



**DICE Consult**

and

**LinkEconomics**

**Comments on**

**On-net/Off-net Price Discrimination and Digicel in PNG:**

**Independent Opinion by Martin Cave and Chris Doyle**

by

Professor Dr. Justus Haucap  
Director of the Düsseldorf Institute of Competition Economics (DICE)  
University of Düsseldorf  
Universitätsstr. 1  
D-40225 Düsseldorf  
Germany

and

Emma Lanigan  
Director  
Link Economics  
Nelson  
New Zealand

28 June 2012

## Introduction

1. We have been asked by bemobile to comment on an independent opinion issued by Martin Cave and Chris Doyle “On-net/off-net price discrimination and Digicel in PNG”. This note is in response to this request.
2. Our comments will focus on two aspects in the following order:
  - the applicability of the papers by Hoernig (2008)<sup>1</sup> and Sauer (2011)<sup>2</sup> and their conclusions, which are claimed by Cave and Doyle to be “the most relevant” papers; and
  - the appropriate remedies to deal with on-net/off-net price discrimination in the current PNG mobile telecommunications market.

## Economic effects of on-net/off-net price discrimination and relevance of Sauer (2011) and Hoernig (2008)

3. In the economics literature it is well accepted that on-net/off-net retail price discrimination can serve as a strategic barrier to entry to retail markets in mobile telephony as was discussed in Emma Lanigan’s report submitted to NICTA in December 2011.<sup>3</sup> Large network operators have strategic incentives to set lower prices for on-net calls than for off-net calls in order to induce price mediated network effects. Thereby, a barrier to growth and expansion if not entry is erected for smaller networks and new entrants. While for some models (such as Hoernig, 2007) call externalities are crucial, Lopez and Rey (2009) have shown that even without call externalities a combination of consumer switching costs and on-net/off-net price differences may also serve as a barrier to entry.
4. In fact, there has recently also been quite some empirical support for this hypothesis starting with Kim and Kwon (2003)<sup>4</sup> and followed by a body of research that has been cited by NICTA in its discussion paper of 4 May 2012.<sup>5</sup>

---

<sup>1</sup> Sauer, D. (2011) Welfare implications of on-net/off-net price discrimination, Toulouse School of Economics.

<sup>2</sup> Hoernig, S. (2008), Tariff-mediated network externalities: Is regulatory intervention any good? CEPR Discussion Papers 6866.

<sup>3</sup> See, e.g., Hoernig, S. (2007), On-Net and Off-Net Pricing on Asymmetric Telecommunications Networks, in: *Information Economics and Policy* 19, 171-188, Calzada, J. & Valletti, T. (2008), Competition and Entry Deterrence, in: *The Economic Journal* 118, 1223-1244, Stennek, J. & Tangerås, T. (2008), Intense Network Competition, NET Institute Working Paper # 08-36, Lopez, A. & Rey, P. (2009), Foreclosing Competition Through Access Charges and Price Discrimination, IDEI Working Paper No. 570, Cabral, L. (2009), Dynamic Price Competition with Network Effects, IESE Business School Working Paper No. WP-843, University of Navarra, and Harbord, D. & Pagnozzi, M. (2010), Network Based Price Discrimination and ‘Bill-and-Keep’ vs. ‘Cost-Based’ Regulation of Mobile Termination Rates, in: *Review of Network Economics* 9 (1), Article 1.

<sup>4</sup> Kim, H.-S., & Kwon, N. (2003), The Advantage of Network Size in Acquiring New Subscribers: A Conditional Logit Analysis of the Korean Mobile Telephony Market, in: *Information Economics and Policy* 15, 17-33.

<sup>5</sup> There are further papers which have not been mentioned by NICTA, but support their case: For Poland, Grajek (2010) finds that network effects are limited to each specific network and argues that this is due to the significant on-net discounts that generate operator-specific effects and lower the degree of compatibility between the networks which in turn limits the extent of market-wide network effects. Sobolewski and Czajkowski (2012) use a choice experiment to show that in the Polish mobile telecommunications market strong

5. In contrast to this large body of theoretical and empirical work which supports NICTA's view that on-net/off-net price discrimination of a large network operator is likely to be welfare reducing, Cave and Doyle consider a recent paper by Sauer (2011) to be most relevant.

6. While we generally agree with Cave and Doyle that price discrimination can be welfare enhancing under certain conditions, it is important to stress that it may also easily be anti-competitive and welfare reducing under other conditions. Typically, price discrimination can be beneficial and welfare enhancing if a market is effectively competitive. For example, restaurants have different prices for lunch and dinner and holiday resorts typically have different prices for high- and low-season. This is likely to be a form of welfare enhancing price discrimination. However, price discrimination can also be anti-competitive, foreclose the market and induce market exit or limit entry and growth, thereby reducing competition. If price discrimination affects market structure, entry and competition, it is much less likely to be welfare enhancing.

7. We do not concur with Cave and Doyle that on-net/off-net price discrimination is likely to be welfare enhancing in the present PNG mobile telecommunications market, but rather conclude that on-net/off-net price discrimination is likely to severely limit competition in the present PNG mobile telecommunications market.

8. In this context, it should be noted that market growth and the pace of growth in mobile teledensity are typically found to be highest when there is effective competition in the market. If, however, the market is characterized by a monopoly or collective dominance, even with some limited fringe competition, growth will be slower as monopolies tend to keep up prices. This is a first-order effect.

9. As the price level for mobile telecommunications in PNG appears to be rather high by international comparisons<sup>6</sup> we conjecture that the first-order effect of limited competition is at work at present, resulting in comparatively low market penetration levels.

10. With respect to the paper by Sauer (2011), there are several assumptions in the paper which severely limit its usefulness for the case at hand:

---

network effects still exist, which are related to the ratio of the consumers' social network group using the same operator and to the magnitude of on-net price discounts. Birke and Swan (2010) have confirmed their findings in a follow-up study of three different countries (the Netherlands, Malaysia and Italy). Another recent study on social network effects among family members and friends in mobile telecommunications markets is Srinuan and Bohlin (2012). See Birke, D. & Swann, G.M.P. (2010), Network effects, network structure and consumer interaction in mobile telecommunications in Europe and Asia, *Journal of Economic Behavior and Organization*, 76, 153-167, Grajek, M. (2010). Estimating network effects and compatibility: Evidence from the Polish mobile market, *Information Economics and Policy*, 22, 130-143, Sobolewski, M. & Czajkowski, M. (2012). Network effects and preference heterogeneity in the case of mobile telecommunications markets, *Telecommunications Policy*, 36, 197-211, Srinuan, P. & Bohlin, E. (2012). Paying less with local network effects? An empirical analysis of the Swedish mobile communications market, online at: <http://publications.lib.chalmers.se/records/fulltext/157231.pdf>.

<sup>6</sup> As can be seen from the Network Strategies 2012 Pacific Mobile Market Update, available at: <http://www.strategies.nzl.com/wpapers/2012011.htm>

- First of all, the paper assumes that there are two operators in the market and that both operators remain active in the market. The issues of potential market foreclosure, entry and exit are not analyzed at all in the paper. Hence, the value of the paper for the case at hand is limited, as the potential for market foreclosure by the dominant operator is the main issue.
- Secondly, when the paper analyzes the case where the market size is not fixed (which is the case Cave and Doyle refer to), it is assumed that the two firms are symmetric and, therefore, both operators have a market share of 50% in equilibrium. This does not capture the situation in PNG at all. In fact, Sauer's Proposition 4 (on page 16) explicitly reads: "*When market size is not fixed, price discrimination raises total welfare along with consumer surplus in a symmetric equilibrium for small  $m$  and small  $\lambda$* " (emphasis added by us). It is certainly fair to say that the PNG mobile telecommunications market does not resemble a symmetric equilibrium, given current market shares.
- Thirdly, Sauer (2011) also assumes a balanced calling pattern between the operators. Again, this does not apply at all to the situation in PNG.
- Fourthly, in Proposition 4 the variable  $m$  is the difference between mobile termination rates and the marginal cost of termination (i.e., the termination mark-up). For Proposition 4 to hold this figure must be small, as Sauer himself writes. This does not appear to be the case in PNG<sup>7</sup>, which gives us yet another reason why the Proposition is not relevant for PNG.
- Fifthly, Sauer (2011) explains on page 16 that "the possibility of market expansion is captured by the term  $\lambda w_i$ . The extent of market expansion for each firm is proportional to the attractiveness of its offer." In Proposition 4 it is stated that welfare raises for small values of  $\lambda$ , meaning that the scope for market expansion must be rather limited. It is not clear that this is the case given current market penetration levels in PNG. Instead, the scope for market expansion should be rather significant.

11. To summarise: Sauer (2011) shows that on-net/off-net price discrimination can be welfare enhancing in a case with (i) two symmetric operators with 50% market share, (ii) balanced calling patterns among them, (iii) small termination mark-ups, (iv) limited scope for market expansion and (v) no incentive for market foreclosure, where all five conditions have to be cumulatively fulfilled. In contrast to Cave and Doyle we do not believe that this describes a situation which is "the most relevant" for PNG. Instead, we conclude Sauer (2011) is indeed an interesting academic exercise, but of no use for the case at hand, as it is not only one of these five conditions that does not apply to PNG, but rather none of these conditions applies. Moreover, the Sauer paper focuses entirely on the case of non-linear pricing. Non-linear pricing seems to best represent the situation in the postpaid market where customers pay a monthly fee and per minute charge. However, the PNG market is predominantly prepaid.<sup>8</sup>

---

<sup>7</sup> The PNG termination rates were not determined through the use of a cost model, and NICTA itself considers that there is no reason to believe that MTRs in PNG are cost-based. (NICTA Response Report on Discussion Paper into the Potential Need for a Retail Service Determination to Certain Mobile Telephone Services, p. 19).

<sup>8</sup> However we recognise that the use of a handset subsidy may bring an element of non-linearity to some prepaid pricing.

12. Cave and Doyle also point to Hoernig (2008) as being one of the most relevant papers to NICTA's analysis. Hoernig (2008) models non-linear pricing. As discussed above, this aspect of the model limits the applicability to the PNG market which would be better characterised as having predominantly linear pricing given the prevalence of prepaid services. In any case, the Hoernig paper specifically recognises that where networks are asymmetric then even if regulation reduces consumer welfare in the short term through higher on-net prices, it is a measure that can protect the long-term interests of consumers through strengthening ongoing competition. More specifically, Hoernig describes the trade-off between: "lower consumer surplus in the short run for a reduced probability of exit of the small network in the future."<sup>9</sup>

13. NICTA's analysis appears to have taken into account the trade-off highlighted by Hoernig – for example, at page 106 of NICTA (4 May, 2012) where it states:

"...any such price rise would be a short term detriment (to Digicel's customers) in the interests of a longer-term benefit in the form of an effectively competitive market, which is in the long-term interests of all mobile phone users (including Digicel's customers)."

14. Given the above numerous reasons, we cannot agree with Cave and Doyle that either of the Sauer (2011) or Hoernig (2008) papers imply on-net/off-net price discrimination is likely to be welfare enhancing in the present PNG mobile telecommunications market, particularly in the long-run. Rather we concur with the analysis presented by NICTA in its report of 4 May 2012 and conclude that on-net/off-net price discrimination is likely to severely limit competition in the present PNG mobile telecommunications market.

#### **Identifying and assessing the appropriate remedy for on-net/off-net price discrimination**

15. Cave and Doyle provide comments on the regulatory options considered by NICTA and express concern that NICTA has not considered the impact of each option. Cave and Doyle go on to advise that in devising a non-discrimination rule, NICTA should start by examining "the structure of prices in effectively competitive markets".<sup>10</sup> Cave and Doyle also comment that NICTA appears to assume that without regulation: "nobody else in the field of economic regulation does anything either."

#### **Option 1: Ex post competition law**

16. In the current context of the PNG market, reliance on competition law runs a considerable risk of irreversible damage to competition. Competition law inevitably would take substantially longer than a retail service determination to address the issue of price discrimination that is posing the very real threat of foreclosure on at least one of Digicel's mobile rivals. It seems highly likely therefore that purely relying on competition law would reduce the level of competition for mobile services and induce irreversible damages to consumers in the long run, as it would be difficult to revitalize competition once it is dead.

---

<sup>9</sup> Hoernig (2008), pp. 18-19.

<sup>10</sup> Cave and Doyle, p. 17.

17. In the European Union, regulators are required to apply a so-called “3-criteria-test” in order to decide whether markets need to be regulated *ex ante* or whether they can be deregulated and be left to *ex post* supervision by competition law standards. The 3-criteria-test consists of three questions, namely:

1. Are there non-temporary legal or structural barriers to entry?
2. Is there a long-term tendency towards effective competition?
3. Is competition law insufficient to address the competition concerns?

18. A typical justification by the Bundesnetzagentur as the German regulator, for the third criterion is the following “The use of competition law alone would only allow for selective interventions. More detailed competencies are required to positively regulate matters. Furthermore, telecommunications law allows faster interventions, as the regulator’s decisions have to be executed immediately” [own translation, J.H.].<sup>11</sup> Hence, one of the key arguments for the regulator is how fast it can intervene. A fast intervention through regulatory intervention is superior to a slower intervention based on competition law standards if there is a sufficiently high risk that the potential damage of an anti-competitive action is irreversible, so that a quick intervention is necessary. This is especially the case if an anti-competitive action is suited to induce structural changes (e.g. a firm’s exit).

#### Option 2: Reliance on wholesale regulation alone

19. It is apparent from the economic literature, analysis of the consumer decision-making process and actual outcomes in other jurisdictions that reliance on wholesale regulation alone will often not remove the incentives that a dominant network has to restrict competition through on-net/off-net-price discrimination.

20. First consider the options facing consumers through an illustrative example. Suppose that there is a group of five customers who are all connected to the largest network A. Assume that they value placing calls at 50 toea per call and receiving calls at 20 toea per call. Hence, every call generates a total gross surplus of 70 toea. If every caller of the group calls every other member 50 times per month, every member generates a surplus of 140 kina and the total surplus generated is 700 kina. Every member of the group receives a surplus of 140 kina, resulting from 200 outgoing calls (with a benefit of 50 toea per call) and 200 incoming calls (with a benefit of 20 toea per call).

21. Let us assume that the large network to which all five consumers are connected charges 20 toea per call. The net consumer surplus per call is now 50 toea and the total net surplus generated per customer is 100 kina (200 x 50 toea).

22. Now suppose that a smaller network attempts to acquire customers from the large network and that the large network in response increases its off-net charge to some price above 50 toea so that off-net calls would basically be “choked off”. If a single member of that group were about to

---

<sup>11</sup> See Möschel (2007): Der 3-Kriterien-Test in der Telekommunikation, *MultiMedia und Recht*, 2007, pp. 343-346.

switch to the small network, (s)he would forego the benefit of being called. Even if the small network lowered its off-net call price to 1 toea, (s)he would only still receive a net benefit of 98 kina (a 49 toea benefit (50-1) from each of the 200 outgoing calls), i.e. less than the 100 kina when staying with the large network. Therefore the consumer is better off remaining with the large network no matter how low the prices of the small network are.

23. Hence, even ignoring any issues related to MTRs there are strong strategic incentives for a large network to increase its off-net rates in order to limit competition in the market to the long-term detriment of consumers.

24. The fact that there is very little off-net traffic in PNG suggests that the mechanism illustrated in this example is well at work. In our view, alternative explanations for the (unusually) strong segmentation of the PNG market are not very convincing.

25. It is also apparent from actual outcomes in the New Zealand market that cost-based wholesale regulation is not sufficient to address competition problems that result from on-net/off-net price discrimination. The New Zealand regulator introduced regulation of mobile termination rates using an estimate of cost based on international cost models in 2011. Despite a reduction from the rates of 12-17 cents per minute<sup>12</sup> down to the current regulated rate of approximately 3 cents per minute, the average market off-net price is still 14 cents per minute (or around 60%) higher than the average market on-net price.<sup>13</sup>

#### Options 3 and 4

26. Option 3 involves direct regulation of the level of retail prices – for example, through setting price levels or imposing price caps and/or on-net price floors. Option 4 is the implementation of a non-discrimination rule. Cave and Doyle (p. 14) express the view that a non-discrimination rule (option 4) is *de facto* another form of direct retail regulation and that the use of option 4: “should therefore be subject to the same requirement which NICTA has set out in relation to option 3 – a minimalist approach which leaves maximum room for competition and minimises distortive effects.”

Option 4 allows Digicel the freedom to set its overall price level for domestic calls which means that Digicel’s ability to recover costs is not affected. In addition, it also leaves the complete freedom to set prices for different services (mobile-to-mobile voice calls, fixed-to-mobile voice calls, SMS, mobile data services, etc.) in response to demand and consumer preferences, as long as the charges are non-discriminatory vis-à-vis mobile rivals. This contrasts with the much more interventionist approach of Option 3 under which the regulator makes detailed decisions about price levels and structures. As long as the non-discrimination rule is adhered to, Option 4 avoids the potentially lengthy delays associated with tariff approvals, thereby allowing for quick response and introduction times for technological and pricing innovations.

---

<sup>12</sup> Telecom and Vodafone Deeds.

<sup>13</sup> New Zealand Commerce Commission (20 March 2012), Mobile Monitoring Report November 2011 to January 2012, p. 7.

Given the above, it is our view that of all the potential forms of retail interventions available to address on-net/off-net price discrimination concerns, Option 4 is the least distortionary and the most proportionate option to solve the competition problem at hand. Hence, Option 4 satisfies NICTA's criteria of taking a minimalist approach when intervening in the retail market.

Let us also note that Cave and Doyle's suggestion of basing a regulatory rule in some way on outcomes in effectively competitive markets (essentially a variation on Option 3) is more intrusive than the non-discrimination rule proposed by NICTA. Further, pricing structures that are welfare-maximising in effectively competitive markets may not be optimal in the PNG market. For example, an on-net/off-net differential observable in a market where there are four networks of roughly equal size may actually have an anti-competitive effect if imposed in a more concentrated market where market shares are highly asymmetric.

#### **Assessing the welfare impacts of the 4 options**

27. The process of assessing regulatory options involves consideration of which best satisfy the goal of promoting competition and long-term interests of consumers, taking into account the potential for regulatory error. There are two types of regulatory error:

- Type I error, associated with over-regulation, occurs when regulation is applied that does not on balance promote competition – that is, when the pro-competitive effects of the regulatory measure are outweighed by competitive distortions that are caused by the regulation;
- Type II error, associated with under-regulation, occurs when regulation that would result in an overall promotion of competition is not imposed.

28. Optimal regulation will minimize the welfare losses from regulatory error.

29. With respect to a price discrimination ban for on-net and off-net retail tariffs, the risk of imposing such a ban consists of stifling retail *price* competition between the mobile network operators in PNG to the detriment of consumers for some time. This implies the consumers may pay too much during this period and that innovations may potentially be introduced later than under a more competitive scenario. In contrast, the risk of *not* imposing a ban consists of significantly limiting the potential for intensified competition and innovation through from the small networks and, in the very extreme, even market exit one or more of the smaller networks and, as a consequence, a significant lessening of effective competition for a long period of time.

30. In general, the damage resulting from competition not gaining ground altogether and especially from market exit by any player in a concentrated market is much higher than the damage from competition potentially being softer for a limited period of time. While market exit would very likely result in softer competition for a long period of time (giving rise to cumulative long-run effects), the potential mistake of softer competition for a number of years can relatively easily be corrected, once the price discrimination ban is lifted. In contrast, if a competitor, in the extreme case, has been successfully driven off the market it is unlikely that another new entrant would easily emerge. Hence, the risk is that effective competition would be lost for a long time – a mistake that could not easily be corrected afterwards.

31. We also note that in many European countries such as Germany competition agencies tend to have a much stronger enforcement focus on what is called obstructive abuse of a dominant position (i.e., the impediment of competitive processes) than on what is called exploitative abuse (i.e., excessive pricing). One reason is certainly that any damage to the competitive process is much more difficult to reverse than excessive prices.

32. Moreover, the risk of softening competition through an on-net/off-net price discrimination ban appears to be rather low, as bemobile has to price aggressively and to undercut its rivals in any case in order to acquire customers. In addition, the degree of competition in the mobile telecommunications market in PNG has not appeared to be strong so far, given the dominance of Digicel.

## **Conclusion**

33. The risk that an on-net/off-net price discrimination ban induces welfare losses appears to be close to nil in PNG. However, the risk that retail price discrimination between on-net calls and off-net calls would limit growth and expansion of small networks and, in the extreme, potentially even induce market exit and, thereby, impose major welfare costs and a reduction of consumer choice is significant. In addition, if imposing a price discrimination ban turned out to be a regulatory mistake that mistake could easily be corrected by lifting the ban. In contrast, if not imposing a ban turned out to be the wrong regulatory decision that mistake cannot be easily corrected afterwards. Therefore, we would strongly recommend imposing a temporary price discrimination ban, including a sunset clause and a provision to evaluate the state of competition and market conditions again after that period.

## Appendix: Curriculum Vitae

### Professor Dr. Justus Haucap

Professor Dr. Justus Haucap holds a chair for competition theory and policy at the University of Düsseldorf, Germany, where he is, since August 2009, Director of the Düsseldorf Institute for Competition Economics (DICE). Haucap is, since 2008, also Chairman of the German Monopolies Commission, which advises the German Government on competition policy and market regulation issues.

Between 2007 and 2009 Justus Haucap was a Professor for Economic Policy at the University of Erlangen-Nuremberg, and between 2004 and 2007 he was Professor for Competition Theory and Policy at the Ruhr-University of Bochum. From 1999 to 2003 Haucap worked as a lecturer at the Institute for Economic Policy at the University of the German Federal Armed Forces in Hamburg.

From 1997 to 1999 Haucap was employed as analyst in the New Zealand Treasury's Regulatory and Tax Policy Branch, working mainly on telecommunications regulation, Commerce Act matters, electricity reforms, and water sector reform proposals.

Haucap holds a Diploma and a Ph.D. in economics from the University of Saarland, Germany, following studies in Saarbrücken, Michigan (Ann Arbor) and Berkeley (California).

Since 2008 Haucap has appeared 10 times as an expert in hearings of various select committees of the federal German parliament ("Bundestag").

As a member of the German monopolies commission Haucap has, since 2006, co-authored 21 reports to the German Federal Government. He has also been a consultant to *Deutsche Telekom*, *Vodafone*, *Mobikom Austria*, *Orange Suisse*, *2degrees (New Zealand)*, the *International Telecommunications Union (ITU)*, and several other institutions and business enterprises.

Haucap has published widely on both competition policy and regulation of network industries (such as telecommunications, electricity, gas, media), and he also serves on the editorial board of *Telecommunications Policy*, *Applied Economics Quarterly* and *EURAS Yearbook of Standardization*.

#### Selected Academic Publications:

Haucap, J. & G. Klein, "How Market Regulation Affects Network and Service Quality in Related Markets", forthcoming in *Economics Letters*.

Haucap, J., U. Heimeshoff & M. Karacuka, „Competition in Turkish Mobile Telecommunications Markets: Price Elasticities and Network Substitution", *Telecommunications Policy* 35, 202-210.

Curwen, P., J. Haucap & B. Preissl (eds.), *Telecommunication Markets: Drivers and Impediments*. Physica: Berlin 2009.

Haucap, J., "The Recommended Regulation of Fixed and Mobile Termination Rates: A Critical Appraisal", pp. 27-34 in: M. Cave et al. (eds.), *Monitoring EU Telecoms Policy 2009*, Network for Electronic Research on Electronic Communications: Madrid 2009.

Dewenter, R., & J. Haucap, "Demand Elasticities for Mobile Telecommunications in Austria", *Jahrbücher für Nationalökonomie und Statistik* 228, 2008, 49-63.

Haucap, J., "Asymmetric Regulation of Mobile Termination Rates?" pp. 56-63 in: L. Benzoni & P. Geoffron (eds.), *Competition and Regulation with Asymmetries in Mobile Markets*, Quantifica: Paris 2007.

Dewenter, R., J. Haucap, R. Luther & P. Rötzel, "Hedonic Prices in the German Market for Mobile Phones", *Telecommunications Policy* 31, 2007, 4-13.

Dewenter, R. & J. Haucap (eds.), *Access Pricing: Theory and Practice*, Elsevier Science: Amsterdam 2006.

Haucap, J., U. Heimeshoff & A. Uhde, "Credible Threats as an Instrument of Regulation for Network Industries", pp. 161-192 in P. Welfens & M. Weske (eds.), *Digital Economic Dynamics: Innovations, Networks and Regulations*, Springer Verlag: Berlin 2006.

Buehler, S., R. Dewenter & J. Haucap, "Mobile Number Portability in Europe", *Telecommunications Policy* 30, 2006, 385-399.

Haucap, J. & J.S. Marcus, "Why Regulate? Lessons from New Zealand", *IEEE Communications Magazine* 43 (11), 2005, 15-16.

## **Emma Lanigan**

Emma Lanigan is an economist and Director of Link Economics and specialises in analysing regulatory, competition and commercial pricing issues, primarily in the telecommunications industry. Emma has more than 15 years experience in working for clients in the telecommunications industry including market participants and regulators and has advised clients in Australia, New Zealand, Europe, Asia, the Middle East and the Pacific Islands.

Emma was a Principal with Concept Economics (April 2008-September 2009), CRA International (2004-2008) and the Networks Economics Consulting Group (NECG) (1998-2004). Emma has also been on secondment to Telecom New Zealand and Telstra as a regulatory manager.

Emma holds a M.A. Economics (with First Class Honours) from the University of Auckland, New Zealand.

In her consulting career, Emma has worked on a wide range of projects including anticompetitive conduct assessment, retail and wholesale pricing strategy utilising economic models of strategic interaction, the establishment of regulatory compliance programs, regulatory policy analysis, cost

modeling, the development of access prices, and the assessment of competitive effects of mergers and joint ventures.

Emma's recent consulting experience on telecommunications matters includes the following:

- Appeared before the Samoan Competition Tribunal as an economic expert on an anti-competitive conduct matter (2011).
- Retained by SamoaTel to prepare expert reports on fixed and mobile termination rates and the review of cost models for submission to the Office of the Regulator in the context of an interconnection determination (2010).
- Preparation of an expert report on interconnection rates in the context of arbitration between two interconnecting parties in a Pacific Island nation (2012).
- Provided expert economic analysis to the New Zealand Commerce Commission on behalf of the mobile entrant, 2degrees, on international benchmarking of mobile termination rates and on-net/off-net price discrimination (2008-2011).
- Provided expert economic analysis for 2degrees on a range of other issues relating to mobile termination regulation including: mobile termination rate pricing principles, the welfare effects of regulation and the effects of on-net/off-net price discrimination.
- Analyses of retail and wholesale mobile pricing and contract arrangements in New Zealand (2011-2012).
- Preparation of market definition and market power analysis for a regulator in an island nation (2012).
- Analysis of the competitive effects of the New Zealand government's rural broadband initiative (2011).

#### Publications

2009, "Price Squeezes and Vertical Discrimination on Next Generation Access Networks" with Henry Ergas and Eric Ralph, *Communications & Strategies*, No. 78/2<sup>nd</sup> quarter 2010, p. 67-85.

2002, "3G Network Sharing in the Australian Context." Paper presented at the Tokyo Mobile Roundtable May 2002.

2000, "The New Zealand telecommunications review: issues and perspectives." Paper presented at Industry Economics Conference, 10 July 2000.

1999, "A comparison of international telecommunications prices." With Sam Lovick. March 11, 1999.

1997, "Modeling Interconnection Agreements of Monopolistic Network Providers."