



# **Telstra Efficient Access cost model – economic issues**

## **An Advisory Note to the ACCC**

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# 1 Executive Summary

This Advisory Note refers to the economic assumptions and calculations in the Telstra Efficient Access (TEA) model, version 1.2.

Ovum has reviewed the TEA model and the further submissions from Telstra. In this revised analysis, Ovum views remain mainly unchanged, but some parameters have been adjusted in light of the further information.

We conclude that:

- The engineering review of the TEA model, version 1.2, shows that the calculated placements are efficient and are consistent with a “scorched node” approach to the access network. The engineering review also indicates that averages used for trenching, surface breakout and reinstatement, etc., may be appropriate but are unverifiable.
- The TEA model assumes that all cables have been laid underground and no alternative usage of other technologies such as aerial cable has been included. In our revised view aerial cable could be used in some regional centres and suggests that the use of underground construction everywhere would overstate the costs for a new entrant.
- Ovum previously believed that the costs in the TEA model were historic. In light of further information provided in the submissions to the ACCC, Ovum believes these costs are at today’s cost. However, Ovum cannot independently comment if the input values, although at today’s value, are appropriate for the revaluation and contain forward-looking figures for an efficient operator. The figures are averages, and seem not to be Band 2 specific, which is inappropriate.
- In Telstra’s response to Ovum’s economic paper<sup>1</sup> on its WACC assessment, Telstra focuses its response on the following inputs: Asset/Equity beta; Imputation credits; Market risk premium; and Tax rate. Ovum’s view on the principles remains unchanged. Telstra has not submitted sufficient evidence to suggest otherwise.

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<sup>1</sup> Ovum (6 August 2008), “Review of the economic principles, capital cost and expense calculations of the Telstra Efficient Access cost model”.

## 2 Summary of Recommendations

This section provides a summary of the changes made to Ovum's recommendations as a result of our review of the submissions made by Telstra and others to the ACCC.

### 2.1 Economic Principles

#### **Network Topology**

The engineering review of the TEA model, version 1.2, shows that the calculated placements are efficient and are consistent with a "scorched node" approach to the access network. Ovum agrees that the TEA model inherently takes into account of topological differences in its engineering modules. There are physical differences and these are reflected in the different lengths of cables, size of cables, number of pits, etc. But there are no identified cost differences between areas in Band 2. The costs between areas are not distinguished and averages have been used throughout the model for the pricing of equipment. Ovum agrees that the use of averages is common in regulatory models and appropriate for costing over all of Band 2 ESAs.

#### **Scorched node approach**

In its previous review, Ovum concluded that The TEA model uses a "scorched node" approach and there was little evidence of the network being optimised and the design is inefficient in some aspects.

With the revised model, as described in our advisory note to the ACCC on engineering issues, we conclude that (p.4):

"The TEA model, version 1.2, is now working as originally described by Telstra. The cable routes in the model database are the shortest paths within the set of actual paths used for cables",

and:

"The dimensioning of cables, ducts, pits, manholes, cable joints, cable gauges and pillars are all appropriate for a "scorched node" model of a copper access network. These calculations include efficiency gains over the existing network."

This implies that changes have been made, and the TEA model has included efficiency gains. The methods in calculating the efficiency gains over the existing network are appropriate.

#### **Underground equipment**

The TEA model 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 this case, Ovum previously believed that local councils will not accept such usage of alternative equipment.

The updated review of the engineering assumptions suggest otherwise. It makes the point that aerial cable could be used in some regional centres and suggests that the use of underground construction everywhere would overstate the costs for a new entrant.

### **Forward Looking**

Ovum previously believed that the costs in the TEA model were historic. In light of further information provided in the submissions to the ACCC, Ovum believes these costs are at today's cost. However, in the Telstra submission, no A&AS contracts or input calculations have been submitted. Ovum cannot independently comment if the input values, although at today's value, are appropriate for the revaluation and contain forward-looking figures for an efficient operator. The figures are averages, and seem not to be Band 2 specific, which is inappropriate.

### **Fibre-related costs**

Ovum's view remains the same. Telstra has not submitted sufficient evidence to suggest otherwise. Fibre costs have not been excluded.

### **Indirect factors**

Ovum's view remains the same. Telstra has not submitted sufficient evidence to include intangible or retail costs within the cost calculation.

### **Number of lines**

In Ovum's previous assessment of the TEA model, Ovum stated that the total number of lines associated with Band 2 ESAs was inconsistent throughout the model and needs to be reviewed. This has now been rectified.

### **Exclusion of shared revenues**

Ovum believes that only costs should be included in the model. The proportion of costs related to the conduit sharing should be removed. This has not been done: instead, however, shared revenues have been deducted from the accounts.

Generally, we would expect the proportion of costs relating to conduit sharing to be removed from the costing. In the absence of this data and with revenue information in its place, we assume that the revenue collected from the operators that lease the conduit is equal to or greater than the associated cost of this activity. This is sufficient as a substitute means of making an allowance for the conduit sharing.

## 2.2 Capital cost and expense factor calculation

In our previous assessment, Ovum recommended that the tilted annuity<sup>2</sup> method be adopted, as Telstra's current methodology could potentially overcompensate (undercompensate) Telstra if the values of assets are increasing (falling). In light of further material from Telstra, Ovum's view still remains the same.

## 2.3 Weighted Average Cost of Capital (WACC)

In general Ovum's view on the principles remains unchanged. In Telstra's response to Ovum's economic review, Telstra focuses its response on the following inputs: Asset/Equity beta; Imputation credits; Market risk premium; and Tax rate. However, in light of the further information, there is not sufficient information from Telstra for Ovum to change its view.

Ovum's original view regarding the valuation of parameters such as Debt Issuance Costs, Equity Issuance Costs, and Gearing Ratio was also different from Telstra's submission. In this revised analysis, Ovum's view remains the same on the above three WACC parameters.

The differences between Ovum's<sup>3</sup>, the ACCC's<sup>4</sup> and Telstra's<sup>5</sup> views regarding all other WACC parameters including the values of Risk-free rate, Debt Risk Premium and Debt beta are immaterial.

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<sup>2</sup> A zero tilt has been applied as no equipment price trends have been submitted.

<sup>3</sup> Ovum (6 August 2008), "Review of the economic principles, capital cost and expense calculations of the Telstra Efficient Access cost model".

<sup>4</sup> ACCC (November 2008), "Assessment of Telstra's Unconditional Local Loop Service Band 2 monthly charge undertaking", Draft Decision, Public Version.

<sup>5</sup> Telstra Corporation Limited (23 December 2008), "Telstra's Ordinary Access Undertaking for the Unconditional Local Loop Service: Response to the ACCC's Draft Decision", Confidential version.

## 3 Analysis of Original Recommendations

In this section, we note the recommendations made by Ovum in its original reports and discuss what changes are necessary in light of the further information provided in the submissions to the ACCC.

### 3.1 Economic Principles

Ref <sup>6</sup>	Ovum's Original Recommendation or Comment	Analysis and Revisions
C1	<p><b>Network Topology</b></p> <p>Every exchange in Band 2 is modelled in the TEA model; however there are no topology differences between each exchange.</p> <p>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.</p>	<p>Telstra<sup>7</sup> believes that there are topological differences between the ESAs. The TEA model routes are based on Telstra's actual network and engineering databases, it implicitly takes into account any topological differences between ESAs.</p> <p>The engineering review of the TEA model, version 1.2, shows that the calculated placements are efficient and are consistent with a "scorched node" approach to the access network. The engineering review also indicates that averages used for trenching, surface breakout and restoration, etc., may be appropriate but are unverifiable.</p> <p>Ovum agrees that the TEA model inherently takes into account of topological differences in its engineering modules. There are physical differences and these are reflected in the different lengths of cables, size of cables, number of pits etc. However, with such differences, there are likely to be cost differences between areas in Band 2. The costs between areas are not distinguished. In fact, there are no geographical pricing differences. Averages have been used throughout the model for the pricing of equipment.</p>

<sup>6</sup> Reference codes represent the codes used in Telstra Corporation Limited (5 December 2008), "Telstra's Ordinary Access Undertaking for the Unconditioned Local Loop Service: Response to Ovum's Submissions", Confidential version, Category 1 confidential material, Category 2 confidential material.

<sup>7</sup> Telstra Corporation Limited (5 December 2008), "Telstra's Ordinary Access Undertaking for the Unconditioned Local Loop Service: Response to Ovum's Submissions", Confidential version, Category 1 confidential material, Category 2 confidential material.

Ref <sup>6</sup>	Ovum's Original Recommendation or Comment	Analysis and Revisions
		Ovum agrees that the use of averages is common in regulatory models and appropriate for costing over all of Band 2 ESAs.
C.1.6	<p><b>Scorched node approach</b></p> <p>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.</p> <p>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.</p>	<p>As described in our advisory note to the ACCC on engineering issues, we conclude that (p.4): “The TEA model, version 1.2, is now working as originally described by Telstra. The cable routes in the model database are the shortest paths within the set of actual paths used for cables”,</p> <p>and:</p> <p>“The dimensioning of cables, ducts, pits, manholes, cable joints, cable gauges and pillars are all appropriate for a “scorched node” model of a copper access network. These calculations include efficiency gains over the existing network.”</p> <p>The methodology is appropriate.</p>
C.1.7	<p><b>Underground equipment</b></p> <p>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</p>	<p>Telstra<sup>8</sup> agrees with Ovum's comments in its original report.</p> <p>The updated review of the engineering assumptions makes the point that aerial cable could be used in some regional centres and suggests that the use of underground construction everywhere would overstate the</p>

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<sup>8</sup> Telstra Corporation Limited (5 December 2008), “Telstra's Ordinary Access Undertaking for the Unconditioned Local Loop Service: Response to Ovum's Submissions”, Confidential version, Category 1 confidential material, Category 2 confidential material.



Ref <sup>6</sup>	Ovum's Original Recommendation or Comment	Analysis and Revisions
	<p>has been included. Other regulatory LRIC models may include alternative technologies.</p> <p>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.</p>	<p>costs for a new entrant.</p> <p>In light of the further information, the TEA model needs to be updated to include alternative technologies.</p>
C.1.8	<p><b>Conclusion</b></p> <p>The new design is unfit and does not seem to reflect that of an efficient operator.</p>	<p>Telstra believes that all the deficiencies cited in Ovum's engineering report have been addressed and has since provided additional evidence of optimisation, producing positive results.</p> <p>With regard to the engineering modules, Ovum concludes that the TEA model, version 1.2, is working as Telstra intended (and documented).</p>
C.2	<p><b>Forward Looking</b></p> <p>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.</p> <p>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&amp;AS") contracts.</p>	<p>Telstra states that its costs are today's cost. In the statement of [REDACTED]<sup>9</sup>, "the A&amp;AS contracts were entered into in [REDACTED] and have a life of [REDACTED] years]. Thus, Telstra's A&amp;AS contract rates are the rates that Telstra will pay for plant and equipment until at least [REDACTED]."</p> <p>Ovum previously believed the costs were historic. In light of further information provided in the submissions to the ACCC, Ovum believes these costs are at today's cost.</p> <p>In the submission, no A&amp;AS contracts or input calculations have been submitted. Ovum cannot independently comment if the input values, although at today's value, are appropriate for the revaluation and contain forward-looking figures for a new efficient</p>

<sup>9</sup> Statement of [REDACTED] (August 2008), CD Filename: 07 Statement of Telstra Witness B2 searchable.pdf.

Ref <sup>6</sup>	Ovum's Original Recommendation or Comment	Analysis and Revisions
		<p>operator.</p> <p>The figures are averages, and seem not to be Band 2 specific. According to [REDACTED] statement<sup>10</sup> average rates have been used. "A simple average of the rates recorded next to each of the items of work described in those schedules using the electronic version of the contract price schedules" has been applied.</p> <p>Calculating the cost of the ULLS costs of a replacement CAN for Band 2 ESAs only for an efficient new operator may produce a lower ULLS charge, because the averages presumably include the very much higher costs per line in Bands 3 and 4. This would be inappropriate and the methodology needs to be reviewed.</p>
C.3.1	<p><b>Fibre-related costs</b></p> <p>Only costs attributable<sup>11</sup> to the running of the ULLS costs of a replacement CAN for all 584 Band 2 ESAs should be included. This includes access network costs such as cables and trenching. Costs relating to retail and other business units such as the mobile network should be excluded.</p> <p>The direct network costs have been overvalued and contain costs relating to other businesses. Fibre</p>	<p>Telstra states<sup>12</sup>: "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)."</p> <p>In Telstra's Response to the ACCC's discussion paper<sup>13</sup>: "DAs that are not fed by copper in Telstra's current CAN (and are instead fed by fibre) are not included in the costing of ULLS as calculated by the TEA model."</p> <p>Fibre costs and fibre-related costs have been included in the model and these should be removed. The costs should be excluded as the ULLS cost is for copper-based facilities</p>

10 Statement of [REDACTED] (August 2008), CD filename: 09 Statement of Telstra Witness C3 searchable.pdf.

11 ACCC (March 2002), "The Pricing of Unconditioned Local Loop Services (ULLS), Final Report".

12 Telstra Corporation Limited (5 December 2008), "Telstra's Ordinary Access Undertaking for the Unconditioned Local Loop Service: Response to Ovum's Submissions", Confidential version, Category 1 confidential material, Category 2 confidential material.

13 Telstra Corporation Limited (23 December 2008), "Telstra's Ordinary Access Undertaking for the Unconditioned Local Loop Service: Response to the ACCC's Draft Decision", Confidential Version, Category 1 confidential material, Category 2 confidential material.

Ref <sup>6</sup>	Ovum's Original Recommendation or Comment	Analysis and Revisions
	<p>costs and fibre-related costs have been included. They should be excluded as the ULLS cost is for copper-based facilities only.</p>	<p>only.</p> <p>The fibre costs can be found in the <b>Investment Summary</b> worksheet of the Cost Calculation Module.</p>
<p><b>C.3.2</b></p>	<p><b>Indirect factors</b></p> <p><b>Product and Customer expenses</b></p> <p>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.</p> <p>An alternative operator should not have to pay for costs such as marketing, customer support or sales etc., as they will have their own retail expenses.</p> <p><b>Intangibles</b></p> <p>In general, financial calculations do not include intangibles because they are non-monetary 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.</p>	<p>The TEA model should calculate the TSLRIC+ of an efficient operator supplying ULLS. Costs not attributable to the running of the ULLS costs of a replacement CAN for all 584 Band 2 ESAs should be excluded.</p> <p>Telstra<sup>14</sup>: states: "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 [5] 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."</p> <p>The directly attributable costs are the costs incurred as a direct result of the provision of the running of the ULLS costs of a replacement CAN for all 584 Band 2 ESAs. The costs stated above in Telstra's statement are not related to the running of the ULLS and thus should be excluded. An alternative operator will have its own charges and should not have to incur the retail costs of the incumbent. All costs incurred in packaging and selling the service delivered over the network should be excluded and added to the</p>

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14 Telstra Corporation Limited (5 December 2008), "Telstra's Ordinary Access Undertaking for the Unconditioned Local Loop Service: Response to Ovum's Submissions", Confidential version, Category 1 confidential material, Category 2 confidential material.

Ref <sup>6</sup>	Ovum's Original Recommendation or Comment	Analysis and Revisions
		<p>retail increment.</p> <p>Telstra<sup>15</sup> also states that: "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+."</p> <p>Common costs should include only costs of those inputs necessary to produce one or more services in at least two increments, one of which, in this case, is the running of the ULLS, where it is not possible to identify the extent to which a specific increment causes the cost.</p> <p>Telstra has not produced any evidence that intangibles are a part of the access, or that the costs affect the running of the ULL service. There is no evidence to suggest that they do affect the running of the ULL service. We conclude that the costs should be excluded in the TSLRIC+ calculations.</p> <p>As stated previously, costs related to the retail business, or intangibles, i.e. costs that are not associated to the running of the ULLS network, should be excluded.</p>
<b>C.3.3</b>	<p><b>Number of lines</b></p> <p>The total number of lines associated with Band 2 ESAs has been inconsistent throughout the model and needs to be reviewed.</p>	<p>Telstra explains in its Modifications in V1.2 of the TEA Model document, that the inconsistency has been rectified in v1.2 of the TEA model.</p> <p>The number of lines used in the TEA model, version 1.2, is consistent and in line with what Telstra has documented.</p>
<b>C.3.4</b>	<p><b>Exclusion of shared revenues</b></p>	<p>Telstra<sup>16</sup> acknowledges "the User Guide incorrectly states that the revenues are</p>

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15 Telstra Corporation Limited (5 December 2008), "Telstra's Ordinary Access Undertaking for the Unconditioned Local Loop Service: Response to Ovum's Submissions", Confidential version, Category 1 confidential material, Category 2 confidential material.

16 Telstra Corporation Limited (5 December 2008), "Telstra's Ordinary Access Undertaking for the Unconditioned Local Loop Service: Response to Ovum's Submissions", Confidential version, Category 1 confidential material, Category 2 confidential material.

Ref <sup>6</sup>	Ovum's Original Recommendation or Comment	Analysis and Revisions
	<p>This is a cost model and therefore we would expect that only costs are included or excluded.</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> <li>• 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.</li> </ul> <p>Our view is that the model could have considered only one input value which is the percentage of conduit that is leased out of total conduits in the distribution network.</p>	<p>deducted from distribution network costs." The user guide should be updated. Telstra<sup>17</sup> states: "... 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."</p> <p>Telstra has also acknowledged that "the number of lines" calculated in the model are inconsistent. This inconsistency has since been rectified.</p> <p>Refer to response to section C.3.3 above.</p> <p>Ovum believes that only costs should be included in the model. The proportion of costs related to the conduit sharing should be removed. This has not been done: instead, however, shared revenues have been deducted from the accounts.</p> <p>Generally, we would expect the proportion of costs relating to conduit sharing to be removed from the costing. In the absence of this data and with revenue information instead, we assume that the revenue collected from the operators that lease the conduit is equal to or greater than the associated cost of this activity. This is sufficient as a substitute means of making an allowance for the conduit sharing.</p>

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17 Telstra Corporation Limited (5 December 2008), "Telstra's Ordinary Access Undertaking for the Unconditioned Local Loop Service: Response to Ovum's Submissions", Confidential version, Category 1 confidential material, Category 2 confidential material.

## 3.2 Capital cost and expense factor calculation

In our previous assessment, Ovum<sup>18</sup> recommended that the tilted annuity method be adopted, as Telstra's current methodology could potentially overcompensate (undercompensate) Telstra if the values of assets are increasing (falling). Tilted annuities are designed to alleviate the problem of "back-loading" to the extent justified by the annual reduction in assets.

Telstra argues regarding this method: "In any event, application of a tilted annuity in Telstra's Undertaking would severely undermine the likelihood of capital recovery and dramatically increase risk." This is certainly not the case, and in our calculations the cost of the ULLS increases as expected; therefore Telstra has a higher return from its investments. With the tilted annuity<sup>19</sup>, the TEA model produced a monthly rate of \$49.44 per line, instead of the default figure of \$47.86<sup>20</sup>.

The evidence indicates that price trend is falling. In [REDACTED]<sup>21</sup> statement, he says: "Telstra expects to realise an estimated savings of [REDACTED] % per year over the [REDACTED] life of the A & AS Contracts as compared to the previous contracting arrangements based on the 2006/07 capital spend. This equates to an annual saving on capital expenditure of approximately \$[REDACTED] million." With this and evidence of copper price falls illustrated in the Ingenious Consulting Network report<sup>22</sup>, we conclude that the forward-looking trend of equipment prices seems to be falling. With falling prices as explained earlier, Telstra would be undercompensated with an annuity calculation. Incumbents such as Telstra would typically wish to "front-load" unit cost recovery as prices are dropping. The tilted annuity alleviates this problem and therefore prevents undercompensation.

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18 Ovum (6 August 2008), "Review of the economic principles, capital cost and expense calculations of the Telstra Efficient Access cost model".

19 In this case tilt of zero.

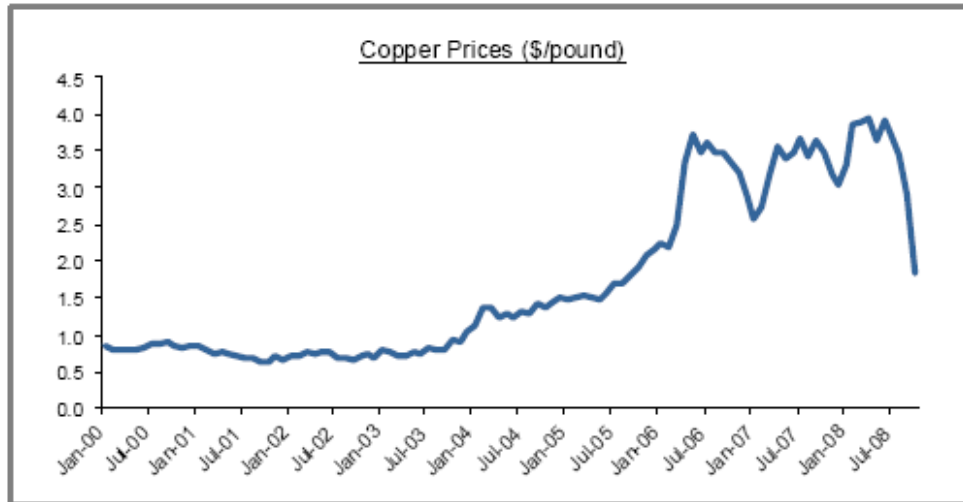
20 Telstra's calculated charge is an approximate calculated rate obtained by an annuity calculation. Telstra uses a levelisation approach in the TEA model, which converts the straight-line depreciation and cost of capital into an approximate annuity rate. Telstra's current charge is slightly lower than an annuity calculation. An annuity charge will produce the same rate as a zero-tilted annuity.

21 Statement of [REDACTED] (August 2008), CD Filename: 07 Statement of Telstra Witness B2 searchable. pdf.

22 Ingenious Consulting Network (December 2008) "Commentary on The use of international benchmarking in setting interconnection rates".

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**Figure 3.1: Copper price changes over time (USD)**



Source: Ingenious Consulting Network

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In the event where the overall capital employed is increasing, Ovum agrees with the ACCC<sup>23</sup> methodology. A tilted annuity is still applied, in this case to prevent overcompensation as prices increase. The ACCC<sup>24</sup> considers this "... approach will lead to Telstra recovering an amount commensurate with its legitimate commercial or business interests, including its recovery of direct costs. This is because the increased asset base in each subsequent period will lead to a cost profile that reflects the cost to Telstra of its network assets. Telstra can continue to generate economies of scale and scope over its CAN."

**We conclude that the tilted annuity is the preferred method: as prices fall the tilt will prevent undercompensation. In the event where prices are increasing, the tilt can prevent overcompensation.**

### 3.3 Weighted Average Cost of Capital (WACC)

The differences between Ovum's<sup>25</sup>, the ACCC's<sup>26</sup> and Telstra's<sup>27</sup> views regarding the values of Risk-free rate, Debt Risk Premium and Debt beta are immaterial.

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23 ACCC (December 2007), "ULLS Access Dispute between Telstra and Primus: Statement of Reasons for Final Determination".

24 ACCC (December 2007), "ULLS Access Dispute between Telstra and Primus: Statement of Reasons for Final Determination".

25 Ovum (6 August 2008), "Review of the economic principles, capital cost and expense calculations of the Telstra Efficient Access cost model".

26 ACCC (November 2008), "Assessment of Telstra's Unconditional Local Loop Service Band 2 monthly charge undertaking", Draft Decision, Public Version.

Telstra also notes that, based on the impact that a change of each of the CAPM inputs has on the monthly TSLRIC+ for ULLS, it focuses its response to the ACCC's Draft Decision on the following inputs:

- Asset/Equity beta;
- Imputation credits;
- Market risk premium;
- Tax rate.

In the analysis that follows we will focus on the above-mentioned WACC parameters.

We also need to note that Ovum's original view was different from Telstra's submission regarding the valuation of parameters such as:

- Debt Issuance Costs;
- Equity Issuance Costs;
- Gearing Ratio.

In this revised analysis, Ovum will not adjust its view on the above three WACC parameters. Below lists our previous comments and a summary of our analysis, details of further assessments are documented later in the chapter.

Ovum's Original Recommendation or Comment	Analysis and Revisions
A rate of 6.31% is an appropriate estimation of risk-free rate	No adjustment as the value is broadly in line with Telstra's and the ACCC's submissions.
Therefore if we consider a risk free rate of 6.31% (see previous section), then an applicable debt premium is 2%	No adjustment as the value is broadly in line with Telstra's and the ACCC's submissions.
We believe that debt issuance costs will be closer to the ACCC's previous estimate of 8.3 basis points rather than Telstra's point estimate of 15 basis points.	No adjustment as the value is in line with the ACCC's Draft Decision and Telstra considers the difference not significantly to affect the results.
Based on our analysis and reference to different sources of information, Ovum believes that a rate of 6%, which is in line with previous ACCC decisions, is a fair estimate of MRP.	Needs to be further assessed in light of further information provided in the submissions to the ACCC. See below.
In the revised WACC calculation the effective tax rate in the assessment of cost of capital is	Needs to be further assessed in light of further information provided in the



Ovum's Original Recommendation or Comment	Analysis and Revisions
applied in line with the ACCC's previous considerations. The 20% tax rate is considered in the WACC value and is based on the ACCC's calculations and previous decisions cited above.	submissions to the ACCC. See below.
we conclude that an equity beta of 0.394 could provide an appropriate estimate of Telstra's equity beta  The calculated value of asset beta is 0.32.	Needs to be further assessed in light of further information provided in the submissions to the ACCC. See below.
Based on previous regulatory decisions, debt beta is set to zero	No adjustment as the value is broadly in line with Telstra's and the ACCC's submissions.
We consider that the average ratio of 34%, supported by the benchmark, is an appropriate value for Telstra.	No adjustment as the value is within the range of 30% and 40% (the ACCC's Draft Decision and Telstra submission) and Telstra considers the difference not significantly to affect the results
We conclude therefore a point estimate imputation factor of 0.5 based on the ACCC's previous studies	See Market Risk Premium (MRP) in section below.
Our view is that, for the purpose of this study, Equity Issuance Cost should be equal to zero	No adjustment as the value is in line with the ACCC's Draft Decision and Telstra considers the difference not significantly to affect the results.
Our assessment of the cost of capital parameters results in an estimation of pre-tax WACC of 9.22%, as opposed to the 16.46% of Telstra's point estimate.	See assessments below.

## Tax Rate

In the previous assessment of the Telstra WACC value appropriate for setting ULLS prices, Ovum concluded that the effective tax rate is the appropriate tax rate in order to calculate Telstra's WACC. Ovum did not calculate a value for the effective tax rate, but recommended that a tax rate of 20% is appropriate based on previous ACCC decisions<sup>28</sup>. Ovum still shares the ACCC's view regarding the

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28 ACCC (July 2000), "A Report on the Assessment of Telstra's Undertaking for the Domestic PSTN Originating and Terminating Access Services", p. 84.

ACCC (August 2006), "Assessment of Telstra's ULLS monthly charge undertaking Final Decision", Public version.

ACCC (March 2008.), "Unconditional Local Loop Service Access Dispute Between Telstra Corporation Limited (access provider) and PowerTel Ltd (access seeker), Statement of Reasons for Final Determination".

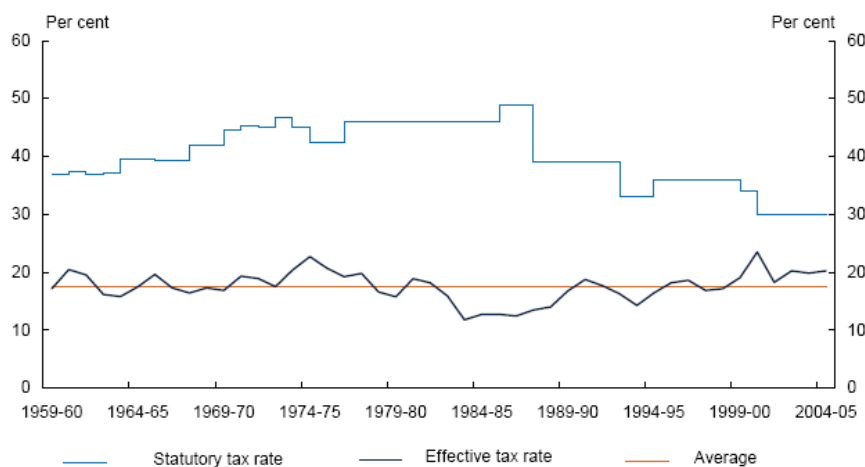
potential advantage that a new entrant could have from accelerated depreciation<sup>29</sup> and therefore recommends the use of effective tax rate for the calculation of Telstra's WACC value.

A study prepared by Warburton and Hendly, on behalf of the Australian Government, shows historical calculations of effective corporate tax rates in Australia<sup>30</sup>. Effective tax rate in this report has been defined as:

*"total corporate taxation revenue taken as a proportion of corporate gross operating surplus (broadly, corporate profits) from the national accounts"*<sup>31</sup>

A comparison with the statutory corporate tax rate is also shown in the figure below.

**Figure 3.2: Effective and statutory tax rate in Australia**



(a) Pre 1974-75 there were separate tax rates for public and private companies. The chart is based on an average of the two rates.

Source: Australian Treasury estimates

According to the same study

*"the effective corporate tax rate has been relatively stable over the period since 1965 and at 20% in 2004 – 2005".*

We also note that, although the statutory tax rate is following a negative trend over recent years, the effective tax rate is following a positive one.

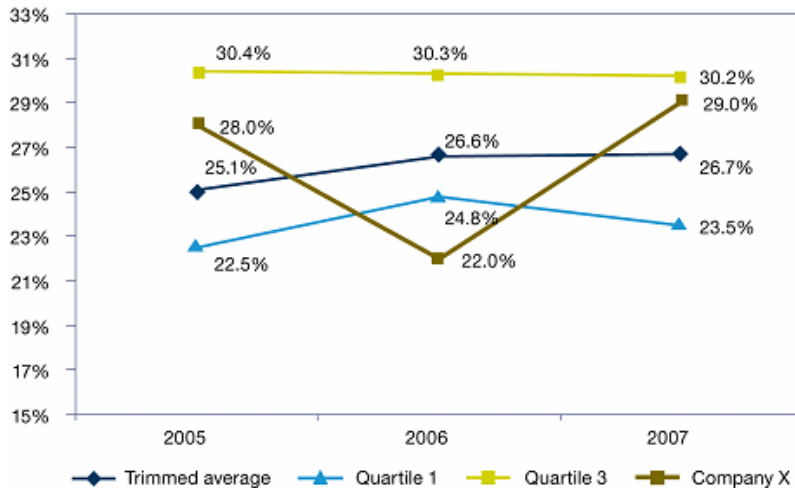
29 ACCC (November 2008), "Assessment of Telstra's Unconditional Local Loop Service Band 2 monthly charge undertaking", Draft Decision, Public Version.

30 R.F.E. Warburton and P.W. Hendy (3 April 2006), "International Comparison of Australia's Taxes", chart 5.4, Available at: [http://comparativetaxation.treasury.gov.au/content/report/downloads/CTR\\_full.pdf](http://comparativetaxation.treasury.gov.au/content/report/downloads/CTR_full.pdf) [Accessed 22 January 2009].

31 R.F.E. Warburton and P.W. Hendy (3 April 2006), "International Comparison of Australia's Taxes", chart 5.4, Available at: [http://comparativetaxation.treasury.gov.au/content/report/downloads/CTR\\_full.pdf](http://comparativetaxation.treasury.gov.au/content/report/downloads/CTR_full.pdf) [Accessed 22 January 2009].

More recently, PricewaterhouseCoopers (PWC) conducted a benchmarking study<sup>32</sup> that looked at the effective tax rates of companies listed on the ASX100 equity index, which includes Telstra. PWC concluded that the effective tax rate for the ASX100 has been increasing over a period of three years (2005 – 2007), mainly due to the base-broadening measures by government, and is a little over 26%.

**Figure 3.3: Effective tax rate in Australia**



Source: PWC

According to PWC,

*"a company's effective tax rate is calculated from its Income Tax Expense as a percentage of Profit Before Tax, per the Income Statement"*

and the average calculated rate might vary depending on the industry.

It should be noted that, although during 2004 – 2005 Australian Treasury estimated an effective tax rate of around 20%, PWC's study shows that ASX100 companies' average effective tax rate is 25.1%, clearly indicating that, for the calculation of effective tax rate, different methodologies have been considered. This can be explained by the fact that the Australian Government study may include a broader sample of companies compared to PWC's ASX100 companies' sample.

The clear message, though, is that effective tax rates have increased over recent years and, more specifically, according to PWC's study, during the period 2005 to 2007, effective tax rate increased by approximately 6%. If we apply this percentage increase to the 2004–2005 effective-tax-rate of 20% (as per the Warburton and Hendly study), then the implied effective tax rate for 2007 is 21.3%. Therefore, as for 2007, effective tax rate is within the range of 21.3% and 26.7%, with an average value of 24%.

The main conclusions of our tax assessment are the following:

32 PricewaterhouseCoopers (2008), "Effective Tax Rate Benchmarking to sustain competitive tax rates", Available at: <http://www.pwc.com/extweb/service.nsf/docid/2415E76EFF10B09ACA2574600001A74A> [Accessed 22 January 2009].

- Telstra has not provided good evidence in order to apply a statutory tax of 30%;
- We still believe that there are persuasive arguments in order to continue using the effective tax rate, as opposed to the statutory rate;
- Based on the two studies mentioned above, there is evidence that effective tax rates have increased over recent years;
- As for 2007, effective tax rate is within the range of 21.3% and 26.7%, but for the purpose of this study we believe that a value of effective tax rate of 24% is applicable for the WACC calculation.

**We conclude that the effective tax rate is an appropriate measure in calculating Telstra's WACC and that Telstra has not provided sufficient evidence in order to apply a statutory rate. For the purpose of this study, an estimated tax rate of 24%, based on a review of recent studies, has been applied.**

## Market Risk Premium (MRP)

In its assessment of Telstra's WACC, Ovum<sup>33</sup> concluded that a rate of 6% is a fair estimate of MRP, which is in line with the ACCC's previous regulatory decisions<sup>34</sup>. In its response to Ovum, Telstra<sup>35</sup> argues that the downward adjustments that Ovum conducted on Dimson *et al*<sup>36</sup> Australian MRP value are not appropriate. Telstra also submits that, even if the adjustments were appropriate, they should be Australia specific, as "applying some global average in the Australian context would likely distort the results".

In its Draft Decision, the ACCC<sup>37</sup> considers that Telstra's proposed MRP of 7% is excessive based on the facts that:

- CAPM is a forward-looking model and therefore the allowed MRP should be just sufficient to induce future investments;
- As a domestic CAPM is used, it should consider Australian domestic MRP;

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33 Ovum (6 August 2008), "Review of the economic principles, capital cost and expense calculations of the Telstra Efficient Access cost model".

34 ACCC (August 2006), "Assessment of Telstra's ULLS monthly charge undertaking Final Decision, Public version" and ACCC (March 2008), "Unconditional Local Loop Service Access Dispute Between Telstra Corporation Limited (access provider) and PowerTel Ltd (access seeker), Statement of Reasons for Final Determination".

35 Telstra Corporation Limited (5 December 2008), "Telstra's Ordinary Access Undertaking for the Unconditional Local Loop Service: Response to Ovum's Submissions", Confidential version.

36 Dimson, Elroy, Marsh, Paul and Staunton, Mike (7 April 2006), "The Worldwide Equity Premium: A Smaller Puzzle" EFA 2006 Zurich Meetings. Paper available at SSRN: <http://ssrn.com/abstract=891620>.

37 ACCC (November 2008), "Assessment of Telstra's Unconditional Local Loop Service Band 2 monthly charge undertaking", Draft Decision, Public Version.

- A forward-looking MRP could be expected to be lower than the values obtained from historical studies.

The ACCC's conclusion regarding the overstatement of historical MRP values is supported by the AER,<sup>38</sup> which submits that:

- *"Brailsford et al identify a number of data quality issues with the pre-1958 data that the authors consider likely to bias up estimates using data from this period. This means the above estimates over the 1883-onwards and 1937-onwards periods are more likely to overstate, than understate, a forward-looking MRP"*
- *the use of historical equity returns will bias upwards the return on the CAPM market portfolio, which includes all assets in the economy and is not limited to equities. This means that the above estimates for any period are more likely to overstate, than understate, a forward looking MRP, and*
- *these estimates include several significant and positive one-off or unexpected events that are unlikely to be repeated. That means historical estimates over the periods considered are more likely to overstate, than understate, a forward looking MRP."*

The above argument implies that, even though the value of the downward adjustments that Ovum recommended in its previous assessment may not be Australian specific (as they may include averages deriving from other countries), as Telstra claimed, a downward adjustment is indeed needed, which will potentially drive the MRP below the level of 7% (average of arithmetic and geometric averages of 7.81% and 6.22%, respectively).

In its response to the ACCC's Draft Decision, Telstra recommends departing from the 6% MRP estimate and adopting an MRP around 7%. Telstra quotes empirical estimates that suggest a higher MRP value:

- Gray and Officer<sup>39</sup> estimate simple arithmetic mean market returns on top of 10-year Government bond yields: 6.43% (1955-2004) – 7.70% (1975 – 2004), 7.17% (1885 – 2004);
- Officer and Bishop's updated report that includes 2007 data: 7.5% (1883 – 2007) and 6.7% (1958 – 2007). The authors also highlight that the historical estimates do not include adjustments to include the impact of dividend imputation on the total return of investors.<sup>40</sup>
- Officer and Bishop suggest a 95% confident range of 4.5% - 10.4% with a mid-point of 7.45%.

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38 AER (December 2008), "Explanatory Statement, Electricity transmission and distribution network service providers, Review of the weighted average cost of capital (WACC) parameters", p179.

39 S. Gray and R. R. Officer (15 August 2005), "A Review of the Market Risk Premium and Commentary on Two Recent Papers" A Report Prepared for the Energy Networks Association, - quoted by Telstra.

40 Officer, R and S. Bishop (August 2008), "Market Risk Premium, A Review Paper" – quoted by Telstra.

At this point it makes sense to quote Gray and Officer's<sup>41</sup> findings:

*"For example, a year ago the 30-year mean excess return was less than 6%, leading some to call for a reduction in the MRP used by Australian regulators. Now, the most recent 30-year mean excess return is 7.7%. We do not advocate increasing the MRP now for the same reason we did not advocate reducing the MRP estimate last year. The problems of the theory and measurement of MRPs suggest a conservative approach – a regulator should be very careful about making any changes without compelling evidence."*

Although Gray and Officer estimate the recent 30-year mean MRP to be 7.7%, they do not recommend increasing the MRP from 6%.

Telstra also submits that

*"the ACCC approach is internally inconsistent as it does not adjust the MRP to reflect its estimate of gamma".*

The AER<sup>42</sup> reviewed a number of previous decisions regarding the consideration of the 6% MRP and concluded that:

*"regulators did have regard to the value of imputation credits in establishing this value, which was consistent with the positive value of imputation credits adopted in those decisions".*

Brailsford *et al* study<sup>43</sup>, also quoted by Telstra, argues that the arithmetic average historical excess returns relative to bonds is 6.2% for the period 1883 – 2005.

Handley<sup>44</sup>, on behalf of the Australian Energy Regulator (AER), has estimated historical excess returns that are updated including 2008 data. Handley's findings are represented below:

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41 S. Gray and R. R. Officer (15 August 2005), "A Review of the Market Risk Premium and Commentary on Two Recent Papers" A Report Prepared for the Energy Networks Association, p10-11.

42 AER (December 2008), "Explanatory Statement, Electricity transmission and distribution network service providers, Review of the weighted average cost of capital (WACC) parameters".

43 Brailsford, Tim; Handley, John C.1; Maheswaran, Krishnan, "Re-examination of the historical equity risk premium in Australia", *Accounting and Finance*, Volume 48, Number 1, March 2008, pp. 73-97(25) – Quoted by AER study: AER (December 2008), "Explanatory Statement, Electricity transmission and distribution network service providers, Review of the weighted average cost of capital (WACC) parameters".

44 John C. Handley (17 October 2008), "A Note on the Historical Equity Risk Premium", Report prepared for the Australian Energy Regulator.

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**Figure 3.4: Historical Equity Risk Premium 1883 - 2008**

Period	ERP relative to 10 year Bonds		
	0.0	0.5	1.0
<i>Imputation Credits</i>			
1883 - 2008	6.1%	6.2%	6.4%
1937 - 2008	5.6%	5.9%	6.1%
1958 - 2008	6.0%	6.4%	6.7%
1969 - 2008	4.5%	5.0%	5.5%
1980 - 2008	5.5%	6.2%	6.8%
1988 - 2008	4.5%	5.4%	6.4%

Source: Ovum assessment of Handley (2008)

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The following observations and conclusions are made from Handley's study:

- Based on the reasoning that the AER has provided, we believe that the periods commencing between 1883 and 1958 and finishing in 2008 should be selected for the estimate of historical MRP;
- By considering an imputation factor of 0, MRP ranges between 5.6% and 6.1%, while an imputation factor of 0.5 provides an MRP that ranges between 5.9% and 6.4%.

The AER has also considered other measures of MRP. Survey measures indicate that MRP is consistently 6%, while cash-flow-based measures support an MRP of around or below 6%<sup>45</sup>.

**Based on the evidence presented above, we still support the view that a value of 6% is a fair estimate of MRP.**

## Imputation factor

In its initial assessment<sup>46</sup> of the imputation factor, Ovum concluded that a non-zero value is applicable for the estimation of Telstra's Cost of Capital. In a previous regulatory decision<sup>47</sup> the ACCC noted Hathaway's study, which estimated the imputation factor to be between 0.25 and 0.45 and on a practitioner survey that shows that the imputation factor is closer to or higher than 0.5, Ovum concluded that an imputation factor of 0.5 is applicable.

In its response to Ovum<sup>48</sup>, Telstra submits that the consideration of a domestic investor is not appropriate due to the significant representation of international

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45 AER (December 2008), "Explanatory Statement, Electricity transmission and distribution network service providers, Review of the weighted average cost of capital (WACC) parameters".

46 Ovum (6 August 2008), "Review of the economic principles, capital cost and expense calculations of the Telstra Efficient Access cost model".

47 ACCC (29 November 2006), "Assessment of Telstra's PSTN and LCS Undertaking Final Decision Public version".

48 Telstra Corporation Limited (5 December 2008), "Telstra's Ordinary Access Undertaking for the Unconditional Local Loop Service: Response to Ovum's Submissions", Confidential version.

investors, who cannot utilise imputation credits, on share registers across Australia. Telstra therefore submits that the imputation factor should be zero, while the consideration of an imputation factor of 0.355<sup>49</sup>, based on Hathaway and Officer, can stand as a second-best estimate. This value (0.355) is calculated by considering a theta value of 50% and a distribution rate of 71%.

The ACCC, in its Draft Decision, argues that Australian companies have increasingly used off-market share buybacks to stream franking credits to investors and that, under a domestic CAPM, Australian residents are entitled to the accompanying taxation benefits; and therefore a zero value for the imputation factor is not applicable. The ACCC also provides the outputs of a number of academic studies that highlight that the imputation factor is well above zero.

Telstra's support for the consideration of an international investor has also been highlighted by NERA<sup>50</sup>, which submits that:

*"because the Australian equity market is integrated with international equity markets and foreign investors get little value from franking credits, gamma is likely to be close to zero.*

*A representative investor will most closely resemble a foreign investor and foreign investors do not receive any benefit from franking credits. The value the market places on franking credits is therefore likely to be close to zero".*

Regarding this point, Handley<sup>51</sup> argues that:

*"In the CAPM framework, this translates to whether domestic assets are priced relative to a domestic benchmark (such as the All Ordinaries Accumulation Index) or are priced relative to an international benchmark (such as the S&P500 or the MSCI World Index)".*

If we also consider NERA's<sup>52</sup> argument that

*"A representative investor has characteristics that are a weighted average of the characteristics of all investors"*

then we conclude that the relevant market portfolio for pricing purposes is an international benchmark, as Handley also highlights. Under this conclusion, then an international CAPM should have been used. This means that the risk-free rate, Market Risk Premium and beta values should have been calculated on an international basis. This definitely is not the methodology that Telstra has used for the estimate of such parameters. Therefore, the arguments that a marginal investor is an international investor and therefore the gamma value should be zero cannot stand.

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49 N. Hathaway and R.R. Officer (November 2004), "The Value of Imputation Tax Credits", Capital Research Pty Ltd.

50 NERA (11 September 2008), "The Value of Imputation Credits", A report for ENA, Gr d Australia and APIA.

51 John C. Handley (12 November 2008), "A Note on the Valuation of Imputation Credits", Report prepared for the Australian Energy Regulator.

52 NERA (11 September 2008), "The Value of Imputation Credits", A report for ENA, Gr d Australia and APIA.



Handley submits that a reasonable estimate of gamma value is within the range of 0.3 – 0.7 and notes that the upper value is based on pre-2001 data and therefore excludes any allowances for cash refunds of excess franking credits.

Two studies were quoted by the AER<sup>53</sup> and the ACCC<sup>54</sup>. The Beggs and Skeels study<sup>55</sup> estimates a theta value of 0.57 for the period 2001 – 2004, which is considerably higher than the theta value from the year 2000. A Handley and Maheswaran study estimated theta values by making use of tax statistics: 0.67 for the period 1990 – 2000, 0.81 for the period 2001 – 2004.

SFG Consulting<sup>56</sup> supports that, by using the standard dividend drop-off method, the theta value is estimated to be in the range of 0.2 to 0.35, with an average estimate of 0.28. A franking credit distribution rate of 100% provides an estimate range of gamma of 0.2 to 0.35 (average of 0.28), while a 70% distribution rate produces a gamma value range of 0.14 to 0.25 (average of 0.19).

NERA<sup>57</sup> makes the following arguments (also underlined by Telstra) regarding an estimate of gamma:

- Gamma is the product of “the fraction of imputation credits created that are distributed to shareholders” and “the market value of imputation credits as a proportion of their face value”.
- An appropriate value for a market wide distribution ratio is 0.71 as calculated by Hathaway and Officer.<sup>58</sup>
- Based on the SFG Consulting study, the most up-to-date estimate of market values of distributed imputation credits is within the range of 0.2 – 0.4.
- A conditional value of the value that the market place places on one dollar of imputation credits is within the range of 0.15 – 0.30.

The AER highlights that SFG’s dividend drop-off study, although the most up-to-date study, does not provide statistical analysis in order to consider the reliability

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53 AER (December 2008), “Explanatory Statement, Electricity transmission and distribution network service providers, Review of the weighted average cost of capital (WACC) parameters”.

54 ACCC (November 2008), “Assessment of Telstra’s Unconditional Local Loop Service Band 2 monthly charge undertaking”, Draft Decision, Public Version.

55 D.J. Beggs and C.L. Skeels (September 2006), “Market Arbitrage of Cash Dividends and Franking Credits”, Economic Record, Vol. 82, No. 258, pp. 239-252.

56 Strategic Finance Group (SFG) Consulting (16 September 2008), “The impact of franking credits on the cost of capital of Australian firms”, Report prepared for ENA, APIA and Grid Australia.

57 NERA (11 September 2008), “The Value of Imputation Credits”, A report for ENA, Grid Australia and APIA.

58 N. Hathaway and R.R. Officer (November 2004), “The Value of Imputation Tax Credits”, Capital Research Pty Ltd.

of the estimates. Therefore, for the purpose of its Draft Decision<sup>59</sup>, the AER has not placed any weight on the SFG study in order to estimate the theta value. Accordingly, we will not consider this study in our estimate of imputation factor.

A summary of theta values resulting from empirical studies is presented below:

**Figure 3.5: Utilisation rate (theta) value estimates**

Study	Period covered	Utilisation rate
Hathaway and Officer (2004)	1988 - 2002	0.5
Beggs and Skeels (2006)	2001 - 2004	0.57
Handley and Maheswaran (2004)	1990 - 2000	0.67
	2001 - 2004	0.81

Source: Ovum assessment of the quoted studies

Based on the above studies, we conclude that an applicable theta value, for the estimation of imputation factor, is within the range of 0.5 and 0.81, with an average estimate of 0.66. If we also take into consideration the pay-out ratio of 0.71, which Hathaway and Officer estimate<sup>60</sup>, then the implied gamma value is within the range of 0.36 and 0.58 with an average value of 0.47. This value is also within the range of 0.3 and 0.7 that Handley has estimated<sup>61</sup>.

**Therefore, in light of the recent empirical studies, we conclude that our initial estimate of gamma value of 0.5 is appropriate.**

## Asset/Equity Beta

Ovum, in its assessment<sup>62</sup> of Telstra's equity beta, concluded that a value of 0.394, which was calculated based on Telstra's monthly-observed equity beta values of the last 5 years, could provide an appropriate estimate.

The ACCC in its Draft Decision<sup>63</sup> submits that, although Ovum's directly calculated equity beta is a fair estimate, the implied asset beta (of 0.32) is lower than the asset beta of 0.47 calculated following a benchmarking approach. The ACCC also notes that an asset beta of 0.5 equates to an equity beta of 0.71 when debt share

<sup>59</sup> AER (December 2008), "Explanatory Statement, Electricity transmission and distribution network service providers, Review of the weighted average cost of capital (WACC) parameters".

<sup>60</sup> N. Hathaway and R.R. Officer (November 2004), "The Value of Imputation Tax Credits", Capital Research Pty Ltd.

<sup>61</sup> John C. Handley (12 November 2008), "A Note on the Valuation of Imputation Credits", Report prepared for the Australian Energy Regulator.

<sup>62</sup> Ovum (6 August 2008), "Review of the economic principles, capital cost and expense calculations of the Telstra Efficient Access cost model.

<sup>63</sup> ACCC (November 2008), "Assessment of Telstra's Unconditional Local Loop Service Band 2 monthly charge undertaking", Draft Decision, Public Version.

is 30% (Telstra's estimate), which is below Telstra's equity beta estimate of 1.028<sup>64</sup> (point estimate).

The AER argues that "unrepresentative events" need to be removed from beta estimates<sup>65</sup>. One example (of an "unrepresentative event") is the "technology bubble" during which market indices were driven upwards by telecommunications, media and technology stock prices, from the late 1990s to 2001. In light of this consideration, in assessing Telstra's equity beta, we did not include any data from this time period.

In estimating equity beta values, Professor Henry<sup>66</sup> argues that

*"a reasonable compromise is to sample the data at a weekly frequency. Given the sparse nature of the data there are too few monthly observations available for many of the stocks to produce statistically reliable estimates of  $\beta$ . For some of the stocks and portfolios considered in this report there are less than 30 monthly observations meaning that statistical inference is unlikely to be reliable. There is a tradeoff between the noisy nature of the daily data and the lack of degrees of freedom in the monthly data. The best compromise would appear to be the use of data sampled at the weekly frequency."*

Although the AER<sup>67</sup> accepted Professor Henry's view, referring to the estimation of equity betas, they argued that:

*"it is standard practice to examine monthly data".*

It should also be noted that Professor Henry used weekly observed data due to the fact that the available sample of data was short and therefore monthly data was unlikely to produce statistically valid inference. Our view is that monthly observed data should be used in cases where the data sample is long enough.

In our previous assessment of beta values, Ovum calculated 5-year and 18-month average historic equity beta values for Telstra, observed on a daily, weekly and monthly basis. The decision to recommend a 5-year-average monthly-observed equity beta was not made on the basis of being "the lowest value". Ovum's recommendation was based on the fact that it is standard practice to examine monthly data over this time period.

It is standard practice to consider monthly observations. **We conclude as before that an equity beta of 0.394 based on a monthly observed beta of last 5 years is appropriate.**

Telstra<sup>68</sup> also notes that, based on a study from CEG<sup>69</sup>:

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64 Telstra Corporation Limited (4 April 2008), "ULLS Undertaking, Weighted Average Cost of Capital (WACC)".

65 AER (December 2008), "Explanatory Statement, Electricity transmission and distribution network service providers, Review of the weighted average cost of capital (WACC) parameters".

66 Associate Professor Ólan T. Henry (28 November 2008), "Econometric advice and beta estimation".

67 AER (December 2008), "Explanatory Statement, Electricity transmission and distribution network service providers, Review of the weighted average cost of capital (WACC) parameters".

*"the traditional CAPM approach understates the required return to equity where the normal equity beta is less than one and overstates the required return to equity when the normal equity beta is above one".*

CEG also recommends that the AER either:

- "rejects the use of the Sharpe CAPM and replaces this with the Black CAPM, or
- makes an adjustment to the Sharpe CAPM to make it mathematically equivalent to the Black CAPM".<sup>70</sup>

Handley<sup>71</sup> has commented on CEG's recommendation and the AER provides considerable evidence regarding the use of the CAPM and therefore rejects CEG's recommendation of adopting the Black CAPM approach.

## Calculation of WACC

The table below summarises our revised assessment of Telstra's Cost of Capital parameters and compares them with our previous estimates<sup>72</sup>, as well as with Telstra's point estimates<sup>73</sup>. The main difference between our previous and current assessment of the WACC parameters is the consideration of a tax rate of 24%, instead of 20%. Our revised assessment supports a pre-tax WACC value of 10.97%, compared to our previous assessment of 9.22%, which is still very low compared to Telstra's point estimate of 16.46%.

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68 Telstra Corporation Limited (23 December 2008), "Telstra's Ordinary Access Undertaking for the Unconditional Local Loop Service: Response to the ACCC's Draft Decision", Confidential version.

69 CEG (15 September 2008), "Estimation of, and correction for, biases inherent in the Sharpe CAPM formula", A report for the Energy Networks Association, Grid Australia and APIA.

70 AER (December 2008), "Explanatory Statement, Electricity transmission and distribution network service providers, Review of the weighted average cost of capital (WACC) parameters".

71 John Handley (20 November 2008), Comments on the CEG reports: "estimation of, correction for, biases inherent in the Sharpe CAPM formula" and "an analysis of implied market cost of equity for Australian regulated utilities, Report prepared for the AER".

72 Ovum (6 August 2008), "Review of the economic principles, capital cost and expense calculations of the Telstra Efficient Access cost model".

73 Telstra Corporation Limited (4 April 2008), "ULLS Undertaking, Weighted Average Cost of Capital (WACC)".

**Figure 3.6: Ovum's and Telstra's view of WACC**

	Ovum previous assessment	Ovum revised assessment	Telstra point estimate
Risk-free Rate	6.31%	6.31%	6.33%
Debt Ratio	34%	34%	30%
Debt Risk Premium	2.00%	2.00%	1.95%
Debt Issuance Cost	0.083%	0.083%	0.15%
Cost of Debt pre Tax	8.39%	8.39%	8.43%
Debt beta	0	0	-
Equity beta	0.394	0.394	1.028
Equity Issuance Cost			0.40%
Market Risk Premium	6.0%	6.0%	7.0%
Cost of Equity post Tax	8.67%	10.81%	13.93%
Tax	20%	24%	30%
Imputation factor	0.5	0.5	-
<b>WACC pre-Tax</b>	<b>9.22%</b>	<b>9.36%</b>	<b>16.46%</b>

Source: Ovum, Telstra

### Ovum's revised view of WACC and WACC parameters

The table below summarises our original and revised assessment of Telstra's Cost of Capital and Cost of Capital parameters.

Ovum's Original Recommendation or Comment	Ovum's Revised Recommendation or Comment
A rate of 6.31% is an appropriate estimation of risk-free rate	No adjustment as the value is broadly in line with Telstra's and the ACCC's submissions.
Therefore if we consider a risk free rate of 6.31% (see previous section), then an applicable debt premium is 2%	No adjustment as the value is broadly in line with Telstra's and the ACCC's submissions.
We believe that debt issuance costs will be closer to the ACCC's previous estimate of 8.3 basis points rather than Telstra's point estimate of 15 basis points.	No adjustment as the value is in line with the ACCC's Draft Decision and Telstra considers the difference not significantly to affect the results.
Based on our analysis and reference to different sources of information, Ovum believes that a rate of 6%, which is in line with previous ACCC decisions, is a fair estimate of MRP.	Based on the evidence presented above, we still support the view that a value of 6% is a fair estimate of MRP.

<b>Ovum's Original Recommendation or Comment</b>	<b>Ovum's Revised Recommendation or Comment</b>
<p>In the revised WACC calculation the effective tax rate in the assessment of cost of capital is applied in line with the ACCC's previous considerations. The 20% tax rate is considered in the WACC value and is based on the ACCC's calculations and previous decisions cited above.</p>	<p>We conclude that the effective tax rate is an appropriate measure in calculating Telstra's WACC and that Telstra has not provided sufficient evidence in order to apply a statutory rate. For the purpose of this study, an estimated tax rate of 24%, based on review of recent studies, has been applied.</p>
<p>We conclude that an equity beta of 0.394 could provide an appropriate estimate of Telstra's equity beta.</p> <p>The calculated value of asset beta is 0.32.</p>	<p>It is standard practice to consider monthly observations monthly. We conclude as before that an equity beta of 0.394 based on a monthly observed beta of last 5 years is appropriate.</p> <p>The calculated value of asset beta is 0.32.</p>
<p>Based on previous regulatory decisions, debt beta is set to zero</p>	<p>No adjustment as the value is broadly in line with Telstra's and the ACCC's submissions.</p>
<p>We consider that the average ratio of 34%, supported by the benchmark, is an appropriate value for Telstra.</p>	<p>No adjustment as the value is within the range of 30% and 40% (the ACCC's Draft Decision and Telstra submission) and Telstra considers the difference not significantly to affect the results.</p>
<p>We conclude therefore a point estimate imputation factor of 0.5 based on the ACCC's previous studies</p>	<p>Therefore, in light of the recent empirical studies, we conclude that our initial estimate of gamma value of 0.5 is appropriate.</p>
<p>Our view is that, for the purpose of this study, Equity Issuance Cost should be equal to zero</p>	<p>No adjustment as the value is in line with the ACCC's Draft Decision and Telstra considers the difference not significantly to affect the results.</p>
<p>Our assessment of the cost of capital parameters results in an estimation of pre-tax WACC of 9.22%, as opposed to the 16.46% of Telstra's point estimate.</p>	<p>Our revised assessment supports a pre-tax WACC value of 9.36%, compared to our previous assessment of 9.22%, which is still very low compared to Telstra's point estimate of 16.46%.</p>

## 4 References

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