REPORT

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The Telstra Return on a National FTTN Network

Community impacts

Prepared for Competitive Carriers Coalition (CCC) Ltd

Centre for International Economics
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Executive Summary

As part of its election commitments, the federal Government plans to build a national high-speed broadband network that delivers fast internet to 98 per cent of Australian homes and businesses. This network will support high quality voice, data and video services using FTTN (Fibre to the Node) technology.

On 11 April 2008, the Communications Minister released the Request for Proposals for the FTTN network's rollout and operation. Telstra has announced its interest in building and operating this network.

Sometime last year it was reported that Telstra would seek 'an internal rate of return on a FTTN network of 27 per cent'.[1] Recently, the Weekend Australian quoted Phil Burgess (Telstra's Group Managing Director, Public Policy & Communications), when he said "We need a return north of 18 per cent."[2]

This seems to be a high return relative to many other investments in the Australian capital market. Indeed, a rate of return of this size may be consistent with the abuse of market or monopoly power.

Alternative models to build the FTTN network that would not be open to the abuse of market power have been proposed by investors.

The key objective of this study is to provide evidence on the economic impacts of alternative models for the provision of a FTTN network. In particular, this study:

- identifies the difference between the expected capital returns from Telstra's FTTN national network and that of an alternative supplier that was not able to extract monopoly prices; and
- assesses the implications to the community and economy of this difference.

This difference is measured using the Weighted Average Cost of Capital (WACC) approach. This approach is the appropriate basis for comparing alternative models because, since the WACC is the 'expected rate of return on a portfolio of all the firm's outstanding securities',[3] by estimating it we can compare the additional revenue that needs to be extracted from customers under each model to meet each company's

1 Michael Sainsbury 2007, "Telstra revives fast net project", The Australian, April 03.

2 Jennifer Hewett 2008, "Telstra wants return 'north of 18pc'", The Australian, April 09.

3 Brealey, R., Myers, S., and Allen, F. 2006, Principles of Corporate Finance, McGraw-Hill Irwin, Eight Edition, p. 463.

targeted returns. Further, differences in the WACC would feed through directly and proportionately into differences in prices in capital intensive businesses. Hence, by using the WACC approach we are able to estimate the impact of the different models for the provision of the FTTN network on the cost of capital, revenue and prices.

Notably, the WACC plays an important dual role. Not only is it used as the discount rate to value capital investment projects, but it also plays a regulatory role. Indeed, the WACC is used by regulators to control the maximum prices charged for some services and assess the level of return proposed by companies. By calculating the efficient WACC, regulators can stop the regulated companies from charging inefficient prices and earning more than normal market returns.

Table 1 presents the WACC estimates for Telstra's FTTN network and an alternative supplier's network. This table also presents estimates of the revenue required by each network to achieve the targeted returns to capital on an indicative asset base of $4.6 billion, which is Telstra's estimated cost to build a FTTN network in the five major capital cities and the Gold Coast.[4]

Additionally, Table 1 shows the revenue estimates for a $9.3 billion national network, which includes Telstra's offer of $4.6 billion to build the network in major capital cities and the Government's investment of $4.7 billion to help build the network.

Importantly, there is currently no guidance from the Government about the return it will require on its $4.7 billion investment. In the absence of detailed information, the estimates in Table 1 assume that the Government would take the same equity risk as the private sector investor and hence would receive the same equity returns.[5]

Recently, Telstra suggested that the cost of the FTTN network would be up to $15 billion.[6] As such, the last column in Table 1 also provides estimates of the revenue needed to achieve the targeted returns to capital on an indicative asset base of $15 billion.

The key points are as follows:

- Telstra's expected return from the FTTN network is more than 2 per cent higher than the return that an alternative investor would expect from the same asset.
- This difference feeds through directly into differences in revenue that needs to be extracted from customers. Compared to an alternative supplier, the additional revenue that Telstra would need to achieve its targeted return to capital on an

4 Jennifer Hewett 2008, "Telstra wants return 'north of 18pc'", The Australian, April 09; Jennifer Hewett 2008, "$9bn fibre minefield for Conroy", The Australian, April 05.

5 This is not likely to be the case as the Government may seek to recover only a return equal to the risk free bond rate (or slightly above). Up to the time of writing, there has not been any announcement from the Government on this issue. However, this estimate is included here for illustrative purposes.

6 This figure includes the Government's investment of $4.7 billion to help build the network.

asset of $4.6 billion is on average $443 million per annum. If the network cost were $9.3 billion, the additional revenue that Telstra would need to obtain each year is $897 million. This is similar to having a telecommunications private tax.

- It was reported earlier that Telstra would lock in the price for broadband for 14 years if it builds the FTTN network.[7] An additional revenue of $443 million per annum over 14 years is equivalent to $6.2 billion. This is comparable to the following measures announced in the 2008-09 Budget:
  - the increase in alcohol tax (estimated to have a gain to revenue of $3.1 billion over 5 years); plus
  - the removal of the current exemption of condensate from crude oil excise (estimated to have a gain to revenue of $2.5 billion over 5 years); plus
  - the increase in the luxury tax rate (estimated to have a gain to revenue of $555 million over 4 years).
- Similarly, additional revenues of $897 million and $1 447 million per annum over 14 years are equivalent to $12.6 billion and $20.2 billion, respectively.
- Telstra's higher cost of capital would translate into higher prices for customers. If Telstra obtain its targeted return, consumers would paid on average 15 per cent more for the service than if the network was provided by an alternative supplier with a lower capital return. This price differential is the same under the three assumed asset costs.

1 **WACC and revenue estimates**

	WACC (per cent)	*Average annual revenue needed to achieve return to capital ($m)*		
		$4.6 billion asset	*$9.3 billion asset*	*$15 billion asset*
Telstra's FTTN network	12.95	3 321	6 715	10 831
Alternative supplier	10.68	2 878	5 818	9 384
Difference between Telstra and alternative supplier	2.27	443	897	1 447

Source: CIE estimates.

Notably, while higher prices would have adverse effects on the economy, the extra income that Telstra's shareholders would obtain from the FTTN network would offset some of these losses. The net effect of this is estimated using a Computable General Equilibrium (CGE) model of the Australian economy. A CGE model is useful to assess these effects because it captures the linkages of the telecommunications sector with upstream and downstream industries across the economy.

7 Fleur Leyden 2007, "Telstra price pledge", Herald Sun, June 08; Garry Barker 2007, "Telstra warns of G9 broadband price slug", The Age, June 08; and nowwearetalking 2007, "Why the G9 scheme won't work; Prices", http://www.nowwearetalking.com.au/ features/why-the-g9-scheme-wont-work-prices, Accessed 19 May 2008.

Chart 2 shows the average annual impacts of adopting Telstra's model under different asset costs, when compared to an alternative supplier's model. These results should be interpreted as permanent changes to the economy that will prevail after the construction of the FTTN network and all of the various flow-on changes have worked through fully. The key points are as follows:

- Telstra's return from the FTTN network on an indicative asset base of $4.6 billion would translate into an increase in the CPI of about 0.07 per cent, when compared with an alternative supplier's return. If the network cost were $9.3 billion or $15 billion, Telstra's high return on the FTTN network would translate into an increase in the CPI of about 0.14 per cent and 0.22 per cent, respectively.
- Higher prices for households and businesses would lead to a long-term decrease in GDP of 0.11 per cent if the network cost is $4.6 billion (equivalent to about $1.12 billion of annual GDP in 2006-07).[8] The effects on the economy would be larger if the costs of the network are higher. Indeed, as shown in Chart 2, if the network cost were $9.3 billion or $15 billion, Telstra's return on the FTTN network would translate into a decrease in GDP of about 0.22 per cent and 0.35 per cent, respectively. These costs include the direct impacts of Telstra's model (i.e. the increase in the cost of the service and the extra income of Telstra's shareholders), as well as the indirect effects that higher costs have on industries upstream and downstream the telecommunications sector.
- Another way in which the community would pay for Telstra's high return is via wages. Compared with an alternative supplier model and depending on the cost of the network, disposable wages under Telstra's model would be lower by up to 0.44 per cent.
- The best single measure of the impact of Telstra's FTTN network return on the community is consumption. Consumption is a better indicator of wellbeing than GDP. As mentioned before, the direct loss caused by Telstra's model on an indicative asset base of $4.6 billion is about $443 million per annum due to higher prices. There is also an offsetting effect due to an increase in Telstra's shareholders income. The economywide analysis shows that Telstra's return on a $4.6 billion network would reduce real private consumption by 0.06 per cent, when compared with an alternative supplier's return. That is, after considering the direct and indirect effects, Telstra's FTTN network return would cause a net real loss of $363 million in consumption.[9] Over the 14 years that Telstra would have locked in its price for its FTTN network services, this loss in consumption would translate

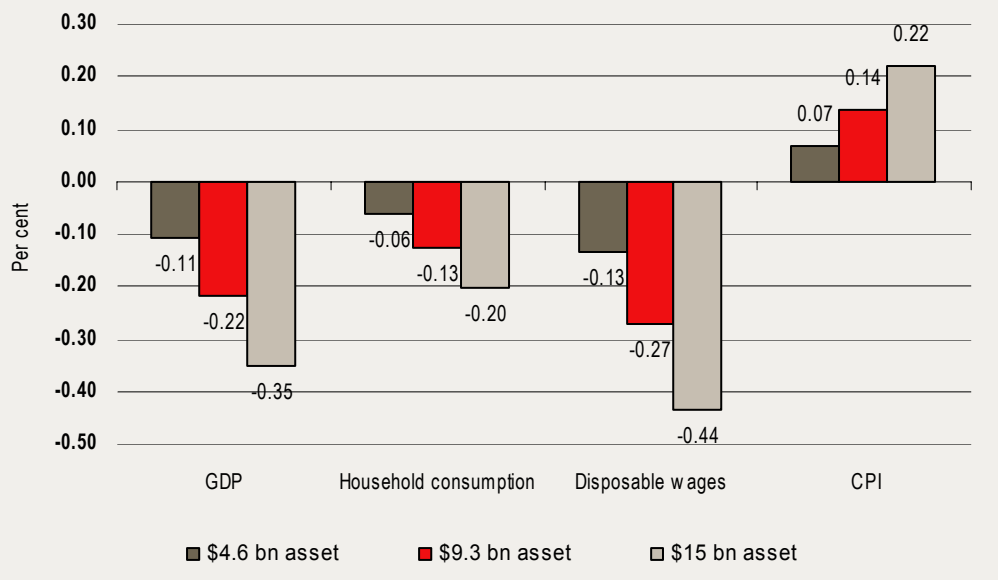
8 This estimate is based on nominal GDP figures for the 2006-07 year by the ABS (Catalogue No. 5206.0).

9 This estimate is based on nominal household consumption figures for the 2006-07 year by the ABS (Catalogue No. 5206.0).

into a net present value of about $3.4 billion.[10] This is roughly three quarters of Telstra's $4.6 billion expenditure on the FTTN network.

- Telstra's return from a $9.3 billion and a $15 billion FTTN network would reduce real private consumption by 0.13 and 0.2 per cent respectively, when compared with an alternative supplier's return. This would be equivalent to a net real loss of $733 million and $1.18 billion in consumption, respectively. [11]

2 **Modelling results (per cent deviations)**



Data source: ORANI model simulation.

A sensitivity analysis of these results using WACC estimates for broadly comparable assets was undertaken. This analysis shows that, while the economywide impacts vary in magnitude depending on the options being compared, the margin between Telstra's required return and the returns received for broadly similar assets translates into significant negative impacts for the Australian economy and the wider community. In particular, it consistently translates into lower output (GDP), higher prices (CPI), lower wages, and lower living standards (household consumption).

Conclusion

This report finds that the difference between the expected capital returns from Telstra's FTTN national broadband and that of an alternative supplier has a significant negative impact on the Australian economy.

10 Calculated using an interest rate of 6.04 per cent (Commonwealth 10 year bond as at March 2008).

11 This estimate is based on nominal household consumption figures for the 2006-07 year by the ABS (Catalogue No. 5206.0).

Notably, although the WACC estimates in this analysis are only broad indicators of the likely costs of capital under different models for the provision of the FTTN network, the evidence presented in this report indicates that there is a significant margin. This margin would introduce an economic distortion that would lead to a general contraction of the Australian economy and hardship for the community.

1 Introduction

As part of its election commitments, the federal Government plans to build a national high-speed broadband network that delivers fast internet to 98 per cent of Australian homes and businesses. This network will support high quality voice, data and video services using FTTN (Fibre to the Node) technology.

On 11 April 2008, the Communications Minister released the Request for Proposals (RFP) for the FTTN network's rollout and operation. Telstra has announced its interest in building and operating this network.

Sometime last year it was reported that Telstra would seek 'an internal rate of return on a FTTN network of 27 per cent'.[12] Recently, the Weekend Australian quoted Phil Burgess (Telstra's Group Managing Director, Public Policy & Communications), when he said "We need a return north of 18 per cent because that is the average return on other investments."[13]

This seems to be a high return relative to many other investments in the Australian capital market. Indeed, a rate of return of this size may be consistent with the abuse of market or monopoly power.

Alternative models to build the FTTN network that would not be open to the abuse of market power have been proposed by investors. An example of this is a recent proposal by a group of Telstra's major rivals known as the G9. [14] While the ACCC rejected some specifics of the G9 model, it indicated that it was generally comfortable with vertical separation where the network only provides access services and the network business would not itself participate in downstream retail markets. A feature of the G9 approach is that it would involve less scope for the abuse of market power by the operator, lower capital returns to investors, and therefore lower costs to consumers. With the prospect that the G9 would make an offer in the Government's tender process and the prospects of others also making proposals, there are grounds to suppose that there are alternatives to the Telstra model.

To provide evidence on the economic impacts of alternative models for the provision of a national FTTN network, this study aims to:

12 Michael Sainsbury 2007, "Telstra revives fast net project", The Australian, April 03.

13 Jennifer Hewett 2008, "Telstra wants return 'north of 18pc'", The Australian, March 22.

14 Telecommunication companies involved in the group include AAPT, iiNet, Internode, Macquarie Telecom, Optus, PowerTel, Primus, Soul and TransACT.

- identify the difference between the expected capital returns from Telstra's FTTN national broadband rollout and that of an alternative supplier that was not able to extract monopoly prices or abuse market power;
- identify the difference between the expected capital returns from Telstra's FTTN national broadband rollout and that of other broadly similar assets; and
- assess the implications to the community and economy at large of these differences.

This report is structured as follows:

- Chapter 2 analyses the return differentials of alternative models for the provision of a national FTTN network.
- Chapter 3 compares the economywide effects of the difference between the expected capital returns from Telstra's FTTN national broadband rollout and that of an alternative supplier.
- Chapter 4 provides a sensitivity analysis to examine the economywide impacts of the difference between the expected capital returns from Telstra's FTTN national broadband rollout and that of other broadly similar assets.
- Chapter 5 outlines the limitations of this study.
- Chapter 6 describes the conclusions of this report.

2 *Return differentials on a national FTTN network*

The first step in analysing the economic impacts of alternative models for the provision of a national FTTN network is to establish a basis of comparison. The appropriate basis for comparison of these alternative models is the return to capital provided by the calculation of the Weighted Average Cost of Capital (WACC).

Broadly speaking, a company's assets are financed by either debt or equity, or more likely with a mixture of both. The WACC is the average of the costs of these sources of financing, each of which is weighted by its respective use in the given situation. Since the WACC is the 'expected rate of return on a portfolio of all the firm's outstanding securities',[15] differences in this measure feed through directly and proportionately into differences in prices in capital intensive businesses. Hence, by estimating the different cost of capital (WACC) under each alternative model for the provision of the FTTN network we can compare the additional revenue that needs to be extracted from customers (or the price that needs to be charged) under each model, to meet each company's targeted returns.

Notably, the WACC plays an important dual role. Not only is it used as the discount rate to value capital investment projects, but it also plays a regulatory role. Indeed, the WACC is used by regulators to control the maximum prices charged for some services and assess the level of return proposed by companies. By calculating the efficient WACC, regulators can stop the regulated companies from charging inefficient prices and earning more than normal market returns.

The WACC should be calculated for a specific investment or asset. This calculation requires specific details about significant commercial facts such as how the asset is financed (i.e. the debt and equity proportions), the underlying level of risk, the cost of issuing debt, etc. Much of this information is kept by companies as a valuable commercial secret. Detailed published information about the FTTN network and about the companies' precise cost of capital for large specific projects is not readily available. To overcome this problem The CIE calculates and compares the likely WACC of broadly comparable assets using publicly available data.

15 Brealey, R., Myers, S., and Allen, F. 2006, Principles of Corporate Finance, McGraw-Hill Irwin, Eight Edition, p. 463.

There are also several approaches for calculating the WACC. For this report, The CIE estimates the WACC following a similar approach to that used by the ACCC or the Independent Pricing and Regulatory Tribunal (IPART) of NSW. This approach, referred to as "vanilla" WACC, uses the Capital Asset Pricing Model (CAPM) and data about the capital market to estimate the nominal post tax WACC.

In this report, we compare the likely WACC of the following assets:

- **Telstra's FTTN network WACC –** This estimate represents the overall return that Telstra would have to earn on the FTTN network to ensure that the return on its equity (i.e. the amount that it distributes to its shareholders) is the targeted 18 per cent. This WACC is calculated using financial data about Telstra available in the public domain.
- **Alternative supplier WACC-** This estimate represents the overall return that an alternative investor that was not able to extract monopoly prices would receive from the FTTN network. This WACC is calculated using the financial information of comparable telecommunication companies with broadly similar assets available in the public domain.

To provide a sensitivity analysis of our results, we have also calculated the WACC of other broadly comparable assets. These estimates and the economywide impacts of the WACC differentials between these assets and Telstra's FTTN network are presented in Chapter 4.

Table 2.1 presents the WACC estimates for Telstra's FTTN network and an alternative supplier's network. Importantly, while these estimates are not precise, obtaining precision is not the main objective of this analysis. The main point is to identify if there is a significant margin between the returns of different network providers. Indeed, as can be seen from Table 2.1, Telstra's overall expected return from the FTTN network is more than 2 per cent higher than the return that an alternative investor would expect from the same asset.

2.1 **WACC estimates for different assets (per cent)**

	WACC	*Expected return on equity*	*Expected return on debt*
Telstra's FTTN network	12.95	18.00	7.89
Alternative supplier	10.68	13.47	7.89

Source: CIE calculations.

A way to illustrate the direct impact that the different expected returns (WACC) would have on the community is to estimate the additional revenue that would need to be extracted from customers and the price that needs to be charged under each model, to meet these expected returns. The formula used to calculate the revenue needed to achieve the target return on capital from each asset is presented in Appendix A.

Table 2.2 presents estimates of the average annual revenue that needs to be obtained from the assets being compared to achieve the targeted return to capital under different asset costs. The first column presents estimates of the revenue that needs to be obtained to achieve the targeted returns to capital on an indicative asset base of $4.6 billion, which is Telstra's estimated cost to build a FTTN network in the five major capital cities and the Gold Coast.[16]

Additionally, Table 2.2 shows the revenue estimates for a $9.3 billion national network, which includes Telstra's offer of $4.6 billion to build the network in major capital cities and the Government's investment of $4.7 billion to help build the network.

Importantly, there is currently no guidance from the Government about the return it will require on its $4.7 billion investment. In the absence of detailed information, the estimates in Table 2.2 assume that the Government would take the same equity risk as the private sector investor and hence would receive the same equity returns. [17]

Recently, Telstra suggested that the cost of the FTTN network would be up to $15 billion. As such, the last column in Table 2.2 also provides estimates of the revenue needed to achieve the targeted returns to capital on an indicative asset cost of $15 billion.

2.2 Estimates of average annual revenue needed to achieve return to capital under different asset costs ($m)

	$4.6 billion asset	*$9.3 billion asset*	*$15 billion asset*
Telstra's FTTN network	3 321	6 715	10 831
Alternative supplier	2 878	5 818	9 384
Difference between Telstra and alternative supplier	443	897	1 447

Source: CIE estimates.

It is estimated that the annual additional revenue that Telstra would have to extract from its customers to achieve its targeted return to capital on an indicative asset base of $4.6 billion is $443 million per annum on average. If the network cost were $9.3 billion, the additional revenue that Telstra would need to achieve each year is $897 million. This is similar to having a telecommunications private tax.

16 Jennifer Hewett 2008, "Telstra wants return 'north of 18pc'", The Australian, April 09; Jennifer Hewett 2008, "$9bn fibre minefield for Conroy", The Australian, April 05.

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It was reported earlier that Telstra would lock in the price for broadband for 14 years if it builds the FTTN network.[18] An additional revenue of $443 million per annum over 14 years is equivalent to $6.2 billion. This is comparable to the following measures announced in the 2008-09 Budget:

- the increase in alcohol tax (estimated to have a gain to revenue of $3.1 billion over 5 years); plus
- the removal of the current exemption of condensate from crude oil excise (estimated to have a gain to revenue of $2.5 billion over 5 years); plus
- the increase in the luxury tax rate (estimated to have a gain to revenue of $555 million over 4 years).

Similarly, additional revenues of $897 million and $1 447 million per annum over 14 years are equivalent to $12.6 billion and $20.2 billion, respectively.

To extract the additional revenue, Telstra's FTTN network would have to attract higher charges. Indeed, the modelling results show that if Telstra achieves its targeted return on the FTTN network, consumers would pay on average about 15.4 per cent more for the service than if the network was provided by an alternative supplier. The price differential is the same under the three assumed asset costs. These higher prices would reduce the benefits from the use of the new FTTN technology and translate into hardship for the economy and the community.

Notably, while higher prices would have adverse effects on the economy, the extra income that Telstra's shareholders would obtain from the FTTN network would offset some of these losses.

To assess the net effect of adopting Telstra's FTTN model on the Australian economy and the wider community, it is necessary to use an economywide framework. This economywide analysis is provided in the next chapter.

18 Fleur Leyden 2007, "Telstra price pledge", Herald Sun, June 08; Garry Barker 2007, "Telstra warns of G9 broadband price slug", The Age, June 08; and nowwearetalking 2007, "Why the G9 scheme won't work; Prices", http://www.nowwearetalking.com.au/ features/why-the-g9-scheme-wont-work-prices, Accessed 19 May 2008.

3 Community impacts

This chapter provides estimates of the net impacts of adopting Telstra's FTTN model. In particular it shows what the differences in capital returns between alternative models for the provision of the FTTN network mean for the Australian economy and the wider community.

To undertake this analysis we have used ORANI, a Computable General Equilibrium (CGE) model of the Australian economy.

The Scenario

The scenario simulated in ORANI provides estimates of the average annual impact to the Australian economy of the differences in capital returns between alternative models for the provision of the FTTN network.

The ORANI model

ORANI divides the Australian economy into about 100 sectors. The model captures the inputs into each industry (labour, capital and goods and services from other industries), and hence it captures the importance of telecommunications services for other industries and consumers. For this analysis, we have used the *Fiscal Horridge* version of the ORANI model. This version of the model differs from the standard ORANI in that it has a richer specification of taxes, allows the income earned by primary factors to go back to households and allows wealth accumulation.

ORANI has the following important features that make it well suited for the analysis in this project:

- It estimates the effects of industry changes on key economic variables such as GDP, exports, imports, CPI, exchange rate, and disposable wages.
- It provides valid measures of changes in living standards (wellbeing) based on household consumption.

Further, the use of a CGE model has the following key advantages over the simpler approach of using an input-output model:

- it takes into account that the structure of the economy responds to changes in relative prices and hence is not rigid; and

- it also takes into account the important long-run, national constraints on the economy - labour supply, budget balance, external balance and private savings.

This leads to results that are more conservative, but more credible, compared with input-output modelling. Interestingly, input-output models are often criticised for providing overly-optimistic economic impact assessments of industries in a way that CGE models are not.

The ORANI model is a comparative static CGE model. This means that it provides a snapshot at a future point in time of the economywide effects of some current change (called a 'shock' to the model). It does not provide the time path of the economy in response to a shock. Rather, it can be run with two different closures, that is, choices of which model variables adjust in response to the shock. There is a short-run closure (corresponding to an adjustment period of a couple of years) and a long-run closure (corresponding to adjustments that may take up to ten years).

The alternative scenarios modelled for this report are based on the standard long-run closure of the ORANI model. The long-run closure shows the long-term effects of industry changes, after the economy has fully responded. This is fitting because industry changes should be judged against their lasting effects on the economy, not just their effects in the first one or two years. Hence, ORANI provides a snapshot of the economy, at a particular point in time, showing the difference in the economy attributable to the change under consideration after the economy has fully adjusted to the change. That is, after the temporary impacts of the construction stimulus and other factors have passed. This will bring into clear relief the key effect of the difference in capital costs between Telstra's FTTN model, and that of alternative suppliers.

More information about the ORANI model can be found in Appendix B.

Modelling Results

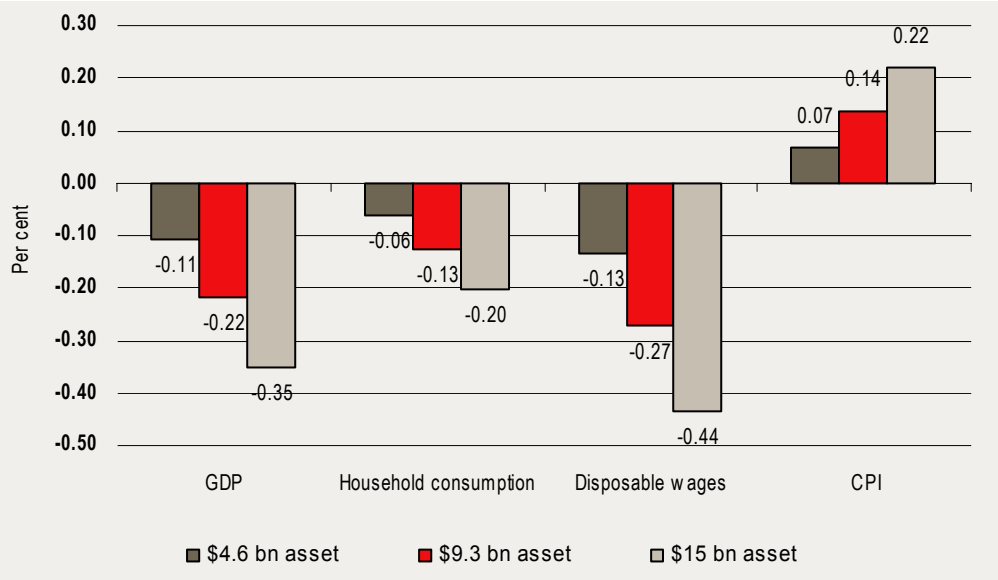
These results should be interpreted as permanent changes to the economy that will prevail after the construction of the FTTN network. Chart 3.1 shows the average annual impacts of the difference in capital returns that Telstra makes.

The first key effect that we observe from Chart 3.1 is that Telstra's high return on the FTTN network would translate into higher prices for the wider community. This is because, as mentioned before, to be able to achieve its targeted return on equity of 18 per cent Telstra would have to extract additional revenue from the network users through higher prices. Higher prices in industries will be passed on to consumers in the form of higher prices for consumer goods and services, leading to a general increase in the level of prices (CPI). Indeed, Chart 3.1 shows that Telstra's return on the FTTN network on an indicative asset base of $4.6 billion would translate into an increase in the CPI of about 0.07 per cent, when compared with an alternative

supplier's return. If the network cost were $9.3 billion or $15 billion, Telstra's return on the FTTN network would translate into an increase in the CPI of about 0.14 per cent and 0.22 per cent, respectively.

Further, Chart 3.1 shows that if Telstra achieves its FTTN network return, higher prices for households and businesses would lead to a long-term decrease in GDP of 0.11 per cent if the network cost is $4.6 billion (equivalent to about $1.12 billion of annual GDP in 2006-07).[19] The effects on the economy would be larger if the costs of the network are higher. Indeed, as shown in Chart 3.1, if the network cost were $9.3 billion or $15 billion, Telstra's return on the FTTN network would translate into a decrease in GDP of about 0.22 per cent and 0.35 per cent, respectively. These costs, include the direct impacts of Telstra's model (i.e. the increase in the cost of the service and the extra income of Telstra's shareholders), as well as the indirect effects that higher costs have on industries upstream and downstream the telecommunications sector.

3.1 **Modelling results (per cent deviations)**



Data source: ORANI model simulation.

Another way in which the community would pay for Telstra's high return on the FTTN network is via wages. Indeed, the modelling results show that compared with an alternative supplier model and depending on the cost of the network, disposable wages under Telstra's model would be lower by up to 0.44 per cent. That is, the decrease in wages caused by the increase in prices dominates the effect of the additional income received by Telstra's shareholders, resulting in a net decrease in disposable wages.

19 This estimate is based on nominal GDP figures for the 2006-07 year by the ABS (Catalogue No. 5206.0).

In addition to these effects, the capital return differentials cause further feedback effects on the economy (such as adjustments in the balance of payments and the exchange rate). Nonetheless, these effects are not enough to offset the negative impacts of the shock, and the economy still contracts.

As mentioned above, higher prices would reduce real GDP. In turn, this would mean a lower real national income than would be the case if an alternative supplier provided the service. The decrease in real income would result in both decreased consumption and investment. Consumers would adjust to the decreased real income by spending less on goods and services, while industries would cut back on expenditures in other areas. Overall, Chart 3.1 shows that Telstra's higher return on a $4.6 billion FTTN network would reduce real private consumption by 0.06 per cent, when compared with an alternative supplier's return. This is equivalent to subtracting about $363 million to real private consumption in the financial year 2006-07.[20]

Similarly, Telstra's return on a $9.3 billion and a $15 billion FTTN network would reduce real private consumption by 0.13 and 0.2 per cent respectively, when compared with an alternative supplier's return. This would be equivalent to a net real loss of $733 million and $1.18 billion in consumption in the financial year 2006-07, respectively. [21]

Notably, consumption is the best single measure of the impact of Telstra's FTTN network return on the community. This is because consumption is a better indicator of wellbeing than GDP. Chapter 2 identified a direct loss of about $443 million on an indicative asset base of $4.6 billion due to higher prices. It also identified that there is an offsetting effect due to an increase in Telstra's shareholders income. The economywide analysis shows that, after considering the direct and indirect effects, Telstra's FTTN network return would cause a net real loss of $363 million in consumption. Over the 14 years that Telstra would have locked in its price for its FTTN network services, this loss in consumption would translate into a net present value of about $3.4 billion.[22] This is roughly three quarters of Telstra's $4.6 billion expenditure on the FTTN network.

20 This estimate is based on nominal household consumption figures for the 2006-07 year by the ABS.

21 This estimate is based on nominal household consumption figures for the 2006-07 year by the ABS (Catalogue No. 5206.0).

22 Calculated using an interest rate of 6.04 per cent (Commonwealth 10 year bond as at March 2008).

4 Sensitivity analysis

To provide a sensitivity analysis of our results, this chapter presents WACC estimates of other assets broadly comparable to the FTTN network. In particular, this chapter provides WACC estimates of the following assets.

- **Competitive Telstra WACC –** This estimate represents the overall return that Telstra would earn on its FTTN network if it did not have market power (i.e. if it was not able to extract monopoly prices).
- **Bowman Telstra CAN WACC –** This is an estimate by Bowman (2007), who was commissioned by Telstra to estimate the WACC for all the services provided by its Customer Access Network (CAN) as of 1 July 2007. [23]This estimate is used to illustrate the return that Telstra receives for an asset broadly similar to the FTTN network.
- **Revised Bowman Telstra CAN WACC**- This estimate updates and revises Bowman's WACC to incorporate more recent financial data available in the public domain.

Additionally, this chapter provides estimates of the economywide effects of the difference between Telstra's FTTN network WACC and the WACC of the assets described above.

Sensitivity analysis of WACC estimates

The WACC of the assets described above is calculated using the same approach described in Chapter 2. For consistency reasons and to make the estimates comparables, for all the WACC calculations we have assumed that the asset being analysed is financed in the same proportion by debt and equity. For the Bowman Telstra CAN WACC estimate we have followed the same approach and used the same parameters as Bowman (2007), but we have replaced the author's debt and equity ratios for our assumption (i.e. 50 per cent debt and 50 per cent equity).

Table 4.1 presents the WACC estimates for the different assets described above. As can be seen from this table, there is a significant variation in the WACC range for the broadly comparable network assets. Still, the asset with the highest expected return to equity owners and debt holders (i.e. WACC) is Telstra's FTTN network. Even the

23 Importantly, Bowman's work is not necessarily used as an example of best practice, but as an illustration of WACC estimates and approaches endorsed or used by Telstra.

WACC calculated by Bowman for Telstra's CAN (11.68 per cent) is more than 1 per cent lower than the return that Telstra expects from the FTTN network. When this WACC is revised and recalculated using more recent financial information, the result is a WACC of 7.76 per cent. This means that the capital returns that Telstra requires from the FTTN network are more than 5 per cent higher than the return that it gets from the CAN. This difference is even more pronounced when Telstra's target capital return is compared with the overall return that Telstra would earn on the FTTN network if it was not able to extract monopoly prices (i.e. 7.58 per cent).

4.1 WACC estimates for different assets (per cent)

	WACC	*Expected return on equity*	*Expected return on debt*
Telstra's FTTN network	12.95	18.00	7.89
Alternative supplier	10.68	13.47	7.89
Competitive Telstra	7.58	7.28	7.89
Bowman Telstra CAN	11.68	16.02	7.35
Revised Bowman Telstra CAN	7.76	7.62	7.89

Source: CIE calculations and Bowman (2007).

To understand what the above estimates mean in terms of revenue extracted from customers, Table 4.2 presents estimates of the revenue that needs to be obtained from each of the assets being compared with achieve the targeted return to capital.

4.2 Revenue and price estimates

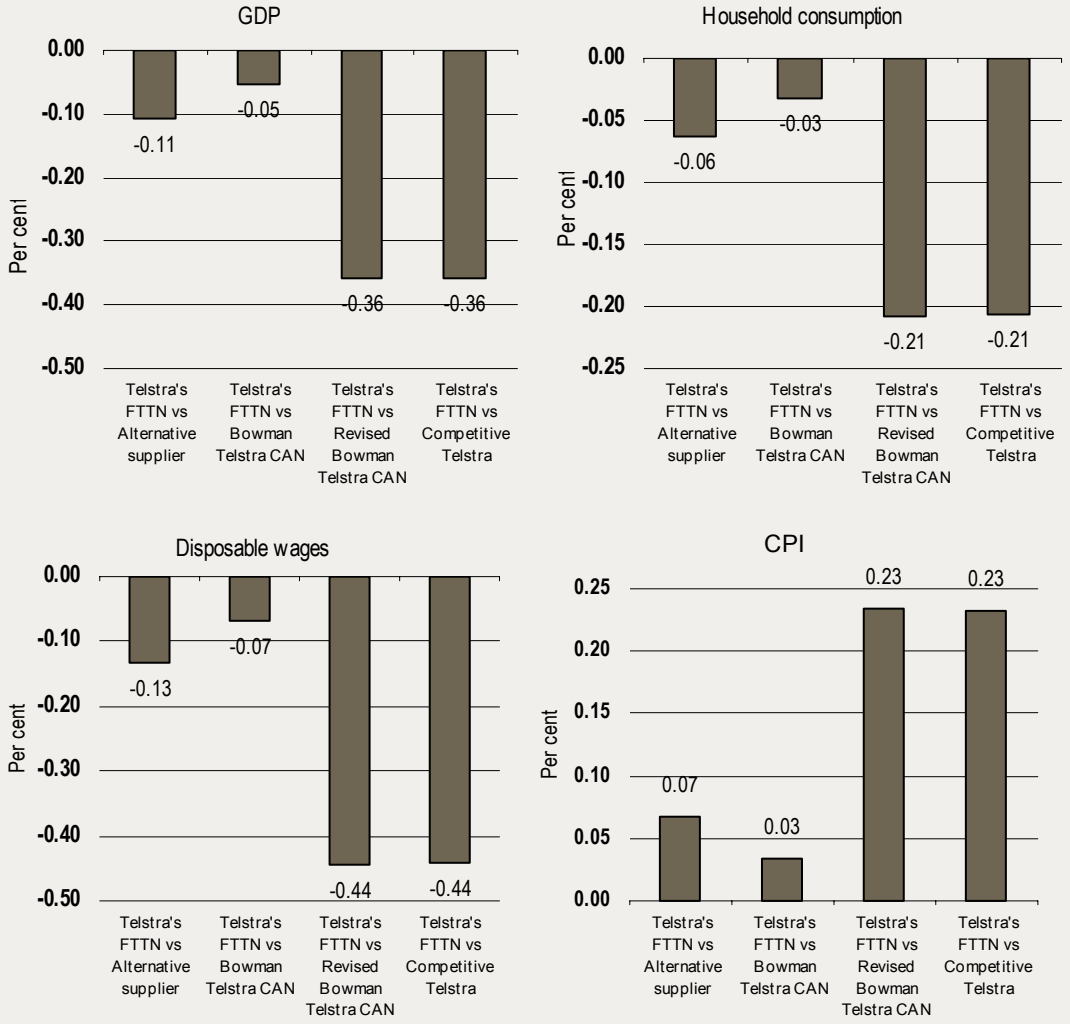
	Average annual revenue needed to achieve return to capital ($m)
Telstra's FTTN network	$3 321
Alternative supplier	$2 878
Competitive Telstra	$1 844
Bowman Telstra CAN	$3 096
Revised Bowman Telstra CAN	$1 923

Source: CIE estimates.

Sensitivity Analysis of Community Impacts

The series of charts in Chart 4.3 show the average annual impacts of the different capital return differentials on key economic variables in the Australian economy. Specifically, the chart shows the average annual cost of Telstra's FTTN network return to real GDP, private consumption, disposable wages, and the CPI, when compared with the capital returns from broadly similar assets.

4.3 **Sensitivity analysis (per cent deviations)**



Data source: ORANI model simulation

While the economywide impacts presented in Chart 4.3 vary in magnitude depending on the options being compared, the key point that these charts demonstrate is that the margin between Telstra's required return and the returns for broadly similar assets, translates into consistent significant negative impacts for the Australian economy and the wider community. In particular, it translates into:

- lower output (GDP);
- higher prices (CPI);
- lower living standards (household consumption); and
- lower wages.

In summary, the modelling results show that allowing Telstra to obtain better than normal market returns on its FTTN network would introduce an economic distortion

that would lead to a general contraction of the Australian economy and hardship for the community.

5 *Limitations of the study*

The findings presented in preceding chapters provide valuable evidence on the economic impacts of alternative models for the provision of a national FTTN network. Nonetheless, as with any modelling exercise, there are a few substantive risks in this analysis. The key limitations of this study are the following:

- There is a degree of imprecision about some of the key quantitative factors provided in this report. For instance, Telstra's precise cost of capital for a large specific project is a valuable commercial secret. Hence, the estimates presented in this report may not be precise. Further, the alternative network's cost is also uncertain as it depends on factors where strategic choices have to be made. As such, the estimation error in the WACC calculations presented in this report may be significant. However, obtaining precision is not the main objective of this analysis. The main point is to show that it is likely that a significant margin exists between Telstra's required return from the FTTN network and the return that an alternative supplier would require for the same asset, and this margin will translate into hardship for the economy and the community.
- The economic impacts of Telstra's FTTN network return have been estimated by comparing the difference between Telstra's WACC and the WACC of an alternative supplier. This comparison translates in more conservative estimates of the costs of Telstra's FTTN network, than if we compare it to the WACC of comparable assets which are significantly lower.
- Important specific attributes of alternative network proposals (such as the speed of the network, ability to carry voice calls, pace of roll out, etc.) have not been modelled in this report. However, as mentioned before, obtaining precision is not the main objective of this analysis. The whole point is to show that differences in the cost of capital will have large implications for our wellbeing, measured in ways that the ordinary person in the street understands.
- The estimates of the economic impacts under the indicative asset cost of $9.3 billion and $15 billion have additional limitations. For instance, there is currently no guidance from the Government about the return it will require on its $4.7 billion investment. In the absence of this information, we have assumed that the Government would take the same equity risk as the private sector investor and hence would receive the same equity returns. It is unlikely that the Government would require the same return from the FTTN network as the private sector. As such, the estimates of the losses caused by Telstra's return from these assets are likely to be at the high end.

- A CGE economic framework is the most complete and transparent method of testing the impacts of different regulatory scenarios on Australia's welfare. The downside of being comprehensive is that the model is very complex, much as the real world is. However, the comprehensive results provided by a CGE model are a reasonable trade off for the loss of transparency for what happens inside the model. If fact, the model 'black box' is not really that opaque – CGE models are widely used by Government and many other analysts, and the ORANI model is the most widely documented model in Australia and probably the world. [24]
- As outlined in previous sections, the ORANI model allows for flexibility in the economy as well as long-term labour market and trade balance constraints. In the long-run, the labour market and external balance are assumed to attain equilibrium, so that economic shocks, such as changes in the rate of return to the telecommunications sector, have no lasting effect on total employment and trade balance. These assumptions in the model would, thus, lead to a conservative assessment of the cost of return differentials to the national economy. Further, for this analysis, it has been assumed that the increase in returns to Telstra's shareholders (i.e. the extra income that the owners Telstra's shares obtain from the FTTN network) stay solely in Australia. This assumption again leads to conservative estimates.
- Finally, it is important to note that the findings in this report are subject to unavoidable statistical variation. While all care has been taken to ensure that the statistical variation is kept to a minimum, care should be taken whenever using this information. This report only takes into account information available to The CIE up to the date of this report and so its findings may be affected by new information.

24 The standard ORANI model is described in Dixon et al. (1997) and Dee (1989). A non-technical description is provided by the IAC (1987).

6 Conclusion

This report finds that the difference between the expected capital returns from Telstra's FTTN network and that of an alternative supplier has a significant negative impact on the Australian economy. In particular, this report provides evidence that the 'return north of 18 per cent' required by Telstra on the FTTN network would introduce a distortion in the economy that would not be offset by the extra income received by Telstra's shareholders. This distortion would lead to a general contraction of the Australian economy.

Notably, although the WACC estimates in this analysis are only broad indicators of the likely costs of capital under different models for the provision of the FTTN network, the evidence presented in this report indicates that there is a significant margin and that this margin will translate into hardship for the economy and the community.

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A Estimating the WACC

WACC estimates in Australia are confused by the varying practices and assumptions made by the different Regulatory authorities. There are several different forms of the WACC formula, and results can be expressed in pre-tax or after-tax form, and in both real and nominal values. For this report, The CIE estimates the WACC following a similar approach to that used by for independent price regulators such as the Independent Pricing and Regulatory Tribunal (IPART) of NSW or the ACCC. This approach, referred to as "vanilla" WACC, uses the Capital Asset Pricing Model (CAPM) and data about the capital market to estimate the nominal post tax WACC.

The standard formula that we use in this report to calculate the WACC is the following:

$$WACC = Re\ (E/V) + Rd\ (D/V)$$

Where:

Re = cost of equity capital;

Rd = cost of debt capital;

E = market value of equity;

D = market value of debt; and

V = market value of the firm (E+D).

The formula used to derive the cost of equity using CAPM is the following:

$$Re = Rf + Be\ (Rm - Rf)$$

Where:

Re= expected return on equity;

Rf= risk free rate;

Be= equity beta factor;

Rm= expected market return; and

Rm – Rf= the market risk premium.

The formula used to de-lever the equity betas is the following:

$$Ba = Be * E/V$$

Where:

Ba = beta for the asset;

Be = equity beta; and

E/V= proportion of equity financing.

The formula used to calculate the revenue needed to achieve the target return on capital of each asset is the following:

$$\text{Required Revenue} = V*(Ra - g) / Ra*(1-Ta)$$

Where:

V = current market value of asset (equity + debt);

Ra = return on investment expected by all investors (debt and equity), or the WACC;

g = future growth rate in revenue that investors expect; and

Ta = Proportion of earnings before interest that is paid as company tax.

Further details about the WACC approach can be found in NSW's Treasury Guidelines for Financial Approval (NWS Treasury, 2007).

Table A.1 shows the various parameter values that were used to calculate the WACC and revenue estimates presented in this report.

A.1 WACC and revenue parameters

	Comment	*Telstra's FTTN network*	*Alternative supplier*	*Competitive Telstra*	*Bowman Telstra CAN*	*Revised Bowman Telstra CAN*
Risk free rate	Commonwealth 10 year bond as at March 2008 (except in Bowman Telstra CAN)	6.04%	6.04%	6.04%	5.96% (from Bowman, 2007)	6.04%
Market risk premium	From Bowman (2007)	7%	7%	7%	7%	7%

(Continued on next page)

A.1 WACC and revenue parameters (cont)

	Comment	*Telstra's FTTN network*	*Alternative supplier*	*Competitive Telstra*	*Bowman Telstra CAN*	*Revised Bowman Telstra CAN*
Debt proportion	Assumption	50%	50%	50%	50%	50%
Debt risk premium	Cost of debt that a company has to pay above the nominal risk free rate.	1.7%	1.7%	1.7%	1.24% (from Bowman 2007)	1.7%
	Assumption					
Debt issuance cost	Cost incurred to issue debt, annualised. From Bowman (2007)	0.15%	0.15%	0.15%	0.15%	0.15%
Cost of debt capital	Sum of the risk free rate, debt risk premium and debt issuance cost	7.89%	7.89%	7.89%	7.35%	7.89%
Tax rate	Statutory rate	30%	30%	30%	30%	30%
Franking credits	Assumption	0.0	0.0	0.0	0.0	0.0
Asset beta	Beta of a debt-free company. Also called unlevered beta.	0.06	0.5	0.06	0.75 (from Bowman 2007)	0.22
Equity beta [(a)]	Reflects both the operating and financial risks of a company. Also called levered beta.	0.18[(b)]	1.0	0.18[(b)]	0.96 (from Bowman 2007)	0.18[(b)]
Equity insurance cost	Cost incurred to issue equity, annualised. From Bowman (2007)	0.4%	0.4%	0.4%	0.4%	0.4%
Cost of equity capital	CAPM plus the equity issuance cost	18% (Telstra's required return on the FTTN network)	13.47%	7.28%	13.09% (from Bowman 2007)	7.62%
WACC	Nominal, post tax vanilla	12.95%	10.68%	7.58%	11.68%	7.76%

Source: The CIE and Bowman (2007).

(a) The equity beta estimates are highly sensitive to the measurement interval (daily, weekly, or monthly) and the estimation period. This results in a wide range of estimates for equity betas. For instance, Yahoo Finance (accessed on 30 April 2008) provided an estimate of Telstra's equity beta of 0.5. In contrast, Bloomberg provides the following estimates of Telstra's equity beta: 0.576 from May 2006 to May 2008 (daily), and 0.698 from May 2006 to May 2008 (weekly). Given that the FTTN network is a long term asset, for this report we have used an estimate of Telstra's equity beta calculated over a period of four years. This estimate is provided by the Risk Measurement Service of the Centre for Research in Finance (Australian School of Business, University of New South Wales).

(b) OLS Beta for the period December 2003 to December 2007, monthly observations. Source: Centre for Research in Finance, Australian School of Business, University of New South Wales.

B The ORANI Model

ORANI is a comparative static Computable General Equilibrium (CGE) model of the Australian economy. This report uses the Fiscal Horridge version of the ORANI model. This version of the model differs from the standard ORANI in that it has a richer specification of taxes, allows the income earned by primary factors to go back to households and allows wealth accumulation.

ORANI can be run with two different closures, that is, choices of which model variables adjust in response to the shock. There is a short-run closure (corresponding to an adjustment period of a couple of years) and a long-run closure (corresponding to adjustments that may take up to ten years). This report uses the long-run closure of the model. Some of the assumptions underlying the long-term closure of ORANI are as follows:

- Profit maximisation: the representative business in each industry chooses inputs and outputs to maximise profit subject to prices, and a production function exhibiting constant returns to scale. This involves choosing inputs of land, capital, labour and intermediate goods and services, and outputs for the local and export markets.
- Labour market equilibrium: in the long-run the labour market is assumed to attain equilibrium, so that an economic shock has no lasting effect on total employment. This assumption is implemented by fixing the level of total employment.
- External trade balance: in the long-run, external balance is assumed to be achieved, so that trade shocks have no lasting effect on the trade balance. This assumption is implemented by setting the trade balance equal to the cost of servicing payments on foreign-owned capital — the real exchange rate needed to achieve this outcome is determined by the model
- Budget balance: in the long-run, fiscal policy must be sustainable. Specifically, in ORANI the government budget is assumed to be in balance. It is necessary to designate a swing fiscal policy instrument to achieve that outcome. Generally, the rate of tax on labour income is used as the swing fiscal policy instrument.
- Private savings: in the long-run the level of private sector savings and associated asset accumulation must be accounted for. Further, as mentioned before, Fiscal Horridge version of the ORANI allows for accumulation of assets.

The ORANI model distinguishes about 100 sectors and describes:

- the demands by industries, households and exports for domestically produced and imported goods and primary factors (that is labour, capital and land);
- the supplies of commodities (for example crops and livestock, manufactures and services) by domestic producers;
- the balance between the demand and supply of commodities and primary factors; and
- macroeconomic outcomes (gross domestic product, balance of trade, etc.), which are the sum of their industry and commodity components.

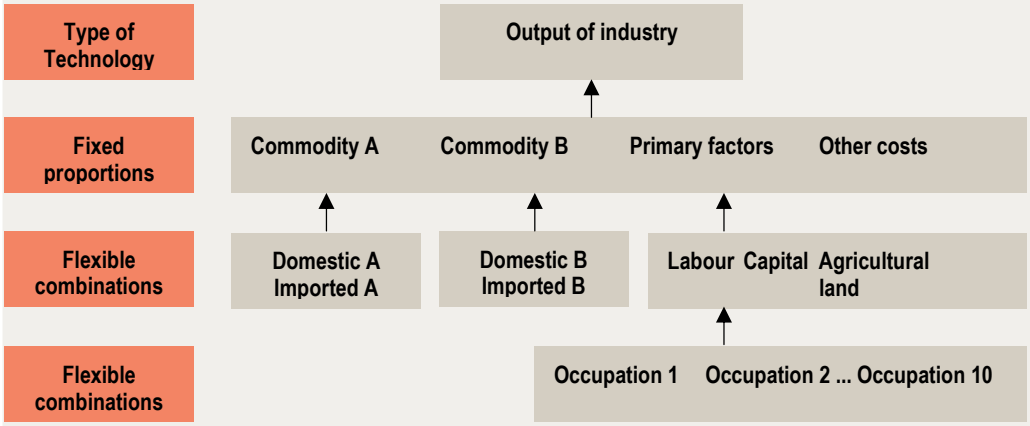
ORANI captures the linkages within an economy by modelling the economic behaviour and interactions of producers, consumers and governments. The in-built behaviour in the model is that consumers are assumed to maximise utility and producers to maximise profits. Markets are assumed to be competitive and there are constant returns to scale. The economy is composed of consumers and producers. Producers can purchase their inputs from any other industry in Australia as well as imports from overseas. Producers supply goods and services to consumers who have a choice about whether they purchase imports based on price and tastes. Producers also supply the export market. Producers have a degree of flexibility in how they combine inputs, using that combination which minimises costs. Technological change is exogenous.

The model reflects a combination of two key components: its database and the theoretical structure embodied in the system of equations of the model. A schematic representation of the production technology used in the ORANI framework is shown below.

Of key importance in this model is that workers can make choices between the occupations they engage in according to the wage they can earn in a particular industry. This labour can be used in varying proportions with capital and land. Also, producers can make flexible choices between the uses of imported or domestic varieties of each commodity from industries, such as motor vehicles. However, each commodity and primary factors in total are used in fixed proportions as given by the input/output structure.

Further information about the standard ORANI model is provided in Dixon et al. (1997) and Dee (1989) Chart B.1. A non-technical description is provided by the IAC (1987).

B.1 **Orani model**



Source: IAC 1987