TELSTRA CORPORATION LIMITED

Telstra's Ordinary Access Undertaking for the Unconditioned Local Loop Service:

Response to Ovum's Submissions

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Contents

A Introduction

Ovum was commissioned by the ACCC to review the TEA model. The ACCC published three Ovum reports:

- Review of the network design and engineering rules of the TEA model ("**Ovum Engineering Report**")
- Review of the economic principles, capital cost and expense calculations of the TEA model ("**Ovum Economics Report**")
- Review of the operability of the TEA model ("**Ovum Operability Report**").

These reports set out Ovum's views on the TEA model and Telstra's inputs into the TEA model. Ovum's conclusions are premised on

- Errors in the TEA model that were subsequently fixed (for example, the TEA model used different values for Band 2 services in operation (**SIOs**) in different places – this was fixed in v1.2 of the TEA model);
- A misunderstanding that the equipment prices in the TEA model are historical costs (they are, in fact, based on Telstra current vendor prices applicable to at least [CIC [redacted]]);
- Misunderstandings as to the network design. Those misunderstandings are clarified in this report (for example, Ovum argues that distribution cables in different distribution areas (**DAs**) should share common trenches, however, Telstra notes this results in cost savings and, as such, is not an inefficiency);
- A lack of recognition regarding the extent of efficiency inherent in the TEA model. This efficiency has now been explained and clearly demonstrated by Telstra's additional material submitted subsequent to Ovum lodging its reports; and.
- A very simplistic international comparison of WACC estimates that does not take into account legitimate factors that give rise to reasonable differences between the WACC to apply in Australia and the WACC to apply to other countries surveyed by Ovum.

On considering the additional material that Telstra has submitted to the ACCC subsequent to Ovum finalising their reports, and the explanations set out in this report, Telstra considers that ACCC should support the engineering and economics assumptions in the TEA model and Telstra's ULLS Undertaking generally.

The remainder of this report is ordered as follows. Section B responds to the arguments set out in the Ovum Engineering Report and section C responds to the Ovum Economics Report.

B Ovum's Engineering Report

Telstra agrees with Ovum's general conclusion (Executive Summary at page 4):

> *The engineering rules described in the documentation are extensive and detailed and, on the whole, represent good engineering practice.*

Ovum endorses the following areas of the TEA model:

- The use of joints, pits and manholes;
- The sizing of the cables and the fill factors; and,
- The placement and size of pillars.

Ovum raises some issues with the TEA model. In particular:

- Ovum is concerned that DAs, which abut one another, share some segments of conduit. However, sharing conduits between DAs actually saves cost and is, therefore, more efficient.
- Ovum finds (at page 4) in the main network "*examples of sections of multiple paths towards an exchange and cable segments where demand flows in both directions*" to be inefficient. However, this is an issue that is fixed in v1.2 of the TEA model.
- Ovum criticises some of the TEA model inputs in relation to terrain type. Ovum argues that averaging the proportion of rock would only be relevant across a large average of Exchange Service Areas (**ESAs**), which is exactly what the TEA model does for Band 2.
- Ovum generally supports the use of underground cabling, but claims that some duct placement and surface restoration for concrete might be avoided altogether by boring. These assertions are based, in part, on the use of lateral boring through nature strips in a pilot project in Perth and a suggestion that, in Paris, conduits might be placed in drains and sewers. The TEA model adopts the use of lateral boring instead of trenching, breakout and restoration whenever feasible. Placing conduit in sewers is not the best in use practice for Band 2 in Australia.
- Ovum suggests that trench sharing in new estates be calculated for each ESA, but Telstra's use of a nationwide average is more conservative because the faster growing areas (with more new estates) are outside Band 2.

While the tone of the Ovum Engineering Report might be viewed as negative, many of Ovum's arguments, in fact, support the logic used by the TEA model. The Ovum Engineering Report, therefore, provides strong support for the engineering rules underlying the TEA model. A detailed rebuttal of the points raised by Ovum follows.

B.1 Optimisation and Efficiency

B.1.1 Cable Routes and Distribution Areas

Telstra and Ovum agree on the following points:

- Ovum states (section 2.1 at page 6): "*The Telstra documentation indicates that two network designs are not used in the model: Cabinet-fed pillar; Customer fed directly from branch cable. These are non-standard designs that lead to operational complexity. It is appropriate that they should be eliminated*".

  The TEA model design correctly eliminates the use of Cabinets and the feeding of small customers directly from main cable routes.

- Ovum states (section 2.1 at page 9) "*It is legitimate, however, for Telstra to use a scorched node approach – fixing the current pillar points – for the purposes of the model*.

  Telstra agrees that it is legitimate for Telstra to use a scorched node approach – fixing the current pillar points – for the purposes of the model. The location of pillars has no impact on overall costs as, the reality is, that the network needs to trench down virtually every street in band 2 areas regardless of pillar location.

Ovum claims (section 2.1 at page 7):

> *In the model database, each network structure point has assigned to it a predecessor structure point: this data structure is meant to be the representation of a single tree network with its root at the exchange.*
>
> *In fact, this feature has not been fully implemented in the database accompanying the model (labelled TEA-Data-v1.0.mdb). In the data provided, there are multiple paths to the exchange from some structure points.*

The main cable data in Version 1.0 of the TEA model contained an implementation error, which resulted in a few network structure points in the main cable route having two next network structure points on the path back to the exchange where cables were laid in both directions within a segment. The main cable data implementation error Ovum cites was fixed in TEA Version 1.1, so that the main data no longer contains instances where a current structure point has two next structure points and no cable segments contain cable laid in both directions. Ovum has not commented on the correction in TEA Version 1.1, but they seem to agree with Telstra's analysis of the problem in their report (section 2.1 at page 8):

> *Telstra claims that the bi-directional segments are an 'unintended consequence' of the method of removing cabinets from the cable data. This appears to be the case for the Blackburn data.*

While Ovum is correct in their analysis of main cable routes, they are incorrect to draw the same conclusion with respect to distribution routes. Their error is rooted in their rejection of the proposition that cables serving adjacent distribution areas

should share common conduit segments (a phenomenon they refer to as "overlapping" DAs).

DAs might share common conduit segments and network structure points (or overlap) when, for example, two conduit runs in two different DAs come together to the same structure point (where the two DAs abut), continue down a common conduit run to another structure point (along the boundary where the two DAs abut), then split apart again to different structure points in the two different DAs. In its 15 July 2008 letter to the ACCC, Telstra explained that this is reasonable and, in any case, only occurs a small amount of the time (0.51% of distribution conduit is shared between cables serving adjacent distribution areas).

However, Ovum disagreed with Telstra's explanation and restated (section 2.1 at page 9) that distribution areas should not abut one another:

> *Any cable passing through a structure point that did not follow the shortest path from this structure point back to the exchange could be replaced with a shorter one that does follow the shortest path.*

and

> *For efficient design, the DAs should not overlap. It is legitimate, however, for Telstra to use a scorched node approach – fixing the current pillar points – for the purposes of the model. Nevertheless, the data within DAs should be cleansed to remove any overlaps between DAs.*

Ovum's rejection of DAs abutting one another and sharing structure points in common is not reasonable, pragmatic or efficient. From an engineering perspective, two distribution routes sharing a structure point in common adds flexibility to the network, which is often useful when shifting demand necessitates augmentation of network capacity. From an efficiency standpoint, the sharing of conduit segments between distribution routes reduces costs because the TEA model only counts the trenching for shared routes once for both cables.

The rigidity of imposing a strict prohibition on the sharing of conduit between DAs would diminish network efficiency rather than enhance it. For example, when a street acts as a boundary between DAs, presumably, it would be necessary to lay conduit down both sides of the street in order to avoid "overlapping" rather than allowing both DAs to share conduit on one side of the street.

The solution to avoid "overlapping" or abutting DAs, the situation Ovum opposes, would involve installing additional trenching and conduit routes in the network so that distribution routes from adjacent DAs would be distinct from one another. Clearly, this is will lead to greater cost and less efficiency.

However, Ovum states that (section 2.1 at page 9):

> *In some, perhaps many, circumstances, it would produce a lower overall cost if the DAs were laid out differently, given that the customer demand is now known (unlike when the DAs were laid out and customer demand was only estimated).*

It is most likely that redesigning DAs to remove abutting DAs would result in duplicative trenches running down each side of a single road in many cases.

However, this would involve adding more plant and more cost and eliminating the efficiencies associated with DAs sharing facilities.

When distribution cables from adjacent DAs converge, share a conduit segment or segments, and then diverge again, it is to connect customers on two separate cables back to their respective pillars. Although cables serving adjacent DAs are distinct, those cables can share a common conduit path for part of their separate routes. If, instead of the two distribution cables being routed to their respective pillars after sharing some conduit segments, they were both routed through just one of the original routes (route A) to one of the pillars, as suggested by Ovum, customers along the remainder of the other route (route B) would still have to be served. Hence, another distribution cable would need to be added along route B to connect the remaining customers along the route to the pillar at the end of route B. Thus, redesigning the DA boundaries to prevent DAs from sharing common facilities would not likely result in any savings.

B.1.2 Pits and Manholes

Ovum states (section 2.2 at page 10):

> *The pits and manholes are laid out according to the diagram and rules in section 3.2 of Access Network Dimensioning Rules. The description is of a very clean, efficient design and layout in the default case. This represents best practice in laying out a Distribution network.*
>
> *Section 3.3.4.1 of Access Network Dimensioning Rules suggests that manholes may be placed at "severe changes of direction" in the Distribution network. This is a good design rule. There appears to be no provision for this rule in the model itself, as changes of direction are not indicated in the base data. This could lead to an underestimate in the number of manholes placed by the TEA model.*

Telstra concurs with Ovum that the network design rules for provisioning pits and manholes used by the TEA model are "efficient" and are likely to result in an "underestimation" of total pit and manhole costs.

B.1.3 Cables and Cable Sizing

Ovum makes the following 6 points (in section 2.3)regarding the TEA model's provisioning of Cables:

- "…if anything, the cable gauges and hence the cost of cables will be underestimated";
- the maximum cable sizes for each gauge cable are standard throughout the industry;
- the model design may result in placing a greater length of heavier gauge cable than is minimally necessary;
- it is not clear what the model does when the need for heavier gauge cable exceeds main cable length;

- the default distribution fill factor is 60%; although it may vary based on environmental factors, 67% is common; and

- An argument could be made to use a 100% fill factor for both main and distribution cable runs but it would have a minimal impact on cost.

Ovum states (at page 10):

> *The maximum distances given are not conservative but, rather, permit suitable transmission losses. Thus, if anything, the cable gauges and hence the cost of cables will be underestimated.*
>
> *The same table gives maximum cable sizes for each cable gauge. These maximums are standard for copper cables.*

Telstra agrees with Ovum's conclusion.

Ovum also states (at page 10):

> *The placement method uses the heavier gauge cable in the main-cable network furthest from the exchange. This is not global best practice for loop make-up and may result in a greater length of heavier gauge cable being placed than is minimally necessary…An efficient cable design would use the heavier gauge cable closest to the exchange. This minimizes the total length of heavier gauge cable used.*

Telstra responded to this criticism regarding the placement of heavier gauge cable in the main network in its 10 September 2008 submission, *Modifications in v1.2 of the TEA Model*, as follows.

> *Telstra has already explained why its provisioning rules in this regard are sound practice. Nevertheless, Telstra has tested the impact of changing the TEA model design to place heavier gauge cable closest to the exchange. The impact of the change is a slight increase in cost (+$0.05).*"

Ovum also states (at page 11):

> *It is not clear from the documentation what the model does if the need for heavier gauge cable exceeds the feeder-cable length. The model actually implements the formula without imposing an upper limit of the feeder cable length. This should not be a problem as it should not occur if the DAs and ESAs have been well designed.*

The TEA model only places 0.64mm gauge cable in the main network to satisfy the transmission limitations identified in the *Network Dimensioning Rules*. If a heavier gauge cable is required in practice, the TEA model does not account for the extra cost. This means the TEA model will understate costs.

In some instances, the length of the main cable that connects the DA to the exchange exceeds the maximum length of 0.64mm gauge cable required to meet transmission limitations for serving a DA. When this occurs, transmission requirements would necessitate either placing 0.90mm gauge cable in the main network, or placing 0.64mm gauge cable in both the main and distribution networks. As stated above, Telstra only places heavy gauge cable in the main network. In order to simplify the

model design, the TEA model uses neither of these two options for Band 2 Exchanges. Instead the model simply uses 0.64mm gauge cable in the main network. This conservative assumption further understates the cost of serving these DAs.

Ovum also comments (at page 11):

> *Given that ultimate demand is known (demand at customer locations is specified), one could argue that the Distribution network should be designed at 100% fill – that is, that no adjustment to demand should be made. … One could also assume that the Main Cable network is sized for ultimate demand, by setting the Main Cable fill factor to 100%.*

Demand on any network continues to fluctuate as customers with differing telecommunications requirements migrate throughout the network, customers' service requirements change over time and the network grows. An efficient forward looking design must account for these future variations in demand. It is neither economical nor efficient to construct a network without spare capacity. It is this fact that has lead to the almost universal use of fill factors in cost models. Telstra submitted a comparison of the fill factors in the TEA model with those used in other jurisdictions in its response to the ACCC's Discussion Paper.

In any case, as Ovum recognised (at page 11), "*just changing the Distribution fill factor to 100%, with no other changes to the default case, produces less than a 1 percentage point change in the cost*". This minor saving in the initial cost of placing a network would be overwhelmed by the additional cost of adding capacity to a network as demand fluctuations occur. The cost of adding capacity to the network in small increments after construction is complete is an order of magnitude greater than the minor cost of including spare capacity in the original build. An efficient provider would recognize this fact and include spare capacity in its original network design.

B.1.4 Cable Jointing

Ovum supports the TEA model's methodology with regard to Cable jointing (section 2.4 at page 11):

> *The jointing of cables, as described in the documentation, is efficient. Joints are only included where necessary: where cable connections are required or where the maximum cable lengths require a joint in a long network branch.*
>
> *The maximum street cable length (section 3.2.3.1.1) is taken to be 500 m, which is a generous value and errs on the side of underestimating the number of cable joints*

B.1.5 Pillars

Ovum mistakenly concludes (section 2.5 at page 12):

> *The "sizing" of pillars consists of choosing either a 900-type pillar or an 1800-type pillar depending on how many pairs are to be terminated. The sizing algorithm leaves some spare capacity in the pillar.*

Telstra's Access Network Dimensioning Rules require one slot in the pillar to be left vacant for maintenance purposes not for spare capacity, as discussed in Telstra's

response to the ACCC's Discussion Paper. This necessary maintenance practice is not "oversizing". In any event, Ovum correctly surmises "[*t]he effect of this oversizing of pillars is likely to be small"*.

B.2 Main Cable Network Engineering

B.2.1 Summary of Findings

Ovum makes the following findings with respect to the TEA Engineering Main Module:

- In their initial review of v 1.0 of the TEA Model they found an implementation error. This was fixed in version 1.1 of the TEA model.

- They have concerns the alleged problems in the input data discussed in Section 2 of the Ovum Engineering Report affect the cable and conduit placement calculations and, as such, in the case of "bi-directional sections" result in placing too much cable and conduit. However, this was fixed in version 1.1 of the TEA model.

- There is an undocumented feature concerning "Fibre T Block Demand," which has only a minor impact on cost in the default case but could be significant if it were set to a larger number. As explained below, this is a misunderstanding on Ovum's part.

- There are some minor inconsistencies between the documentation and the implementation of the model. These are explained below.

Consequently, Ovum's review of the TEA model supports the engineering of the Main network.

B.2.2 Demand at Fibre fed Pillars

Ovum states (section 3.2 at page 14):

> *The model also adds in the demand for a 'Fibre T Block', which in the Input sheet is specified as 'Demand at Fibre Fed Terminals'. This final element is not specified in the documentation (paragraph 145).*
>
> *This extra element (Fibre T Block Demand) increases the demand at fibre fed pillars and has the practical implication of increasing the price per line calculated in the Calc-Engine.*

The terminology used by Telstra is ambiguous and could easily be misinterpreted. Telstra will modify the terminology to make it abundantly clear in its next TEA model release. Column D in the Main-Summary tab of the Main Engineering Module is inappropriately labelled. It should be labelled "Fibre Fed Demand" rather than "Demand at Fibre Fed Pillars". This quantity includes both demand at fibre fed pillars and demand at fibre fed building terminals. Additionally, the formula used to calculate this column (D) uses the term "Fibre TBlock Demand," when the term "Fibre Building Terminal Demand" would have been clearer (Telstra has used the terms TBlock and Building Terminal interchangeably in some of its labelling and/or documentation). Total fibre fed demand in the TEA model (ambiguously labelled

Demand at Fibre Fed Pillars) is the sum of the demand at fibre fed pillars and the demand at fibre fed building terminals.

In the ULLS run of the TEA model, fibre fed demand is only included in the total number of lines, not in the number of distribution lines. This is because the main costs are shared between fibre and copper fed DAs (and, therefore, unit costs are derived by dividing total main cost by total lines including fibre fed demand) and the only distribution network costs included are for copper fed DAs (and, therefore, unit costs are derived by dividing total distribution costs by the number of copper lines).

B.2.3 Sections 3.3 - 3.9

Telstra acknowledges Ovum's findings in sections 3.3 to 3.9.

B.2.4 Main Module Documentation

Ovum states (section 3.10 at page 19):

> *Ovum concludes that inputs and formulas described in sections A & C of the documentation are consistent with the model's spreadsheets and functionality.*

Ovum includes a table that identifies some typographical errors in the documentation, areas where the documentation explanations are not clear, and explanations that may be included in one set of documentation (e.g. the model documentation) but are not specified in another (e.g. the engineering rules). These minor documentation omissions and unclear verbiage have no impact on the TEA model results and will be evaluated and revised if necessary in future documentation filed with the ACCC.

There is one comment in Ovum's chart that they claim may have an impact on costs although they say it is "negligible". On the lines labelled Par. No 221 and 222 Ovum points out that the formula that identifies number of joints required on the main cable side of the pillar (Columns AF and AG on the Main-Collapsed worksheet in the Main Engineering Module) includes a provision that, to have a joint, the cumulative demand on the segment (Column E on the Main Collapsed worksheet) must exceed 1. Ovum argues that the formula should state that a joint may be required if the demand exceeds 0. They then acknowledge that this would probably have no impact because the demand on the main side of the pillar would virtually always be "a value that far exceeds 1". The Cumulative Cable demand (Columns E and F in the Main-Collapsed worksheet) is expressed as the size of main cable needed to serve the demand passing through the given segment. A 100 pair cable is the smallest cable used in the main network. Consequently, the smallest cumulative cable demand on any main cable segment that has demand would equal 100 pair. Using a value of 1 or 0 would have no impact on the calculation since both are significantly lower than the minimum 100 pair cable demand that would exist on any main cable segment.

B.3 Distribution Network Engineering

B.3.1 Summary of Findings

Ovum states (section 4.1 at page 25)

Ovum's review points out that there are three dimensioning rules where network requirements are over calculated resulting in increased costs

Despite their apparent negative tone, Ovum's review supports the distribution network engineering design used in the TEA model. For example, Ovum states (at page 25, emphasis added):

"*The use of nontapered cable is, however,* ***common practice*** *in DA design.*

"*As indicated in section 2, a fill factor of 67% (corresponding to 1.5 pairs per living unit) is* ***normal****. This makes little difference to the costs.*

"*However, it is* ***best practice*** *to admit some additional capacity to allow for unplanned new demand and for fault restoration.*

"*This supports the view that a non-tapered design, which provides greater operational efficiency,* ***would be preferred by an efficient operator*** *of a copper-cable access network.*

The remainder of Ovum's section 4 demonstrates Ovum's general satisfaction with the reasonableness of the TEA Engineering Distribution Module. A few of their general conclusions are quoted below.

B.3.2 Distribution Conduits

Ovum states (section 4.2 at page 26):

This confirms that the DAs are well dimensioned.

B.3.3 Distribution Pits

Ovum state (section 4.3 at page 28):

It is an appropriate design, which somewhat underestimates the number of pits, to assume that four cable pairs are served by one pit.

B.3.4 Placing and Sizing of Pillars

Ovum state (section 4.5 at page 32):

The sizing of pillars is satisfactory.

B.3.5 Distribution Module Documentation

Ovum state (section 4.6 at page 32):

Ovum concludes that inputs and formulas described in sections A & B of the documentation are consistent with the model's spreadsheets and functionality.

B.4 Engineering Factors Used for Costing

B.4.1 Introduction

Ovum states (section 5.1 at page 37):

> *Because of the use of averages, it could be misleading to look at the TEA model costs for one or a few ESAs…Hence, the costing is really only valid for a large sample or the complete set of Band 2 ESAs.*

This is not a criticism of Telstra's Undertaking, since the cost and price under consideration are for the complete set of Band 2 ESAs.

B.4.2 Terrain Type

Ovum states (section 5.2 at page 37):

> *In the user interface, the proportion of rock can be entered for each ESA. This parameter is really set by the geography of the ESA and so, like the structure of DAs, should be part of the input dataset (that is, in the database, not in the user interface).*

Telstra will consider Ovum's recommendation to include the proportion of rocky terrain for each ESA in the input dataset in a future release of the TEA model. With regard to the current Undertaking, the proportion of rock is a user input. As with all user inputs, this input must reflect real world conditions.

Ovum states (section 5.2 at page 36):

> *Hence, it is likely that the separation of terrain by rock type is really misleading, as the costs are set to provide the overall average cost in some Telstra data."*

Ovum's critique applies only if a user is estimating costs for a subset of Band 2 ESAs. Since Telstra's Undertaking applies to all Band 2 ESAs, this comment does not apply.

B.4.3 Surface Breakout and Restoration Costs

Ovum states (section 5.3 at page 38) that all cable placements for Band 2 exchanges should be underground.

> *All cable placements in the model are assumed to be underground. For Band 2 (suburban) ESAs, this is appropriate.*

This is the approach adopted in the TEA model.

Ovum supports (at page 38) the TEA model's use of distribution area customer line density characteristics to approximate the actual breakout and restoration activities that would be required to construct a replacement CAN.

> *The Costing module then applies the proportions of each breakout and restoration activity to the conduit and pit placements in each of the Density Zones. This is an appropriate method, based on actual DA characteristics, to approximate the actual*

breakout and restoration activities that would be required if the cable runs were duplicated.

Ovum states (at page 38):

> *Much of the concrete surface breakout and restoration in a suburb could be avoided in suitable circumstances. For example, when Bright laid fibre for a pilot in South Perth, it used lateral boring through the nature strips for the fibre runs. This avoided the concrete footpaths in most cases. While this may not be entirely satisfactory for copper cable placement, it indicates that careful surveying and planning can avoid difficult surfaces.*

Ovum suggests that much of a suburb's concrete surface breakout and restoration could be avoided in some instances when constructing a new network. Telstra agrees with this proposition and has accounted for it in the model's default inputs. The conduit placement percentages used in the TEA model minimize the use of expensive concrete and asphalt restoration. When concrete surfaces cannot be avoided, Telstra's default inputs for placement of 1x50 and 1x100 conduit runs assume boring a vast majority of the time avoiding the higher costs of trenching, breakout and reinstatement. In the TEA model, approximately 53 percent of all distribution conduit routes outside of new estates are placed in trenches that were dug through plain turf requiring no concrete of asphalt breakout and/or restoration costs. Approximately 40 percent of all distribution conduit routes outside new estates are placed using lateral boring, similar to the Bright example identified in the Ovum report. Only 8 percent of the distribution conduit routes in the TEA model require concrete and asphalt breakout and/or restoration.

Ovum also states (at page 39):

> *In addition, some duct costs could be avoided altogether. In several locales worldwide (for example, Brisbane and Paris), it has been suggested that existing drains and easements could be used for telecommunications ducting. This could avoid many conduit runs but new pits and manholes may still be required in significant numbers.*

Ovum's assertion that it has been suggested that duct costs could be avoided altogether by placing cables in sewers is not evidence that such practice is possible or in use anywhere in the world. TSLRIC+ costing principles require use of equipment and practices which are best in-use worldwide, not theoretical examples that have been "suggested" by someone as possibly being useful. Ovum provides no background for this suggested solution such as the proponent and/or forum in which it was presented. Indeed, it is not safe in Australia to locate telecommunications facilities in sewers and drains, particularly when frequent access is required for maintenance.

Ovum concludes (at page 39):

> *In summary, while the TEA model does a credible job of estimating surface breakout and restoration activities, much of the resultant cost could be avoided by a new provider with careful planning in Band 2 ESAs (mostly suburbs).*

Ovum's conclusion that much of the costs of placing cable and conduit could be avoided with "careful planning" does not follow from the material provided by Ovum

in the same section. The TEA model avoids concrete surface breakout and reinstatement costs through heavy reliance on boring and trenching through turf where possible, and it would be unsafe to place telecommunications facilities in drains. Thus, there is simply no support for Ovum's conclusion that breakout and reinstatement costs could be avoided to any great extent more than they have already been in the TEA model through careful planning.

B.4.4 IEN Duct Sharing

Ovum states (section 5.4 at page 39):

> *However, because Telstra generates the input dataset from the real cable records, the actual sharing of ducts with the IEN could be specified in the input dataset, along with the other cable parameters. This approach has been used in other engineering design tools.*

Telstra will consider Ovum's recommendation to include the actual sharing of ducts between IEN and CAN in the input dataset in a future release of the TEA model. Regardless, as Ovum acknowledges, the TEA model does include 5% sharing and Ovum does not dispute this amount.

B.4.5 New Estates

Ovum states (section 5.5 at page 39) that it is preferable to specify the presence of new estates by ESA. Given that Telstra's Undertaking is for all Band 2 ESAs, it is unnecessary to have a different input for each ESA when one input for all Band 2 ESAs will provide the same result. Telstra notes, however, Ovum's apparent intention to have the new estates ratio reflect the cost of the ESAs that are being modelled. In this regard, presumably, Ovum would support using a trench sharing ratio for band 2 rather than a ratio for all bands, in the Band 2 TEA model. In Band 2 areas only, new estate lots made up [CIC] of total band 2 demand in 2006/07,[1] compared to 1% on a national basis.

C Ovum's Economics Report

Ovum makes many positive conclusions with respect to the TEA model. In particular, Ovum finds (section 1 at page 5):

> *Instead of taking costs from Telstra's audited accounts as the starting point, as one would find in most Top-Down models, the model estimates the cost of the network by reviewing the investment costs needed to meet the demand in Band 2 ESAs. This methodology is typical as starting base for building BU models.*

C.1 Network topology

Ovum claims (section 2.1 at page 9):

[1] Statement of [CIC] at paragraph 1 and 4 of Annexure [CIC]

Every exchange in Band 2 is modelled in the TEA model; however there are no topology differences between each exchange.

and

The difference in ULLS monthly costs if individual ESAs in Band 2 are selected is due to the demand of line types as the total ULLS cost is calculated by multiplying the equipment unit costs by the volume of equipment/lines needed to reach the number of businesses and residential homes. It is not unusual to find averaging methodology used in bottom-up models. However, if the model was used to select, say, only a few ESAs in Band 2, then the results could significantly overestimate or underestimate the actual costs of supply.

Telstra's Undertaking is for the entirety of Band 2 ESAs. Therefore, in assessing the reasonableness of Telstra's Undertaking, the average cost over all ESAs is relevant not the costs of "only a few ESAs". In any case, Ovum is incorrect that there are no topological differences between ESAs. Since the TEA model routes are based on Telstra's actual network and engineering databases, it implicitly takes into account any topological differences between ESAs. For example, if ESAs have different suburban street layouts due to, for example, hills, coastline or rivers, that will be reflected in Telstra's engineering records and, subject to the processes of optimising actual network routes, in the TEA model. Variations in the length of conduit runs between ESAs with similar demand, as observed in the TEA model output, are evidence of this.

C.1.6 Scorched node approach

Ovum claims (at page 9):

The TEA model uses a "scorched node" approach. The main nodal locations are fixed, which in this model include: the telephone exchange locations, the Distribution Area ("DA") boundaries, the Pillar locations at the edge of each DA, and the customer locations. The model then dimensions a traditional access network to meet the customer demand using the locations specified. This method is appropriate but its design should be modified. In Europe and across the world many regulators have adopted a modified scorched-node approach.

A modified scorched-node approach takes the existing topology as a starting point, but then modifies the network by eliminating inefficiencies. The technology between the existing nodes is optimised to meet the demands of a forward-looking efficient operator. There is little evidence of the network being optimised and the design is inefficient in some aspects. See the accompanying engineering review for further details.

In the Ovum Engineering Report, Ovum condones Telstra's scorched node approach stating (at page 9):

"*It is legitimate, however, for Telstra to use a scorched node approach – fixing the current pillar points-for the purpose of the model.*

Ovum also cites several efficiencies that were built into the model such as the rules used to size and locate manholes and pits. Despite these points, Ovum claims (at

page 9) there is "*little evidence of the network being optimised*" by eliminating inefficiencies in the actual network design.

In any case, subsequent to Ovum's report, Telstra lodged two reports that demonstrate the significant efficiencies resulting from the TEA model network design:

- *Measure of TEA Model Efficiency: ULLS Band 2*, which shows that the TEA model has 35.5% fewer trench km, 83.2% fewer manholes, 20.8% fewer pits and 56.8% fewer cable sheath km than Telstra's corresponding actual network.

- *TEA Model Route Optimisation Process*, which shows how the network was optimised (or 'modified') in the way suggested by Ovum.

Telstra believes that these two reports should satisfy Ovum's concern about the lack of optimisation.

C.1.7 Underground equipment

Ovum correctly identifies (at page 10):

> *The topology of an ESA plays an important role in structure and the associated costs of its network. The model also assumes that all cables have been laid underground and no alternative usage of other technologies such as aerial cable has been included. Other regulatory LRIC models may include alternative technologies. However, in Australia there is no alternative. Ovum believes local councils will not accept such usage of alternative equipment. With such an assumption in place the model has been modelled fairly to represent no alternative technologies.*

C.1.8 Conclusion

Ovum concludes (at page 10):

> *The new design is unfit and does not seem to reflect that of an efficient operator.*

However, this is based on Ovum's incorrect assertion that the network design has not been modified to eliminate inefficiencies. All of the deficiencies cited in Ovum's Engineering Report have been addressed in section B of this submission. Further, the additional Telstra material referred to above and submitted after Ovum's reports were received, documents the TEA model's optimisation methodology and provides evidence of the positive results. Telstra believes that this additional information would convince Ovum to reverse its conclusion.

C.2 Forward looking

Ovum claims (section 2.2 at page 10):

> *The TEA model seems to estimate the cost of the network with historic costs, despite stating that the model is forward-looking. There is no evidence that the network costs submitted in the model have been re-valued and made forward looking.*

In contrast, the costs in the model are historic. The costing inputs are sourced from Telstra's engineering department, and are mainly drawn directly from the averaged costs from Telstra's three Access and Associated Services ("A&AS") contracts.

The equipment costs should be valued at today's cost.

It appears that there is some confusion as to what Telstra's A&AS contract rates represent. As discussed in the statement of [CIC], the A&AS contracts were entered into in [CIC] and have a life of [CIC]. Thus, Telstra's A&AS contract rates are the rates that Telstra will pay for plant and equipment until at least [CIC]. Therefore, it is not correct to characterise them as historic costs. Instead, they are, as Ovum says is appropriate, today's cost.

Ovum did a comparison (at page 11) between Telstra's copper cable costs and an international benchmark. In this comparison Telstra's cost for 100 pair cable in the TEA model is lower than the international benchmark and the costs for smaller sizes of cables are higher. Based on this analysis Ovum states (at page 11):

In all cases except for the largest cable size (which is also the most commonly used size), the benchmark price of cable is somewhat lower. We conclude overall that the cost of cable is broadly in line with international benchmarks.

If you use the Ovum costs for cable in the TEA model, the monthly cost increases by more than a dollar when the non tapered option is used.

While Ovum's comparison supports Telstra's vendor prices for cables, Telstra has some concerns that the Ovum analysis does not compare similar costs. Following is the Ovum analysis revised to show all the components of the Telstra cable costs identified in the comparison:

Ovum compared the bold costs in the column second from the right. These costs include an assignment of indirect loadings and the cost for hauling the cable through conduit. It is very possible that the international benchmark rates identified by Ovum would not include indirect overheads and/or the cost of hauling cable into conduit. If these two costs were removed from the Telstra rates in the Ovum comparison (i.e. the column second from the left), Telstra's vendor prices for copper cable are considerably less than Ovum's international benchmarks for every size of cable.

Ovum also states (at page 11):

> *However, the other equipment prices in the TEA model should be lower. In general, equipment prices have fallen around 5%-15% per annum over the last 5 years. If the cable costs are adjusted to the numbers above and other equipment prices are reduced by 10%, then the final ULLS cost falls by 6%.*

Telstra understands that Ovum has not actually compared Telstra's vendor prices, for plant and equipment other than cables, with prices in other countries. Instead, Ovum's position is based on the mistaken assumption that A&AS rates used in the TEA model are historic costs that need to be adjusted with recent price trends to reflect current prices. However, as explained, the A&AS rates are Telstra's current prices and applicable at least until [CIC [redacted]]. Thus, the adjustment suggested by Ovum is not necessary.

C.3 Access only costs

C.3.1 Fibre-related costs

Ovum claims (section 2.3 at page 12):

> *The direct network costs have been overvalued and contain costs relating to other businesses. Fibre costs and fibre-related costs have been included. They should be excluded as the ULLS cost is for copper-based facilities only.*

The TEA model shares main network costs between lines that are in exclusively fibre-fed DAs (not included in the ULLS costing) and lines that are in copper-fed DAs (included in the ULLS costing). This is described in detail in the *TEA Model Documentation* (at paragraph 264) and Telstra's *Response to the ACCC's Discussion Paper* (at page 27). This is a reasonable approach to account for main network sharing and does not over value network costs in the way suggested by Ovum.

C.3.2 Indirect factors

Ovum claims (at page 12):

> *The model is only concerned with access ULLS costs. The product and customer expense is not associated with the running of the ULL service and should be excluded from the TEA model. The expense should be allocated to the retail business unit of the organisation. Such costs as marketing, sales, billing, customer service and retail elements of finance and human resource also belong to the retail increment.*

There appears to be a misunderstanding as to how Telstra calculated the indirect cost factors for the TEA model. Telstra has calculated indirect factors from Telstra's RAF. Telstra RAF is divided into the following three business categories:

- Retail – which identifies Telstra's costs relating to the supply of retail services;

- External – which identifies Telstra's costs of supplying wholesale services to access seekers; and,

- Internal – which identifies Telstra's costs of supplying wholesale services to Telstra's retail business units.

Telstra used only the external and internal wholesale business unit costs in calculating the indirect factors. Costs associated with Telstra's retail businesses were purposely excluded for the reasons identified by Ovum. There are marketing, sales, billing, customer service, finance and human resource costs legitimately incurred in the supply of wholesale services to access seekers and Telstra's retail business. Only [C|C] percent of the total customer and product costs are associated with Telstra's internal and external wholesale operations. If Telstra were to eliminate all these wholesale customer contact and billing functions it would never be able to comply with the SAOs.

Ovum claims (at page 12):

> *In general, financial calculations do not include intangibles because they are nonmonetary and/or are difficult to measure. In this case, Ovum suggests that the intangibles should be removed as they are not part of the access network costs. Intangibles do not affect the running of the ULL service and should be removed from the TEA model.*

It is inappropriate to exclude a category of cost on the basis that they are nonmonetary and/or difficult to measure. It is reasonable to include the best and unbiased estimate of those costs despite the difficulty in measuring them.

Intangibles should also not be removed on the basis that they are not part of the access network costs, or that they do not affect the running of the ULL service. They are common costs, which are a genuine component of costs to be included in an estimate of TSLRIC+.

C.3.3 Number of lines

Ovum identifies (at page 12) that v1.1 of the TEA model used three different and inconsistent counts for the number of access lines. As explained in *Modifications in V1.2 of the TEA Model*, this minor inconsistency has been rectified in v1.2 of the TEA model.

C.3.4 Exclusion of shared revenues

Ovum make a number of points (at page 14) in relation to how conduit revenues, earned from third parties who lease conduit space in Telstra's CAN, are deducted from the ULLS cost estimate. First, Ovum state:

> *Although in the model guide it is mentioned that conduit leasing applies to the distribution network, in the TEA model, the cost of ducts and pipes in the main network have been reduced by the amount of conduit leasing revenue.*

The User Guide incorrectly states that the revenues are deducted from distribution network costs. In fact, the user Guide should state that they are, and should be, deducted from main network costs, since a majority of the leases are for main network conduit. However, as long as all the revenue sharing savings are

incorporated into the model, their location on the cost calculation page will have no impact on the final cost estimate.

Second, Ovum state:

> *This is a cost model and therefore we would expect that only costs are included or excluded. We therefore believe that the assumption has been made that the revenue collected from the operators that lease the conduit is equal to the associated cost of this activity, which means that profit margin is zero.*

Telstra has deducted all the allocated conduit sharing revenues from the ULLS cost. Even if there is profit from conduit sharing, which is not the case, then subtracting anything less than the allocated conduit sharing revenue would result in a higher ULLS cost.

Third, Ovum state:

> *The values of the factors in the above equation (apart from the Number of lines in Band 2) are inputs to the model and there is no reference to how they are calculated. We would expect the revenue value to derive from RAF, but this could not be reconciled with RAF data.*

The measurement of conduit sharing revenue is set out in the statement of [CIC].

Fourth, Ovum state:

> *The number of lines in Band 2 used in the formula is not the number of lines calculated in the model. This is a value that cannot even be flexed in the Telstra Cost Model user interface.*

As discussed above, Ovum correctly identified a slight inconsistency between the line count for developing the cost per line in the TEA model and the line counts used to identify the sharing revenues to be allocated to each line. Telstra corrected this inconsistency in v1.2 of the TEA model. The new line count is not a user adjustable variable in the TEA model interface as it is a constant that is meant to reflect the total number of lines in Telstra's CAN. Note that any adjustments to this revised line count would result in the same inconsistencies that concerned Ovum regarding the original Telstra line counts.

Fifth, Ovum state:

> *As there is no reference to how the values of the inputs used in the formula are calculated, the conduit leasing revenue would be fixed and independent of the number of exchanges considered in the grouping module.*

This is incorrect. The conduit sharing revenue is converted into a per-line amount and then deducted from the per-unit costs of ULLS. Hence, when a user selects only a subset of ESAs in the TEA model, the calculated costs for that subset of ESAs will not have the total conduit sharing revenue deducted from it, only an amount representative of the proportion of Band 2 lines in the exchange.

C.4 Efficiency savings in O&M

Ovum state (section 2.4 at page 15):

> *Currently in the TEA model the operational and maintenance factor is higher for each plant and equipment item, except for ducts and pipes alone, when compared to the historic cost factors. The operational costs should be equal to or lower than their historic counterparts. Therefore, the factors are inappropriate and include inefficiencies in the network.*

It is not clear from the Ovum Economics Report what 'historical' values Ovum is comparing the O&M factors in the TEA model to. In any case, the O&M factors compare favourably to O&M factors accepted by the ACCC in the past.

	TEA Model	**ACCC modelling of Telstra's CAN (based on Optus figures)[2]**	**ACCC modelling of Telstra's Transmission Network[3]**	**ACCC modelling of Mobile networks[4]**
Ducts and Pipes	CIC	0.12	n/a	n/a
Copper Cables	CIC	0.13	n/a	n/a
Multiplexing Equipment	CIC	0.07-0.12	n/a	n/a
Inter-Exchange Cables	CIC	0.10	0.10	0.11
Switching Equipment - Local	CIC	0.07	n/a	n/a

Clearly, Telstra's O&M factors compare favourably to the O&M factors used by the ACCC in other decisions.

Ovum also claims (at page 16):

> *It is unlikely newly laid equipment such as copper lines require as much or more maintenance costs as older copper lines.*

For a TSLRIC model to measure costs over the long term, it must have regard to O&M over the life of the relevant assets. Therefore, while it might be the case that O&M is lower in earlier years of an asset's life, a TSLRIC cost estimate should be representative of the O&M over the entire life of that asset. The TEA model calculates O&M using Telstra's accounts at 2005/06, which broadly reflects a midpoint in Telstra's assets' lives.

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[2] ACCC (2000), *A report on the assessment of Telstra's undertaking for the Domestic PSTN Originating and Terminating Access services*, July 2000, at tables A1.6 and A2.4

[3] ACCC Transmission Cost Model, http://www.accc.gov.au/content/index.phtml/itemId/823855

[4] WIK (2007), *Mobile Terminating Cost Model of Australia*, January 2007, at table A-3

C.5 Capital cost and expense factor calculations

Ovum claims (section 3.1 at page 19):

> *[Telstra's] method could potentially overcompensate (undercompenstate) Telstra if the values of assets are increasing (falling). In most Bottom-Up LRIC models, the chosen depreciation methodology is the annuity method. The advantage of an annuity calculation is that it takes account of the discount rate (cost of capital), which generally suggests that it is rational to delay depreciation payments to some extent.*

The levelisation approach used in the TEA model converts the straight-line depreciation and cost of capital into an annuity. Therefore, the TEA model is consistent with Ovum's view of the approaches adopted in "*most bottom-up LRIC models*".

Ovum correctly identifies (at page 19):

> *"[The annuity method] creates a "back-loaded" depreciation profile (i.e. more depreciation later in the asset life). This may be considered inappropriate for telecommunications assets because real prices tend to be declining, which means that future entrants will be able to purchase cheaper assets, and so incumbents will typically wish to "front-load" unit cost recovery.*

Telstra agrees that it is inappropriate to backload depreciation of telecommunications assets. This is discussed in more detail in Telstra's submissions.[5] Henry Ergas discusses this issue in his expert report (generally and at sections 3 and 4 specifically).

Ovum continues:

> *Tilted annuities are designed to alleviate the problem of 'back-loading' to the extent justified by the annual reduction in asset values. With this methodology, the sum of the depreciation charge and the return on capital employed declines over time consistent with the reduction in the replacement value of the asset.*

Ovum concludes (at page 19):

> *We recommend the tilted annuity methodology. With this methodology implemented, and with no other parameter or calculation changes, the result of the TEA model produces a monthly rate of $50.91 per line, instead of the default figure of $49.27.*

Ovum's view that tilted annuities alleviate the problem of back-loading is only true in some circumstances – namely when asset prices are decreasing over time. The ACCC has, in recent proceedings, assumed CAN asset prices are increasing when they apply the tilted annuity method.[6] This back-loads depreciation further into the future than what would arise from application of a standard annuity. Therefore, it is questionable

[5] See Telstra, *Response to Access Seeker Submissions*, 18 November 2008, section F.7
[6] ACCC (2007), *ULLS Access Dispute between Telstra and Primus: Statement of Reasons for Final Determination*, December 2007.

whether Ovum would recommend a tilted annuity as the ACCC has in the past, in the knowledge that that would result in an aggravation of the back-loading problem Ovum identifies. Indeed, Ovum seems to raise the monthly charge by using a tilted annuity, assuming that prices will fall and thus front-loads depreciation rather than further back-loading it as the ACCC has done in the past.

Ovum claims (at page 19):

> *[Tilted annuity depreciation] is consistent with the preferred approach by a number of regulators (e.g. ComCom in New Zealand, PTS in Sweden, Telestyrelsen in Denmark).*

It is not clear, however, that these regulators have applied a tilted annuity to front-load or back-load depreciation. Comparison of approaches between countries would require an analysis of the tilt applied in the tilted annuity to test whether they are consistent with the ACCC's application of tilted annuity. In any event, application of a tilted annuity in Telstra's Undertaking would severely undermine the likelihood of capital recovery and dramatically increase risk.

C.5.1 Asset Lives

Ovum states (section 3.2 at page 21):

> *According to Telstra, the asset lives are from the accounting department:*

and

> *Although the asset lives are sourced from Telstra's accounting department, the asset lives used in the TEA model do not match the asset lives as reported in the Annual Report.*

The lives provided were Telstra's unbiased estimate of economic lives. It is reasonable and common practice to use economic lives in a TSLRIC+ model.

Ovum quotes (at page 21) Donald McGauchie as saying:

> *By the early part of this century, over 30 per cent of the copper pairs in the Australian network were more than 30 years old, with more than 5 per cent pre-dating 1950.*

Donald McGauchie's statement says nothing about the average age of copper cable. At most it says that 30% are more than 30 years old. Indeed, Donald McGauchie's statement is consistent with 50% of copper pairs being more than 15 years old, which approximately corresponds to the average age of the main and distribution cable lives in the TEA model.

Ovum identifies (at page 21):

> *Not all of the asset lives are linked through the model. If the model user decides to change the asset lives of these asset categories, for certain asset lives listed below, the changes to the asset lives will have no impact upon the final result...*

As explained in *Modifications in V1.2 of the TEA Model*, Telstra corrected this issue in v1.2 of the TEA model.

C.5.2 O&M costs

Ovum states (section 3.4 at page 44):

> *It is not unusual to calculate factors using a top-down approach, but, where this is applied, the latest information has been used. As the 2007 RAF accounts are available, we believe that the TEA model should be using 2007 data.*

Telstra notes that, at the time of preparing the TEA model for release to the ACCC and, in particular, the O&M factors, the 2006/07 RAF accounts were not available. Therefore, the default inputs to the TEA model were based on the 2005/06 RAF accounts.

Ovum makes additional points in relation to Telstra's O&M factors (at page 44).

First, Ovum states:

> *The model using the model [sic] calculated investment for some asset categories, while other types of investment are taken from the RAF accounts (historical investment).*

and

> *Outputs of the model (investment per line) are used to calculate inputs (O&M factors). This creates circular references which are sources of potential error and decrease the accuracy and flexibility of the model.*

The calculation of O&M factors in the TEA model is consistent with the approach used in the PIE II model that the Commission relied on in part in developing the current ULLS rates.

Ovum is correct that the factor calculation relies in part on the investment output from the TEA model for two accounts. When the TEA model is run, the investment cost per line for copper cable and conduit needs to be placed into the factors calculation to ensure the factors reflect the appropriate current cost. However, this is simply a step in operating the model and not a circular reference. The investment cost of cable and conduit is calculated in the TEA model without any dependence on the O&M factors. These investment amounts are then input into the factor calculation to derive the O&M factors. Although this results in an extra step in the modelling process, it does not constitute a circular reference, in that the two calculations are not interdependent.

Second, Ovum states:

> *The model assumes that the unit investment cost per line of ULL Bands 1, 3 and 4 is equal to the investment costs of ULL Band 2.*

Telstra did not assume that the investment per line was identical in all bands. In developing factors for ducts and pipes and copper cables, Telstra divided the total company O&M costs by the total company current investment for copper cables and conduit. Since the TEA model did not have investments for all bands Telstra used a ratio of Band 2 to total company investment in the PIE II model, which is currently

used by the ACCC to set ULLS prices, to convert the Band 2 TEA investment up to a total company equivalent.

Ovum states (at page 44):

> *The investment costs per line that were calculated from the TEA model and used in the factor calculation sheet are supposed to be direct investment costs per line. From these costs, a certain amount is deducted because it is considered to be inclusive of support assets investment cost. This implies that the direct investment costs calculated in the TEA model include an amount of support assets investment costs. If this is the case, then the TEA model is double counting the network support assets investment costs.*

Ovum correctly identifies an error in this calculation although it does not involve double counting. The denominator for the copper cable and ducts and pipes O&M factor is the investment costs measured by the TEA model. These investment costs were, as Ovum said they should be, the direct investment without any assignment of indirect assets. The denominator for the remainder of the O&M factors is the investment costs measured from the RAF reports. The RAF asset values include an assignment of indirect asset investment. The assignment of indirect asset investment in the denominator for these O&M factors had to be removed, since, in the TEA model, the O&M factors are applied to the direct investment, which does not include any indirect asset assignment. In doing this, Telstra inadvertently deducted an amount of indirect assets from the direct investment costs that were taken from the TEA model (to develop the copper cable and ducts and pipes O&M factors) as well as those taken from the RAF (to develop the remainder of the factors). Since the direct investment costs calculated from the TEA model does not include any assignment of indirect asset investment, this adjustment should not have been made to the values taken from the TEA model. Eliminating the adjustment reduces the loop cost by $0.14 or less than 0.3%.

C.5.3 Indirect O&M costs

Ovum makes several points in relation to Telstra's indirect O&M factors (at page 45).

First, Ovum states:

> *There are no references to how the adjustments were made and where the values were sourced from. For example, the model is eliminating depreciation but there is no reference to the origin of this cost or how it is calculated.*

Indirect O&M is calculated in Telstra's factor study by making several adjustments. These can be seen below row 61 in the 'Operating Expenses' worksheet in the factor study. These adjustments are also explained in section C.1.1 of *Operations and Maintenance and Indirect Cost Factor Study*. In relation to the specific example cited by Ovum, on the topic of the depreciation adjustment, it is stated in the *Operations and Maintenance and Indirect Cost Factor Study* (at paragraph 34):

> *The construct of the RAF separately identifies depreciation expenses for direct network asset categories. For indirect asset categories depreciation expenses are included in the indirect expense categories. Therefore, in the RAF, the depreciation associated with indirect cost categories are included together with the other*

expenses associated with those categories. Since the TEA model separately calculates depreciation on indirect assets, these costs must be removed to avoid double counting depreciation costs.

This explains why the adjustment is made and that the source of the adjustment is the RAF.

Second, Ovum states:

ULL specific costs have been excluded from the indirect operating costs... First of all, these costs are not just ULLS specific but include LSS specific costs as well. In addition, it is not clear why O&M (IT) costs of $4,468.45, which are supposed to be direct opex, are mapped to IT indirect costs. O&M (Indirect) costs of $ 382.76, which include Connection Group and Product management indirect costs, are also mapped exclusively to Other Organizational costs instead of to indirect product costs. Lastly, it is not clear why O&M (Product) costs of $1904.27, which include direct wholesale product management and connection group costs, are mapped to indirect marketing costs.

Ovum is correct that both ULLS and LSS specific costs are excluded from indirect operating costs. ULLS and LSS specific costs must be subtracted from the O&M factors as they would otherwise be double counted – once in network costs and once in specific costs.

O&M (IT) ULLS/LSS specific costs of [CIC] are excluded from the IT indirect costs category in the RAF, because Telstra's accounting practices allocate these types of costs into the 'Information Technology' cost item in the 'Non-Communications Plant and Equipment' cost category in Telstra's RAF. Therefore, to determine indirect costs for ULLS, ULLS/LSS specific costs need to be excluded from the 'Information Technology' cost item in the RAF.

In terms of O&M (Indirect), it makes no difference to the ULLS price whether those costs are allocated to 'Other Organisation' or 'Indirect Product and Customer' costs.

O&M (Product) ULLS/LSS specific costs of [CIC] are excluded from the indirect marketing cost category in the RAF, since Telstra's accounting practices allocate these types of costs to the indirect marketing category in the RAF.

Third, Ovum states:

The product and customer indirect expenses include costs of Marketing, Sales, Billing, Interconnection, etc. These are clearly Retail related costs and should have been excluded in the LRIC model.

Telstra incurs wholesale product and customer indirect expenses, including marketing, sales, billing and interconnection. These functions are required to provide service to wholesale customers and for Telstra to meet the SAOs. These costs do not include retail costs and in fact amount to only [CIC] percent of Telstra's total customer and product costs, the rest being assigned to the retail cost category. The retail costs have been purposefully excluded from the factor calculation.

Fourth, Ovum states:

Depreciation has been eliminated from Indirect Expenses. Indirect operating expenses are operating expenses, which are different from capital investment expenses. Therefore, why is there a depreciation associated with these costs?

As explained in the *Operations and Maintenance and Indirect Cost Factor Study* (at paragraph 34), the RAF includes some depreciation on indirect assets in the indirect expense categories. Hence, those depreciation costs need to be excluded from the factor study as depreciation is already captured in the TEA model. Failure to do so would result in the double recovery of these costs.

Fifth, Ovum states:

The total direct expenses used as denominator in the formula above are equal to the total direct O&M expenses. Why is the model not considering the operating expenses after the relevant adjustments?

The denominator for the calculation of the indirect expense factors is the unadjusted O&M expenses. Indirect expenses are incurred in support of all of the company's business activities. Using unadjusted O&M expenses in the denominator ensures that these indirect costs are spread over all the direct O&M expenses not just those associated with providing ULLS service. If the adjusted O&M expenses were used as the denominator in the factor calculation, all the indirect expenses would be attributed to the ULLS product. Telstra's approach results in lowering ULLS costs by assigning only a pro-rated share of indirect expenses to the ULLS.

C.5.4 Indirect assets costs

Ovum makes several points in relation to Telstra's indirect O&M factors (at page 48).

First, Ovum states:

There is no reference source for most of these adjustments and, more specifically, about the accumulated depreciation and the noncommunications [sic] related amount.

Indirect asset costs are calculated in Telstra's factor study by making several adjustments. These can be seen below row 106 in the 'Investments Costs' worksheet in the factor study. These adjustments are also explained in section C.3.1 of *Operations and Maintenance and Indirect Cost Factor Study*. In relation to the specific examples cited by Ovum, the values for accumulated depreciation and non-communications assets adjustment are sourced from Telstra' detailed accounting records underlying the RAF.

Second, Ovum states:

ULL specific costs have been excluded from indirect investment costs…First of all, these costs are not just ULLS-specific but include LSS-specific costs as well. In addition, it is not clear why Capex (Direct) costs of [CIC] are mapped to indirect costs and deducted from the indirect software costs.

Ovum is correct that ULLS and LSS specific costs are excluded from indirect investment costs. ULLS and LSS specific costs must be subtracted from the indirect

factors as they would otherwise be double counted – once in network costs and once in specific costs.

Capex (Direct) ULLS/LSS specific costs of [CIC] are excluded from the indirect investment costs, because those types of costs are allocated into the 'Software' cost item in the 'Non-Communications Plant and Equipment' cost category in Telstra's RAF.

Third, Ovum states:

> *We would expect to see in the model actual accumulated depreciation of retail investments instead of calculated figures.*

In setting ULLS and LSS specific cost recovery, the ACCC identified those assets for which Telstra would be granted recovery. By using the Commission derived investment in eliminating ULLS and LSS specific costs, the analysis matches the adjustment to Telstra's actual cost recovery.

C.5.5 Assessment of cost factors

Ovum presents a table (Figure 3.16) that compares the O&M and indirect cost factors in the TEA model to those in Danish and Swedish cost models. The TEA model compares favourably to all factors except the indirect expense factor. Ovum states:

> *All factors except indirect expenses seem acceptable in the model. The indirect expenses in the TEA model [CIC] compared to the publicly available models* [7.5%-18.0%] *are extremely high.*

When making comparisons of this nature it is important that one compares like with like. The indirect expense factor used in the TEA model [CIC] is multiplied by the total amount of direct expense in the TEA model.

The model developed by the Danish regulator (ITST) does not calculate indirect expenses in the same way. ITST's model calculates indirect expenses by multiplying the indirect expense factor by total cost (including capital costs).[7] The model developed by the Swedish regulator (PTS) calculates indirect expenses in a similar way.[8]

Therefore, it is not appropriate to compare the indirect expense factor in ITST and PTS's models with the indirect expense factor used in the TEA model without adjustment for the underlying differences. Further inspection of the most recent release of ITST's model for access shows that the amount of overhead allocated to the access network is DKK595m and OPEX is DKK564m.[9] Hence, the ratio of overhead to OPEX, which is more comparable to the indirect expense factor used in the TEA model, is 105%.[10]

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[7] Telestyrelsen (2002), *Characteristics of the Top-Down and Bottom-Up Cost Analysis*, 15 March 2002, at section A.6.5.1
[8] Post & Telestyrelsen (2004), *Hybrid Model Documentation (PTS Hybrid model v 2.1)*, 10 December 2004, at section 2.6.5
[9] See 'Overview' worksheet at cells L11 and M11. The model can be accessed at http://en.itst.dk/interconnection-and-consumer-protection/lraic/lraic-on-fixed-network/lraic-hybrid-model-2008-1
[10] PTS's model combines direct and indirect expenses so a similar comparison is not possible.

Consequently, contrary to the conclusion reached by Ovum, the evidence Ovum relies upon indicates that the indirect expense factor used in the TEA model is of a similar value (slightly lower) than that used in ITST's models.

C.6 WACC

Telstra has provided detailed information on the logic behind the valuation of the components of the WACC used in its ULL Undertaking. This submission critically examines Ovum's views on WACC quantification outlined in the Ovum Economics Report.

C.6.1 International WACC comparisons

Ovum present (at pages 23-24) data to illustrate that Telstra's WACC for ULL is significantly higher than WACC estimates applied in overseas jurisdictions. Meaningful and informative comparison of WACC estimates across countries can be very complex and require accounting for country-specific factors to ensure that one is making a like-for-like comparison. Ovum identifies this (at page 24):

> *It should be noted that the values of cost of capital included in this graph derive from NRAs' assessment of WACC. These individual assessments contain country specific elements, such as inflation, interest rate risk and different risk-free rates. Differences in these parameters may increase or decrease the WACC value.*

Despite recognising this issue with international comparisons, Ovum makes no adjustment for country-specific factors other than for the risk free rate and issuance costs. Ovum's comparisons (in figure 3.3) are simplistic and particularly misleading. They (still) incorporate many country-specific factors that give rise to legitimate and appropriate differences in the WACC between countries.

Ovum concludes (at page 25), in Telstra's view incorrectly:

> *The figure highlights that even if we exclude the impact of risk-free rates on the WACC, the other parameters (debt and equity premium) are set at high levels compared to other countries.*

There are at least four critical components of the conventional CAPM WACC that need careful consideration and standardisation before meaningful inter-country comparison of WACC estimates is possible and meaningful. These adjustments include, but are not limited to:

- Neutralising the impact of international differences in corporate tax rates which effect the extent of gross-up (from post-tax to pre-tax) to enable returns sufficient to fund tax obligations as well as capital providers;
- Standardising the risk-free rate which varies internationally due to differences in macro-economic and other country-specific factors;

- Standardising the market risk premium (MRP) which depends critically on market characteristics and hence varies significantly across countries; and

- Standardising the debt risk premium (DRP) to remove the effect of the internationalisation of the US sub-prime crisis which has heightened the DRP estimate applied in Telstra's WACC estimate but was likely not present in the WACC estimates referenced by Ovum.

These are discussed in turn below.

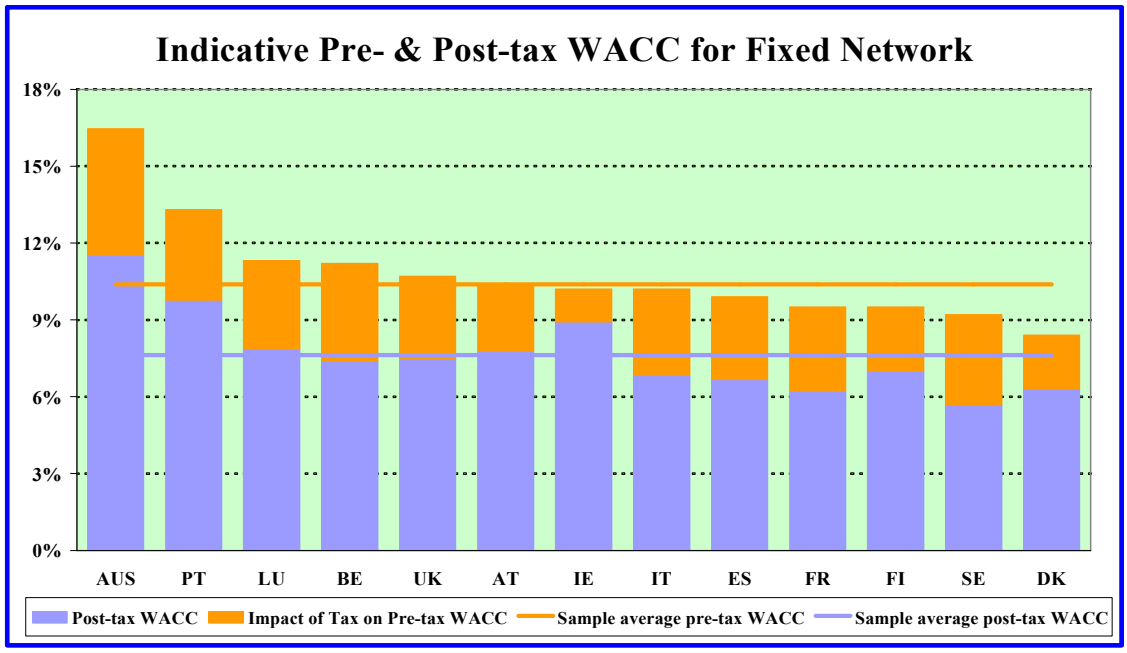
For completeness, Telstra also excluded debt and equity issuance costs. As Ovum highlight, these have not been incorporated into the WACC estimates for the other countries.

Neutralising the impact of taxation differences

The comparisons presented by Ovum (at figures 3.3 and 3.5) are on a pre-tax basis meaning they compound the impact of differential corporate taxation rates across the relevant countries. To earn the same post-tax WACC an entity in a higher corporate tax country will require a higher pre-tax WACC to enable payment of corporate tax and then to provide the same (after corporate tax) return to the relevant providers of capital. Consequently, the entity from the higher tax country has the higher pre-tax WACC but this does not translate to higher returns to the capital providers as the simplistic Ovum analysis implies.

The chart below converts the pre-tax WACC estimates provided by Ovum (figure 3.3) into post-tax estimates applying corporate tax rates sourced from the OECD.[11] Telstra clearly has the highest (absolute) mark-up from post-tax to pre-tax given the above average corporate tax rate relative to those in the Ovum sample. The comparison below shows that the differential between Telstra and other countries has fallen when taking into account just one of the country specific factors that legitimately drives differences in the WACC between countries. The other factors are discussed below.

[11] The corporate tax rate applied in this analysis is the latest corporate tax rate sourced from the OECD and may not be the same as the relevant regulatory authority applied in these calculations. Nevertheless, this provides an indication of the magnitude of the impact of converting from a pre-tax basis to a post-tax basis.



Source: Ovum, OECD

The most direct method of neutralising the impact of differential corporate tax rates on international WACC comparisons is to compare post-tax WACC estimates. On this basis, the impact of different corporate tax rates is not included in the WACC estimates and thus does not affect international comparisons.

Note that the Telstra post-tax WACC (11.52%) is different to the vanilla WACC estimate included in Telstra's Undertaking (12.28%) since the post-tax construct includes the cost of debt on a post-tax basis (unlike the vanilla WACC which incorporates a pre-tax cost of debt). The post-tax WACC estimate should be used for proper comparability with the constructed post-tax WACC estimates of the other countries.

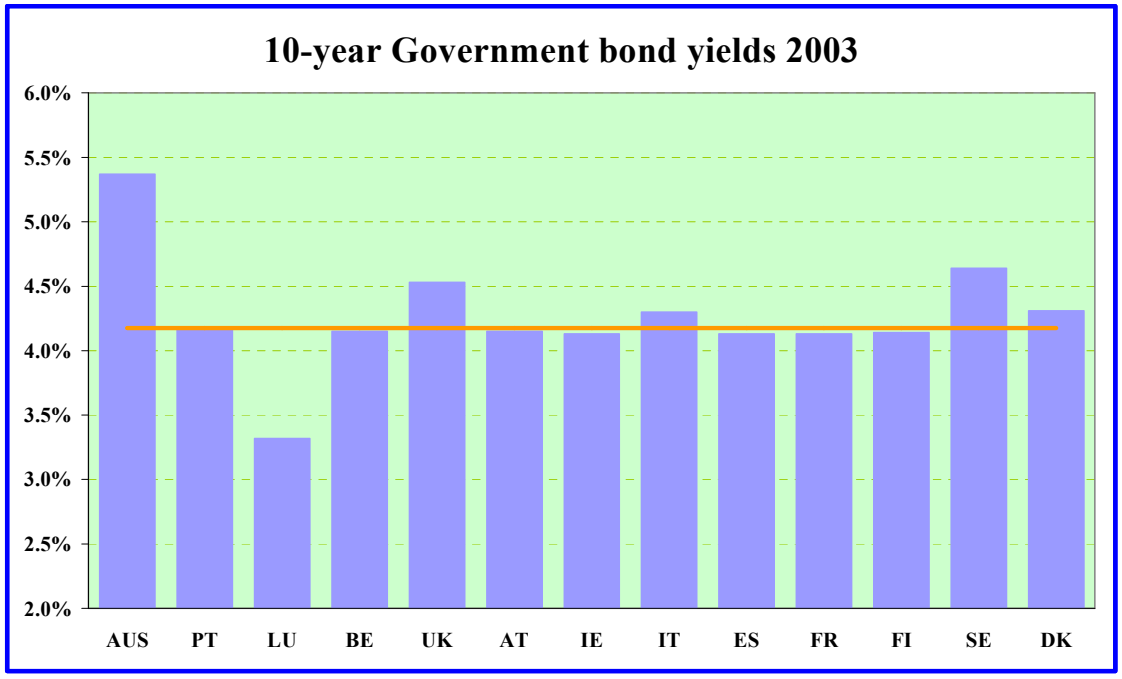
Standardising the risk-free rate

The risk-free rate is a critical component in WACC estimation and is typically based on a yield on a government bond in the relevant country (that is, normally the country in which the relevant entity operates). Despite increasing globalisation of financial markets (including for government bonds), bond attractiveness remains impacted by a range of country-specific factors. The range of potentially relevant factors includes (amongst many other factors) inflation outcomes and expectations; (GDP) growth outcomes and expectations; demand and supply considerations of bonds and various substitutes and complements; recent and prospective performance of other assets including mainly equities, cash and property; and recent budget outcomes and expectations around prospective fiscal health. Given these factors can affect the attractiveness and hence price of government bonds they also impact (inversely) on the relevant bond yield.

From the perspective of international WACC comparisons it is important to note that government bond yields in Australia have been consistently higher than bond yields (of similar maturity) in most other countries. This largely reflects the faster GDP growth achieved in recent years driven largely by the rapid industrialisation of China

and attendant boom in commodity prices and Australian resource exports. Faster growth has, in turn, increased government tax revenue and lowered the amount of government bonds issued, raising yields commensurately. The same factors increased price and wage inflation (increasing bond yields to maintain long-term purchasing potential).

The chart below plots government long-term bond yields in year average terms for calendar 2003 (chosen to reflect the timing of the study referred to by Ovum) across the range of countries covered by Ovum (at figure 3.3). It is readily apparent that bond yields at that time were significantly higher in Australia relative to the other countries covered.[12] A contemporary chart would likely have a similar profile. In fact, the spread between other countries and Australia is now likely more pronounced given the strong growth and upside inflation risks more evident in Australia than the other countries in Ovum's sample.



Source: OECD

Clearly the government bond yield relevant for calculating both the cost of debt and cost of equity will be higher in Australia than in other countries. This in turn uplifts the calculated WACC in a manner that is inescapable for Telstra (including in its role as notional stand-alone ULL provider in this context) and for all capital users in the Australian market.

Furthermore, Ovum's comparison of the pre-tax WACC for ULLS in different European countries (at figure 3.6) is dated May 2004, which is almost 4 years prior to the

[12] Calendar year averages for 2003 were chosen for this analysis to reflect the fact that the WACC estimates included by Ovum at figure 3.6 were sourced from a Europe Economics report authored in May 2004. Although this may not match precisely with the WACC estimates at figure 3.3, it is likely sufficient for an indicative unwinding of the effects of country disparate risk-free rates on WACC estimates. Especially given that figure 3.5 suggests a simple average risk-free rate for the other countries included of 4.075% (i.e. simple average of range end-points) compared with the simple average in the above chart of 4.18%.

notional date for the WACC in Telstra's Undertaking (1 January 2008). It would be particularly incorrect to compare a WACC based on a risk free rate applicable prior to May 2004 to a WACC that is based on a risk free rate applicable to 1 January 2008. The risk free rate has likely risen dramatically in European countries between these two dates, which would lead to a further reduction in the difference between Telstra's WACC and the WACCs in European countries that is not considered by Ovum.

Standardising for the market risk premium

The equity risk premium, as Ovum calls it, more commonly known as the market risk premium (MRP) in Australia, that is relevant in the CAPM construct is the premium that investors in a fully diversified portfolio *expect to earn* above the relevant risk-free rate over some indeterminate forward period.

A range of factors influence the *ex ante* MRP (some of these are the same factors that impact domestic bond markets and yields mentioned above) and some are country-specific. The following factors suggest a higher MRP in Australia than the MRP in most (if not all) of the countries covered by Ovum:

- The Australian market has a larger representation of resource companies than other markets in the Ovum sample. This results in Australia having a higher level of systematic risk than in other markets and higher MRP.

- The Australian market has a narrower representation of general industry and a higher representation of banks than other markets in the Ovum sample. The smaller potential for (industry) diversification at the market-wide level implies greater systematic risk and hence higher MRP.

- The cross-listing of equities across multiple European bourses (including those in the Ovum sample) would broaden the diversification benefits available to the market and imply lower systematic risk relative to that likely for the Australian market overall given reduced opportunity for multiple listing.

- The Australian market is significantly smaller than most of those in the Ovum sample. The smaller the size of the entity/country the likely higher is the related risk (both total and systematic).

- The Australian market and its listed entities have lower liquidity than their counterparts in other markets.

- The Australian market is generally comprised of smaller companies than in other markets in the Ovum sample.

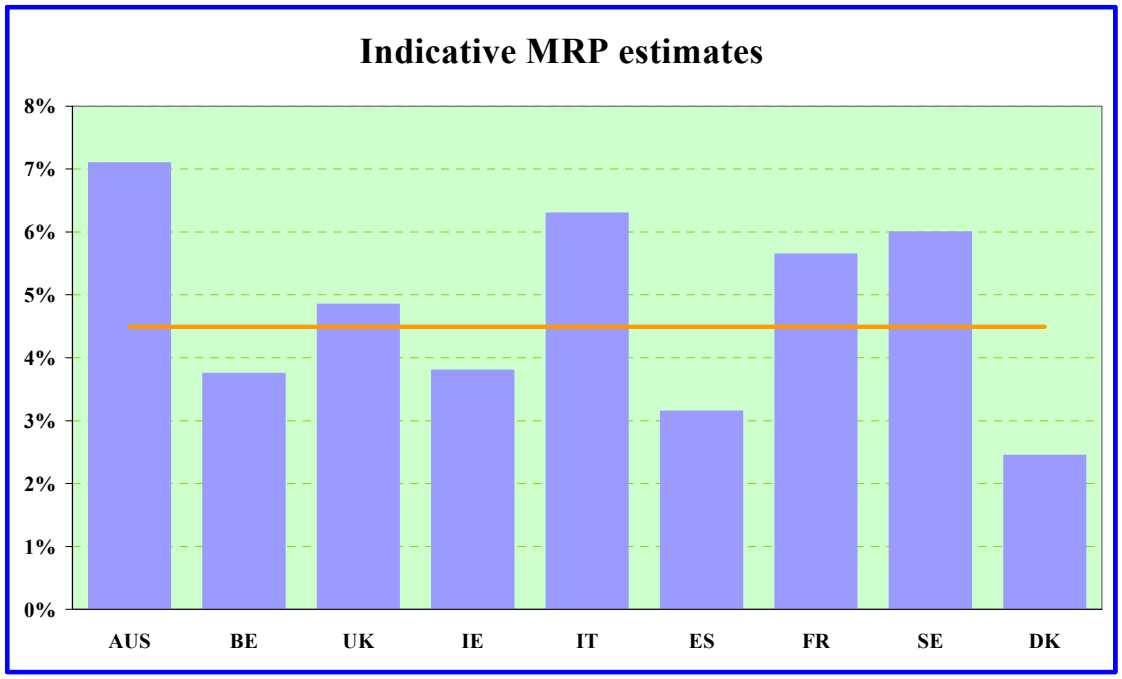
- There is less diversity in the Australian market than in the markets in the Ovum sample.

- There are fewer risk management opportunities in the Australian market than are available in other markets.

Combined, these factors strongly imply that the Australian-specific MRP is legitimately higher than that of other countries, especially those in the Ovum sample.

Australian entities would therefore need to offer the potential for returns that were higher than required in other countries, all other things the same, to reflect the higher market risk. Australian domestic entities cannot avoid this requirement to offer higher returns commensurate with the risk of the market in which they operate.

Analysis from Dimson, Marsh and Staunton supports the contention that the Australian MRP is higher than for most other countries.[13] The estimates for MRP in their analysis are globally renowned and often used by international investors, international fund managers and others considering investments in Australia and elsewhere. Their analysis confirms that the Australian MRP is generally significantly higher than that of a range of countries included in the Ovum sample. This is illustrated in the chart below. Dimson et al argue that averaging over a long time series is preferable for guiding future expectations.



Source: Dimson, Marsh and Staunton

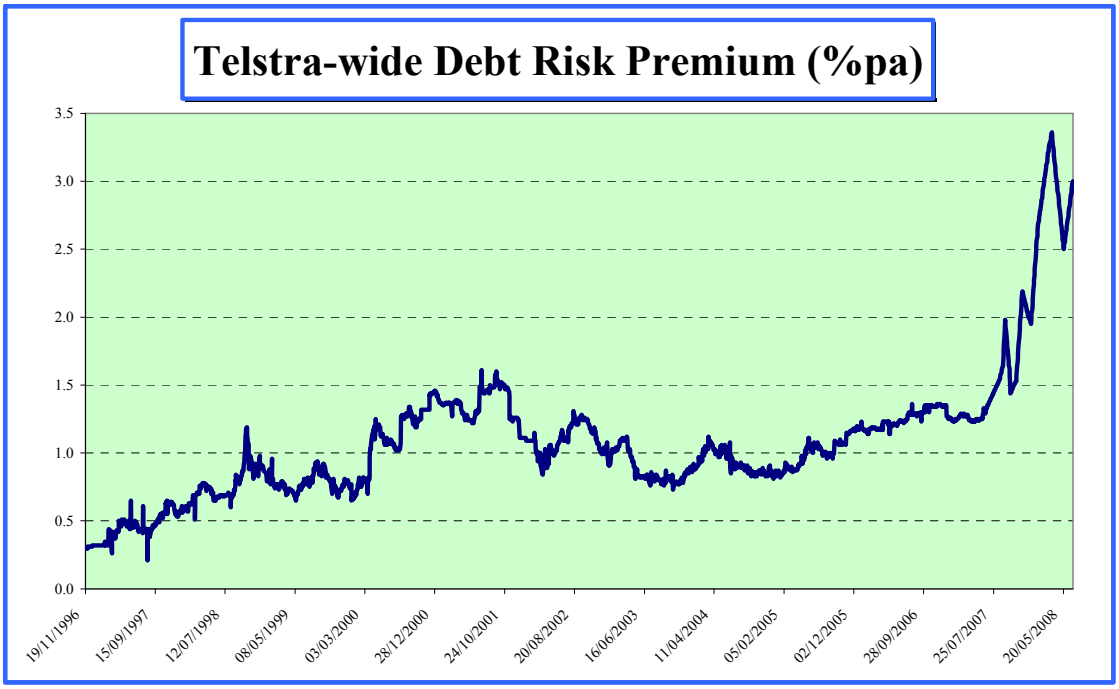
Rigorous international comparison of WACC estimates would clearly require that legitimate differences in the MRPs between countries be taken into account.

Standardising the debt risk premium

The debt risk premium (DRP) is the margin above the risk-free rate that a particular entity must offer to attract debt funding. The quantum of the DRP will reflect the underlying risk associated with the relevant business and will reflect the credit rating attributed to that business or the debt of a similar business by the ratings agencies.

[13] E. Dimson, P. Marsh and M. Staunton, "*Global Evidence on the Equity Risk Premium*" Journal of Applied Corporate Finance, table 1, page 5

The DRP relevant in Telstra's Undertaking is one applicable at the time that the assets to be costed were valued. Clearly that requires calculating the DRP around 1 January 2008 consistent with assets valued at that date. The Telstra-wide DRP for debt with (approximately) 10 years to maturity over much of the last decade is plotted in the chart below. It is quite apparent that the Telstra-wide DRP has risen sharply through late-2007 reflecting the impact of financial market turbulence in the aftermath of the near-collapse of US sub-prime mortgage market. The consequent credit crisis increased credit spreads including for relatively highly rated and low risk corporations like Telstra.



Source: Telstra Treasury

The WACC estimates in the Ovum sample do not appear to have included relatively recent readings on the DRP applicable to the relevant entities **after** the internationalisation of the US sub-prime crisis impacted credit spreads (see Ovum's Figure 3.5). Comparing the Telstra recommended WACC, including increased credit spreads reflecting credit illiquidity, with other WACC estimates that (likely) pre-date this impact will artificially and inappropriately underestimate other countries' WACCs relative to Telstra's.

Rigorous international comparison of WACC estimates would clearly require DRPs with a similar base. This would require all WACCs in the comparison sample to be calculated using a higher and more recent DRP reflecting the impact of global credit illiquidity.

Adjusted WACC estimates

Telstra has attempted to account for the factors discussed above to enable a more robust comparison of the WACC estimates presented by Ovum at Figure 3.3. However, not all relevant factors could be accounted for. The adjustments required to facilitate

a more like-for-like comparison are summarised in the chart below and reflect the following factors:

- Telstra's vanilla WACC estimate (12.28%) is converted to a post-tax construct (11.52%);

- Ovum's pre-tax estimates are converted to a post-tax basis to neutralise the impact of differential corporate tax rates on the gross-up from post-tax to pre-tax (the corporate tax rates applied are based on OECD data);

- Telstra's WACC estimate is adjusted to exclude the impact of debt and equity issuance costs which Ovum advise was not included in the WACC estimates of the benchmark sample;[14]

- Differences in the risk-free rate were accounted for by applying the average risk-free rate for countries in the Ovum sample to Telstra. This neutralised the impact of different macro-economic and other factors causing higher bond yields in Australia than in other relevant countries as well as any timing difference that may be relevant.

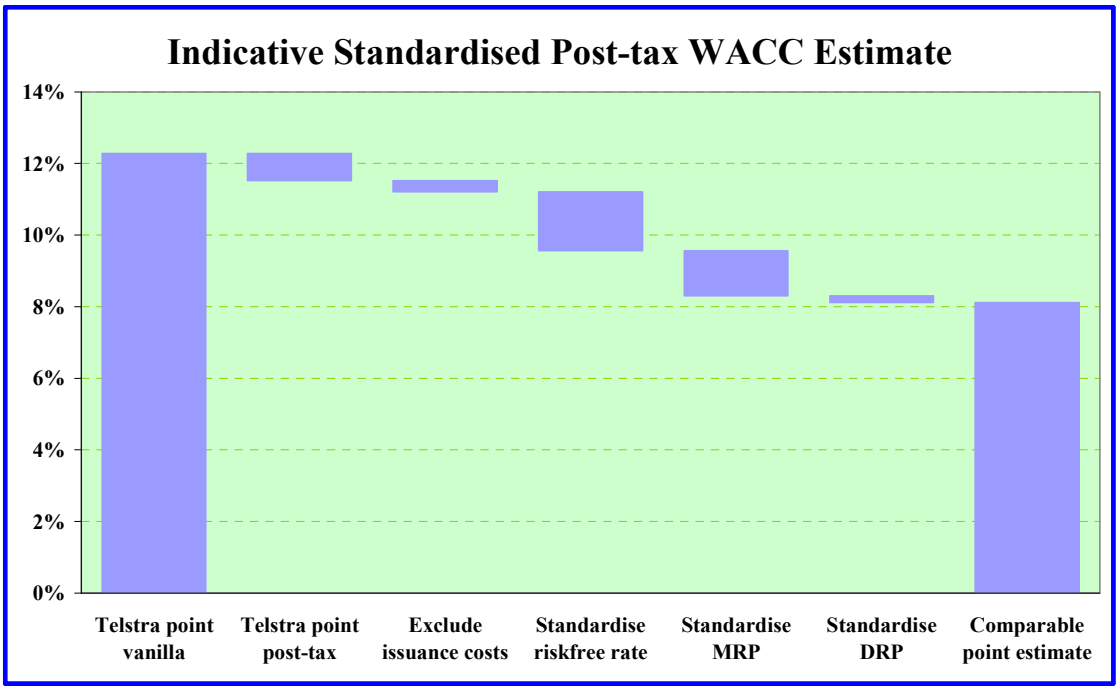
- Differences in the MRPs between the sampled countries were accounted for by applying the mid-point of the range of MRPs identified by Ovum (see Figure 3.5) to Telstra.[15]

- Differences in the DRPs between countries were accounted for by applying Telstra's DRP prior to the ballooning of credit spreads in the wake of the globalised fallout from the US sub-prime crisis of 1 % (this also corresponds to the mid-point of the range for other countries identified by Ovum in Figure 3.5).

The objective of the series of adjustments summarised above is to determine Telstra's WACC assuming that Telstra operated in a European market so that it could be compared to other countries on a like-for-like basis. There are other factors which Telstra has not taken into account. The chart below depicts the impact that each of the factors discussed above has on Telstra's WACC.

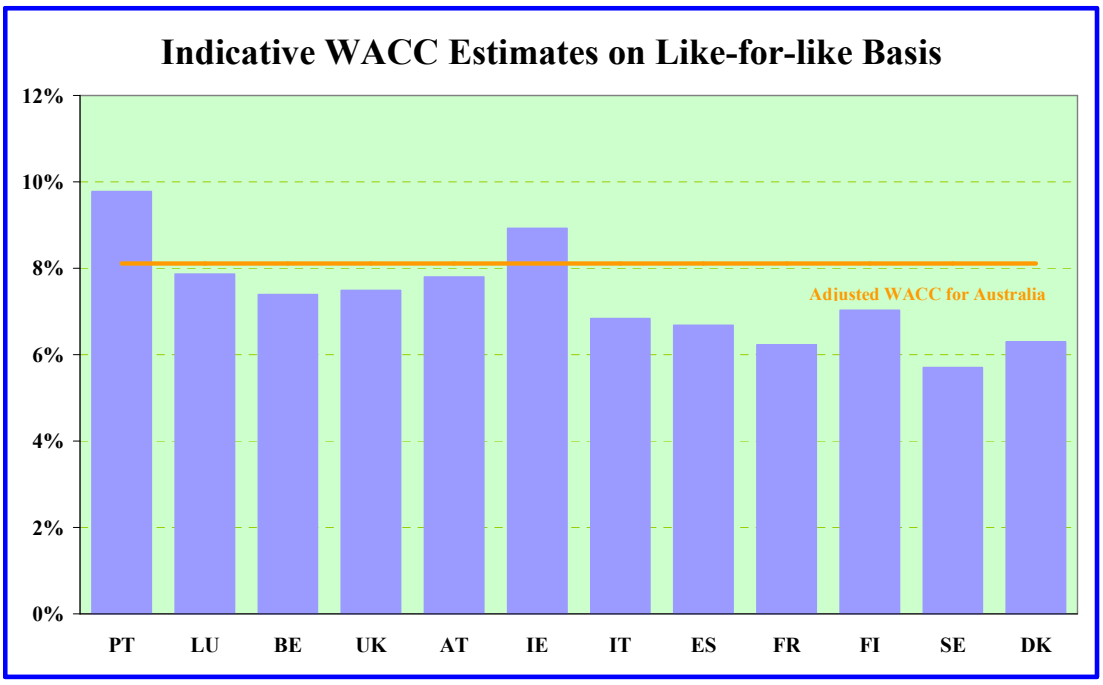
[14] Exclusion of these costs from the WACC estimate here is solely to facilitate like-for-like comparison and in no way suggests that it is appropriate that they should be excluded from the Telstra recommended WACC for the CAN. It is possible that these costs are otherwise recognised in the costings applied by the relevant regulators. In the Australian context these costs are not recognised in the notional cashflows (operating expenses) and hence are appropriately included in the WACC (properly amortised).

[15] Arguably this estimate (5.25%) is too high relative to the simple average of countries (excluding Australia) in Dimson et al (approximately 4.5%).



Source: Telstra calculations

Even taking into account this subset of factors, Telstra's adjusted WACC compares with the various estimates provided by Ovum converted to a post-tax basis to enable proper comparison. This is illustrated in the figure below.



Source: Telstra calculations

Ovum concludes (at page 26) that the Telstra WACC should be recalculated downward on the basis of their limited and somewhat simplistic international comparison. However, Ovum has not theoretically or empirically established why Telstra's WACC

should not be above the WACC for similar firms in other countries. In a like for like comparison, Telstra's proposed WACC is reasonably close to the international benchmarks.

C.6.2 Risk-free rate

Ovum outlined (at pages 28 - 29) the various approaches adopted by a sample of regulators to quantifying the risk-free rate, focusing mainly on the extent of averaging applied. Ovum concludes that averaging over a 10-day period prior to the asset valuation date is appropriate.

Telstra's suggested approach involves valuing the risk-free rate as at opening of trading on 1 January 2008, enabling consistent valuation across the asset base, the risk-free rate (and hence WACC) and the notional cashflows that are generated from the costing. In any case, as Ovum identifies, this makes little difference to the value of the risk free rate.

Ovum also argues that Telstra submitted its Undertaking on 3 March 2008 and that this enabled Telstra to quantify the risk-free rate on an *ex post* basis (valuation date for risk-free rate chosen by Telstra was 1 January 2008) implicitly allowing some form of artificial optimisation (presumably in the sense that Telstra could have chosen an alternate day with a higher risk-free rate). The 1 January 2008 start date for Telstra's Undertaking was chosen prior to this date, for the ULLS undertaking Telstra dated 21 December 2007, which Telstra subsequently withdrew and replaced with the Telstra Undertaking dated 3 March 2008. Ovum's claim that Telstra opportunistically chose this date is clearly false.

C.6.3 Debt Risk premium

The debt risk premium (DRP) is the margin above the risk-free rate that a particular entity must offer to attract debt funding. The quantum of the DRP will reflect the underlying risk of the relevant business and will reflect the credit rating attributed to that business or the debt of a similar business by the ratings agencies.

Ovum recommends (at page 31) using a DRP of 2%. This is slightly above the value adopted by Telstra and the ACCC in its pricing principles paper.[16]

Ovum prefer to base their estimate of the DRP on an average of a range of companies with a credit rating of "A" ascribed by Standard and Poors at 31 December 2007. This is consistent with the ACCC's approach.

In any case, both approaches appear to result in very similar values.

C.6.4 Debt Issuance Costs

Telstra explains why it has adopted its value for debt issuance costs in its WACC report.

[16] ACCC (2008), *Unconditioned Local Loop Service: Pricing Principles and Indicative Prices*, June 2008, at page 17

C.6.5 Market Risk Premium

Ovum supports the retention of a 6% market risk premium (MRP) for Australian contexts consistent with the value previously applied by the ACCC. Ovum's central perspective on the appropriate MRP for Australia to be applied in WACC calculations is based on the findings of Dimson, Marsh and Staunton[17] and argues that historical *ex post* MRP estimates need to be adjusted to exclude components that are unlikely to persist. Thus, Ovum supports the following adjustments:

- The exclusion of the effect caused by the increase of price-earnings ratios across the twentieth century, which appears non-repeatable going forward and hence not part of an *ex ante* MRP; and,

- A reduction to lower the dividend yield component of the future MRP on average (across all the countries in the sample group analysed) by between 0.5% to 1.0% (according to Dimson, Marsh and Staunton) because current dividends are lower.

Dimson, Marsh and Staunton argue that achieved market returns (in real terms) were significantly higher in the second half of the 20th century (9.0% annualised) compared with the first half (3.5%). The first half included a number of major negative events whilst in the second half "many events turned out better than expected".[18]

The MRP appropriate for inclusion in the CAPM WACC is the *ex ante* MRP required by investors. This inevitably reflects investors' differing syntheses of historical returns (that is, different investors attribute different likelihoods to the potential for historical events to repeat in the future). Practically, investors only have ready access to data on past returns without any analysis of components which are arguably due to transitory and/or non-repeatable influences. Thus, the information that sets their expectations does not readily facilitate the kind of adjustment proposed by Dimson *et al*; even if such an adjustment were technically feasible and prudent. If these factors are opaque to investors then they cannot influence expectations of the *ex ante* MRP.

Dimson *et al* implies that the estimated real market return is non-stationary or specifically that it has risen between the half centuries. The extent of the increase is quite significant (3.5% annualised over 1900-1949 and 9.0% annualised over 1950-1999). Dimson et al want to adjust MRP downwards for the declining trend in dividend yields such that the long-term average is not representative of current rates (and presumably expected yields) but do not propose a similar adjustment to the non-dividend component of the real market return which has trended higher across the long-term.

Telstra disagrees with the argument for an adjustment to the MRP due to lower contemporary dividend yields than the long-term average. Moreover, the adjustment proposed by Dimson *et al* (and applied by Ovum in their discussion) to respect of dividend yields appears to average the 17 countries covered in their sample.

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[17] Dimson, E. , Marsh, P. and Staunton, M. (2006), *The Worldwide Equity Premium: A Smaller Puzzle*, 7 April 2006, at pages 24-27
[18] Dimson, E. , Marsh, P. and Staunton, M. (2006), *The Worldwide Equity Premium: A Smaller Puzzle*, 7 April 2006, page 23

Even if an adjustment along the lines proposed by Dimson et al were appropriate, the adjustment should be Australian specific. The extent to which current dividend yields do not represent those embedded in the long-term MRP varies by market (country) and hence the required adjustment should reflect that divergence across markets. Applying some global average in the Australian context would likely distort the results.

C.6.6 Corporate Tax Rate

Ovum has supported the Commission's application of an effective tax rate in calculating the vanilla WACC based on a view that the effective tax rate applied should be different to the statutory rate to reflect permanent differences in the tax burden but ignore short-term or transitory effects. Ovum also applies the Commission's previous estimate of the effective tax rate (initially calculated in the context of PSTN OTA) and thereafter applied in a number of different contexts. The Commission, despite a preference for applying an effective corporate tax rate, has applied the statutory corporate tax rate in its final decision regarding ULL reflecting estimation difficulties.[19] Despite its stated preference towards the effective rate Ovum has not attempted a calculation.

Telstra's predominant view is that the corporate tax rate relevant for WACC calculations is that which is likely to be indicative of the tax burden over the entire useful life of the relevant asset. This correlates with the perspective of capital providers who are interested in likely returns over the assets entire useful life. If accelerated depreciation is allowable it results in an effective tax rate lower than the statutory tax rate in some span of early years followed by a period (towards the end of the assets useful life) where the effective tax rate is actually higher than the statutory rate as there is less depreciation to claim as a tax deduction once the asset becomes more depreciated (on an accelerated basis). On this basis, the average effective tax rate over the entire asset life (that is the tax rate relevant in WACC estimates) approaches the statutory corporate tax rate (although there is a timing advantage occasioned by accelerated depreciation which would result in some minor deviation between the effective and statutory rates).

Telstra considers that its approach to the corporate tax rate is consistent with the view of IRG cited by Ovum (at page 34). The IRG view is that any adjustment to the statutory corporate tax rate in a WACC-related context should only reflect factors that cause a permanent difference between the statutory and effective rates. Whilst accelerated depreciation results in a timing difference it does not generate a permanent difference and hence the statutory tax rate does not need adjustment under the logic that IRG articulate.

Telstra also considers that accelerated depreciation, the main potential driver of divergence between the statutory and effective rates is no longer relevant in TSLRIC costing contexts. Changes in tax law have virtually eliminated the potential for creating depreciation timing differences for assets purchased or constructed on or after 21 September 1999. In the context of CAN-related assets, Telstra considers that accelerated depreciation is not applicable as such is not available to forward-looking

[19] ACCC (2006), *Assessment of Telstra's ULLS monthly charge undertaking: Final Decision*, August 2006.

costs of CAN-related assets notionally constructed in the years relevant to the current costing exercise (2007-08 and into future).

The Commission has previously rejected this perspective and favoured its own estimate of the effective tax rate.[20] The basis for the Commission's rejection of the statutory rate appears to be that many assets were constructed prior to the discontinuance of accelerated depreciation and that therefore accelerated depreciation was available to Telstra in the real world. If that remains the Commission's perspective it should be noted that Telstra's book depreciation would now be approaching (if not above) tax depreciation such that the effective rate of tax is likely to be the same (if not above) the statutory rate of tax for many of these assets. Indeed the Commission seems to accept this by stating that "*in subsequent assessments, an increasing proportion of the assets will indeed be ineligible for accelerated depreciation provisions, and these will have to be treated appropriately when making revenue assessments*".[21]

The uncritical application by Ovum of the outdated 20% estimate is clearly inappropriate. Application of a 20% effective corporate tax rate would clearly require some empirical support that such an estimate was appropriate.

The narrow application of the corporate tax rate in the re-levering and de-levering equations around beta also reinforces the view that the statutory tax rate is appropriate. Typically when de-levering observed equity betas the statutory tax rate is used. Telstra is not aware of any estimates of the asset beta that do not apply the statutory corporate tax rate in the de-levering process. This likely reflects the high informational demands involved in calculating the effective corporate tax rate. To ensure internal consistency across beta estimation it is imperative that the statutory corporate tax rate is also used in the re-levering process. To apply the statutory corporate tax rate in the beta de-levering process and then the guess-timated effective tax rate in the beta re-levering process is inconsistent and distorts the resultant asset/equity beta estimates.

C.6.7 Asset and equity beta

Ovum concludes that the asset beta is 0.32 and equity beta is 0.394. Telstra notes that his is considerably lower than the ACCC's recent determination of 0.5 for the asset beta and 0.83 for the equity beta. This could in part be due to the fact that the data Ovum source their information from was taken after 1 January 2008, the timing for estimation of the WACC.

Telstra's approach to estimating the asset and equity betas is set out in its WACC report.

C.6.8 Gearing

[20] Detail on this view is found at ACCC (2000), *Assessment of Telstra's Undertaking for the Domestic PSTN Originating and Terminating Access Services – Final Decision*, July 2000, at appendices 3, 4 and 6.
[21] ACCC (2000), *A report on the assessment of Telstra's undertaking for the Domestic PSTN Originating and Terminating Access services*, July 2000, Appendix 4, page 84.

The ACCC has previously decided that book gearing around the time of Telstra's initial partial privatization should determine the appropriate gearing for the combination of network assets and specific assets.[22] Conversely, the debt gearing recommended by Telstra for the CAN-related assets is based on the Telstra-wide target market gearing.

In November 2005, Telstra publicly announced that it was increasing its target *book* gearing ratio from a range between 45% to 55% debt to a range between 55% to 75% debt. These targets were presented in book terms because they were aimed at ratings agencies that tend to focus on book gearing. However, for WACC purposes gearing should be based on market values to reflect contemporary opportunity costs of debt and equity. After applying an indicative contemporary share price for Telstra, the target book gearing converts to an indicative target market gearing of between 20% and 40% debt. Reflecting the slow take-up of debt towards this revised target, an indicative target market gearing for Telstra therefore would be 30% debt.

Ovum apply a similar technique to convert Telstra's actual book gearing as at 30 June 2007 to an estimated target market gearing applying Telstra's external guidance on target book gearing above. Ovum though applies an average share price over the entire 2006-07 financial year to estimate the market value of equity. Consequently Ovum mixes an average value of equity over the full financial year with an estimate of the market value of debt (leveraged from the balance sheet book estimate) effectively as at 30 June 2007. This is inappropriate and the market value of equity should be calculated as at 30 June 2007 to maintain internal consistency with the implied valuation of debt as at 30 June 2007.

Despite this mixing of valuation dates, Ovum recommends (at page 39) gearing of between 23% and 42% with an average value of 34%. This is broadly consistent with the figure recommended by Telstra of 30% which is the mid-point of the indicative range of 20% to 40% target debt gearing.

It is certainly preferable to applying the Commission's theoretically unusual approach. The continued adoption of book gearing in the context of determining the WACC is counter to the theory of corporate finance that underpins the determination of the WACC. In Telstra's view, the Commission then compounds the error by relying on gearing from around the time of Telstra's initial partial privatisation back in 1997. This further departs from accepted theory in that it mixes estimates now nearly a decade old (i.e. the gearing structure) with estimates based on contemporary market conditions (ideally the other components in the WACC calculation). This is not a sound basis for calculating a contemporary WACC estimate.

C.6.9 Imputation

Ovum argues that Telstra fully franks its dividends and that, therefore, the relevant imputation factor should be higher than zero. Ovum then concludes that the previously applied amount of 0.5 is appropriate. Telstra does not consider this to be a rigorous examination of the issues around the quantification of the imputation factor and hence does not provide any substantive support for the continued application of 0.5.

[22] ACCC (2006), *Assessment of Telstra's PSTN and LCS Undertaking, Final Decision*, 29 November 2006, at pages 77-78

Ovum does not address Telstra's central contention that the value of imputation should be determined by the marginal investor. Just as the marginal investor is critical in determining share prices, the valuation of imputation by the marginal investor is critical in quantifying the imputation factor in a WACC-related context. The marginal investor for most (if not all) Australian listed entities is likely to be an international investor given their significant representation on share registers across Australia. The domestic listed entities need to attract overseas investors. Therefore, it is likely that the valuation of imputation by the marginal investor that establishes share prices is by an international investor that cannot utilise these imputation credits and therefore attaches no value to them. This does not mean that dividend imputation has no value to domestic shareholders. However, it does mean that the marginal investor determines the share price at which the relevant market clears and also that domestic shareholders, who would have been prepared to pay a higher amount for those shares (reflecting their valuation of imputation credits), enjoy some consumer surplus (that is, they value the shares greater than the market clearing price). Similar consumer surplus is a component of most markets and explains why Telstra franks its dividends. Consequently, evidence to the effect that Telstra fully franks its dividends is not conclusive to a consideration of the after personal tax valuation of attached franking credits.

Even if Ovum argued for an average investor approach their views appear clearly deficient in at two respects. First, again the fact of Telstra franking dividends does not necessarily indicate that shareholders attribute a non-zero value to them. Secondly, the ACCC's valuation of imputation at 0.5 seemed partly based on the original Officer and Hathaway estimate which valued imputation at 0.46.[23] If the ACCC does not consider it appropriate to set gamma in line with the marginal investors' valuations of Telstra equity, then it would now appear sensible that the ACCC consider adopting the latest update by Hathaway and Officer. Hathaway and Officer's latest estimate of the value of gamma is 0.355.[24] Nevertheless, in Telstra's view adoption of the latest estimate by Hathaway and Officer would be second-best given the central tendency emerging around the appropriateness of the marginal investor approach and thus an imputation factor valued at 0.

[23] Hathaway, N. and Officer, R.R., " *The Value of Imputation Credits*" Working Paper, Melbourne Business School
[24] Hathaway, N. and Officer, R. R., "*The Value of Imputation Tax Credits, Update 2004*" Capital Research, November 2004