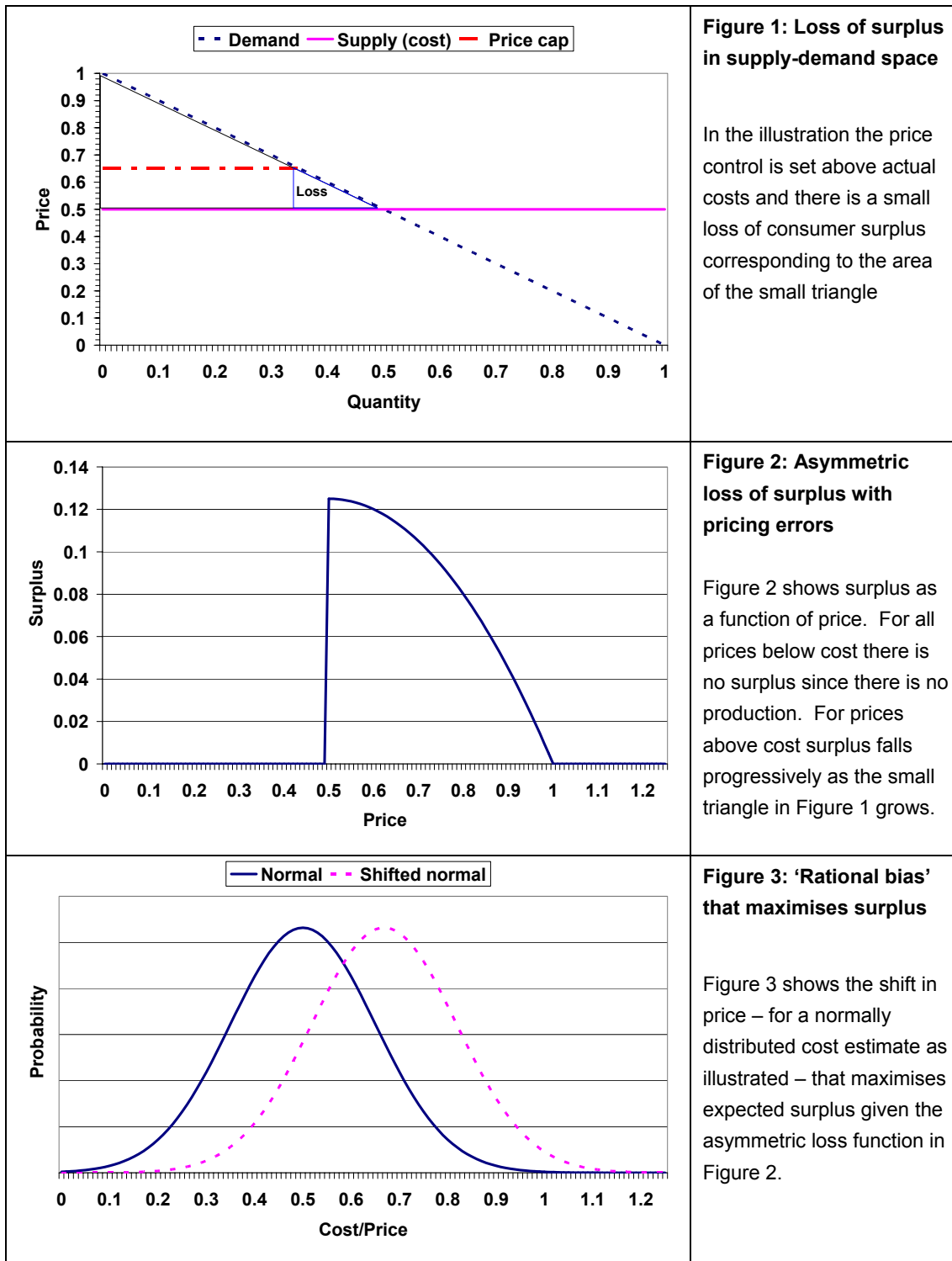
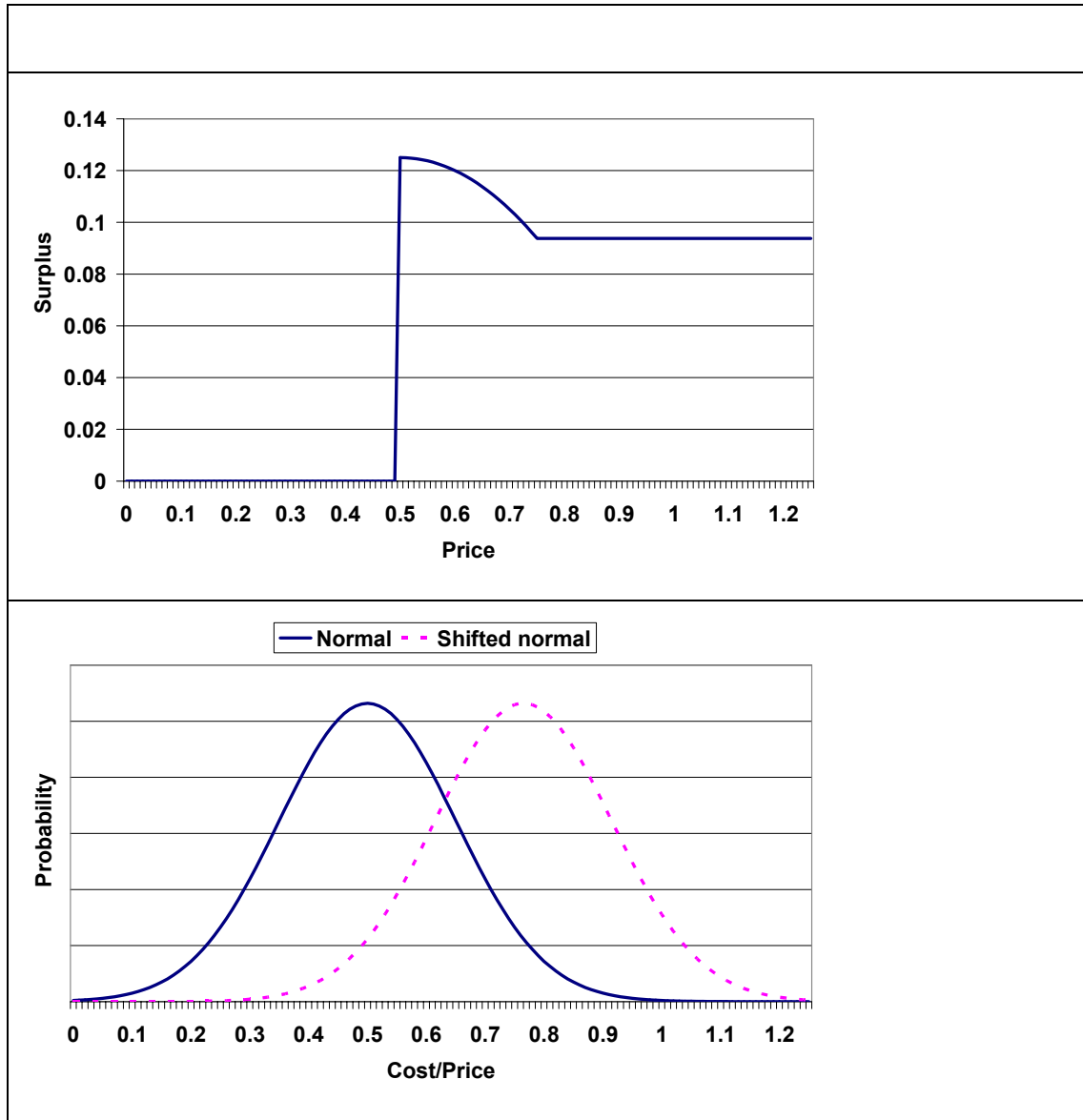




Figure C2: Biasing pricing decisions to maximise surplus – price cap with high variance

Standard deviation = 0.15

Optimal price shift = 0.265 i.e. greater than monopoly price and therefore corresponds to forbearance





Appendix D: Legend for Abbreviations in Figure 2

This appendix sets out abbreviations used in Figure 2.

Abbreviation	Country
ALB	Albania
AZE	Azerbaijan
BGR	Bulgaria
BIH	Bosnia and Herzegovina
BLR	Belarus
BOL	Bolivia
BRA	Brazil
BTN	Bhutan
BWA	Botswana
CHN	China
COG	Congo, Republic of
COL	Colombia
CPV	Cape Verde
CUB	Cuba
DOM	Dominican Republic
DZA	Algeria
ECU	Ecuador
EGY	Egypt
FJI	Fiji
FSM	Micronesia, Federal States of
GEO	Georgia
GMB	Gambia



Abbreviation	Country
GTM	Guatemala
GUY	Guyana
HND	Honduras
JOR	Jordan
KAZ	Kazakhstan
LKA	Sri Lanka
MAR	Morocco
MDA	Moldova, Republic of
MDV	Maldives
MHL	Marshall Islands
MNG	Mongolia
MRT	Mauritania
NAM	Namibia
PER	Peru
PHL	Philippines
PRY	Paraguay
RUS	Russian Federation
SLV	El Salvador
SUR	Suriname
SWZ	Swaziland
SYR	Syrian Arab Republic
THA	Thailand
TKM	Turkmenistan
TON	Tonga



Abbreviation	Country
TUN	Tunisia
VUT	Vanuatu
WBG	World Bank Group
WSM	Samoa
YUG	Yugoslavia