Vertical Integration, Vertical Separation and the Efficiency Consequences of the G9 SAU

Attachment A – Technical Report

Serge MORESI

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TABLE OF CONTENTS

1. TECHNICAL REPORT ........................................................................................................ 1
   1.1. INVESTMENTS IN FTTN AND COPPER PAIRS ASSETS .............................................. 1
   1.2. COMPETITION IN DOWNSTREAM RETAIL MARKETS ............................................... 1

2. BRIEF DESCRIPTION OF THE TWO PROPOSALS .......................................................... 3
   2.1. THE G9 FTTN PROPOSAL .......................................................................................... 3
   2.2. THE TELSTRA FTTN PROPOSAL .............................................................................. 4

3. COMPARATIVE ECONOMIC ANALYSIS OF THE TWO PROPOSALS WITH
   RESPECT TO THE INCENTIVES TO INVEST IN FTTN AND COPPER PAIRS ASSETS ....... 5
   3.1. ASSUMPTIONS AND NOTATION ............................................................................... 5
   3.2. INCENTIVES TO INVEST UNDER THE TELSTRA FTTN PROPOSAL ......................... 6
   3.3. INCENTIVES TO INVEST UNDER THE G9 FTTN PROPOSAL ..................................... 7
   3.4. COMPARISON OF THE TWO PROPOSALS ............................................................... 8

4. COMPARATIVE ECONOMIC ANALYSIS OF THE TWO PROPOSALS WITH
   RESPECT TO THE INCENTIVES TO COMPETE IN THE RETAIL MARKET ..................... 8
   4.1. INCENTIVES TO COORDINATE IN RETAIL MARKETS ............................................ 9
   4.1.1. General concerns raised by the G9 Proposal ........................................................... 9
   4.1.2. Assumptions and notation ..................................................................................... 10
   4.1.3. Incentives to coordinate under the Telstra FTTN Proposal .................................... 11
   4.1.4. Incentives to coordinate under the G9 FTTN Proposal .......................................... 11
   4.1.5. Comparison of the two proposals ........................................................................ 12
   4.2. INCENTIVES TO COMPETE IN RETAIL MARKETS ................................................ 12
   4.3. THE COURNOT MODEL ............................................................................................ 13
   4.3.1. The Bertrand model .............................................................................................. 15

5. CONCLUDING REMARKS ................................................................................................. 17
   5.1. THE G9 FTTN PROPOSAL ......................................................................................... 17
   5.2. REMARKS ON NERA’S CLAIMS .............................................................................. 17

APPENDIX A – CV .................................................................................................................. 21
1. TECHNICAL REPORT

This Report provides a formal economic analysis of several important issues discussed in the main text of the report. In particular, it shows that the Telstra FTTN Proposal (the “T Proposal”) is superior to the G9 FTTN Proposal (the “G9 Proposal”) in two key dimensions:

1.1. INVESTMENTS IN FTTN AND COPPER PAIRS ASSETS

- Under the T Proposal, Telstra will have stronger incentives to undertake value-enhancing investments (such as maintaining and upgrading the quality of FTTN services, developing new FTTN products, etc.) than FANOC would have under the G9 Proposal.

- Similarly, under the T Proposal, Telstra will have stronger incentives to invest in its Copper Pairs assets than Telstra would have under the G9 Proposal.

1.2. COMPETITION IN DOWNSTREAM RETAIL MARKETS

- Under the T Proposal, the risk that Access Seekers might have the ability and the incentive to engage in coordinated interaction – and thus refrain from competing against each other in the retail market – will be lower than it would be under the G9 Proposal.

- In addition, in the event that Access Seekers will not attempt to engage in coordinated interaction, and instead will compete against one another, the T Proposal will lead to more intense retail competition than the G9 Proposal.

2 The intuition for these results is straightforward. Under the T Proposal, Telstra will have relatively strong incentives to invest in FTTN assets and increase the quality of FTTN services because that will generate additional FTTN revenues, additional Copper Pairs revenues, and additional downstream revenues from Telstra’s retail operations. In contrast, under the G9 proposal, FANOC will have much weaker incentives to undertake those investments because FANOC will capture only the additional FTTN revenues generated by the investments and will not account for the additional value created at other levels of the vertical chain. Importantly, this finding also casts considerable doubts on FANOC’s incentives to go beyond “phase 1” of the G9 Proposal.

3 With respect to competition in retail markets, the T proposal is superior because vertical integration tends to reduce retail prices by eliminating certain “double markups” and, at the same time, tends to reduce the risk of coordination among retailers by making output reductions more costly. Under the T Proposal, Telstra will be fully vertically integrated into the FTTN assets, while under the G9 Proposal the G9 consortium would be only partially vertically integrated into the FTTN assets, since the G9 consortium would have only a partial financial interest in FANOC.
These important results will be derived formally in the following sections using first principles of economics. That is, we will develop highly stylized economic models that capture the key differences between the two proposals, and show the validity of the above results within the theoretical framework of these models.

By necessity, the economic models analyzed in the following sections will abstract from many complexities that characterize both this industry and the two proposals. While the models will make several simplifying assumptions, these assumptions are neutral and do not favour one proposal over the other. For example, we will ignore the fact that the T Proposal has many technological advantages over the G9 Proposal, and instead we will assume counterfactually that the two proposals are technologically equivalent. This and other similar neutral assumptions will allow us to establish the superiority of the T proposal on purely economic grounds and in the most transparent way.

This Report therefore provides rigorous economic support to several key arguments developed in the main text of the report. Section II briefly describes the two proposals and their differences with respect to the allocation of financial interests and corporate control rights. Sections III and IV perform a comparative economic analysis of the two proposals by focusing on how each proposal might affect the incentives to invest in the infrastructure (i.e., FTTN and Copper Pairs), and the extent to which each proposal might promote (or lessen) competition in retail markets. Section V briefly summarizes the results and explains why certain claims made by NERA are misleading and inaccurate.

In considering these issues, this Report, as noted above, compares the incentives for efficiency in two situations:

- The proposed G9 SAU, with its vertically separated ownership and management structures; and
- A potential Telstra FTTN, in which those ownership and management would be vested in an integrated entity.

While the relevant issue in the assessment of the SAU is the comparison between the world with that SAU and the status quo (as there is no Telstra FTTN SAU before the Commission), the comparison presented here is relevant for two reasons.

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1 This is explained in more detail in the main text of the report.

2 Since we focus on the incentives to invest in the infrastructure and the incentives to compete in the retail market on a levelled playing field, we also make the neutral assumption there would be no foreclosure or discrimination under either proposal. That is, under the T Proposal, Telstra will not foreclose or discriminate against its retail competitors and, similarly, under the G9 Proposal, FANOC would not foreclose or discriminate against Telstra and other (non-G9) Access Seekers. The issue of potential vertical foreclosure is discussed in more detail in the main text of the report. See also the concluding remarks in Section V of this appendix.

First, from an analytical perspective, the issue of the efficiency or otherwise of structural separation is not affected by the technological content of the situations being compared. Second, an important feature of the status quo is that it preserves the option of Telstra developing and implementing an FTTN on a vertically integrated basis, an option which the G9 SAU would effectively extinguish (without itself providing end-users with guaranteed access to any services that are not available in the status quo).

2. BRIEF DESCRIPTION OF THE TWO PROPOSALS

2.1. THE G9 FTTN PROPOSAL

The G9 Proposal would involve the creation of FANOC, an entity that would be the sole owner of the FTTN assets. A large share of FANOC’s stock would be in the hands of large “outside investors” who would not have any other financial interests in this industry. The remaining share of FANOC’s stock would be held by the G9 consortium and would be allocated among the G9 members. The G9 Proposal thus would lead to a fragmented ownership structure of the FTTN assets (i.e., FANOC) and to financial interests in FANOC being divided up among many different owners.

As discussed in more detail in the main text of the report, such divided financial interests in FANOC would likely create a variety of potential problems. In particular, there likely would be potential conflicts of interest between the outside investors and the G9 consortium, because the outside investors would have no financial interests in retail operations. For example, the G9 consortium could have an incentive to oppose a profitable investment by FANOC simply because the investment would be more valuable to non-G9 firms than to G9 members. In addition, there likely would be potential conflicts of interest among the G9 firms, for instance if smaller firms tend to focus on residential customers while larger firms tend to focus on business customers.

The G9 Proposal also would involve the creation of the BAS Manager, an entity that would be in charge of FTTN operations. All Access Seekers (including non-G9 firms) would be able to participate in the BAS Manager. We understand that certain business decisions in a number of different areas would have to be agreed upon by both FANOC and the BAS Manager. This suggests that the corporate control structure of the FTTN assets would be even more fragmented than their ownership structure, because control rights on FANOC/BAS would be divided up among an even larger number of different entities. In addition, the G9 Proposal would use the ACCC or an Independent Reviewer to arbitrate disputes. This further dilutes the allocation of control rights.
As discussed in more detail in the main text of the report, such divided control rights over FANOC/BAS would likely create disputes and gridlock. In particular, we understand that large G9 firms would be subject to ownership caps with respect to their financial interests in FANOC. This would tend to give smaller G9 firms both a disproportionately large financial interest in FANOC and a disproportionately large amount of control over FANOC/BAS’s decisions. Given that small retailers tend to be more risk-averse than larger firms, they likely would have the incentive and the ability to oppose or slow down certain large investments in the FTTN infrastructure.  

Finally, under the G9 Proposal, FANOC would have to obtain access to Telstra’s Copper Pairs. This means that the ACCC would have to regulate two different sets of prices, i.e., the prices of FTTN services and the prices of Copper Pairs services. This clearly would add to the regulatory burden on the ACCC, as well as increasing the risk of regulatory error.

2.2. The Telstra FTTN Proposal

The T Proposal will avoid or alleviate the potential problems associated with the G9 Proposal that we have described in the previous section.

There will be no divided financial interests in the FTTN assets and control rights over FTTN operations and decisions will be concentrated in the hands of Telstra and the ACCC. This should eliminate the potential for gridlock and the need for arbitration.

In addition, under the T Proposal, FTTN assets and Copper Pairs assets will be vertically integrated. This will ensure more efficient joint investments in the FTTN/Copper Pairs infrastructure, as shown in the next section. This also will reduce the required amount of regulatory oversight as the ACCC will be able to regulate a smaller set of prices (i.e., only the prices of FTTN services).

In the next two sections, we will carry out a formal economic analysis of the two FTTN proposals and evaluate the likely impact of each proposal on competitive incentives. Section III will analyze the incentives to invest in the infrastructure, focusing in particular on FTTN and Copper Pairs assets. Section IV will analyze the incentives to compete in the retail market.

The general conclusion that emerges from these economic analyses is that the T Proposal is superior to the G9 Proposal because it will lead to more investment and greater competition.

Since each G9 member would have some ability to oppose (or threaten to oppose) certain decisions that would benefit other G9 members, the G9 Proposal could provide the G9 consortium with a “punishment mechanism” that would facilitate coordinated interaction in retail markets. See Section IV of this appendix.

NERA suggests that under the T Proposal, Telstra will have the ability and the incentive to engage in discrimination and sabotage against its downstream competitors. We believe this type of allegation is unfounded. See the discussion in the main text of our report and the remarks in Section V of this appendix.
3. COMPARATIVE ECONOMIC ANALYSIS OF THE TWO PROPOSALS WITH RESPECT TO THE INCENTIVES TO INVEST IN FTTN AND COPPER PAIRS ASSETS

21 We begin with an evaluation of the extent to which the owner of the FTTN assets (i.e., Telstra under the T Proposal or FANOC under the G9 Proposal) will have an incentive to undertake value-enhancing investments, such as maintaining and upgrading the quality of FTTN services, as well as developing and offering new FTTN products to Access Seekers.

22 In this analysis, we also evaluate the likely impact of each proposal on Telstra’s incentives to invest in its Copper Pairs assets.

3.1. ASSUMPTIONS AND NOTATION

23 We make several simplifying, neutral assumptions:

- Under either proposal, there will be a single FTTN service offered.

- The FTTN service that will be offered under the T Proposal will have the same quality, initially, as the FTTN service that would be offered under the G9 Proposal. This assumption – which is obviously highly favourable to the G9 proposal (as that proposal would involve a lower service quality than is currently available, much less than will be available under the T Proposal) – ensures that any finding that one or the other proposal would provide stronger incentives to maintain or upgrade the quality of service could not be attributed to a difference in initial quality levels.

- The FTTN service offered under the T Proposal will have the same cost per unit of service (denoted by $C_{FTTN}$) and the same regulated price per unit of service (denoted by $P_{FTTN}$) as the FTTN service offered under the G9 Proposal. This assumption ensures that any finding that one or the other proposal would provide stronger incentives to invest could not be attributed to a difference in FTTN profit margins. Again, this assumption is artificially favourable to the G9 Proposal, as (according to the G9) the allowed rate of return for FANOC would be materially lower than that which (the G9 claim) Telstra will seek.

- Under either proposal, the volume of FTTN traffic will depend on the quality of the FTTN service and the quality of Telstra’s Copper pairs. Maintaining and upgrading the quality of these assets will require periodic investments.

- The quality of the FTTN service will depend on the level of FTTN investments (denoted by $I_{FTTN}$). These investments will be undertaken either by Telstra under the T Proposal or by FANOC under the G9 Proposal.
• The quality of Telstra’s Copper Pairs will depend on the level of Copper Pairs investments (denoted by $I_{CP}$). These investments will be undertaken by Telstra under either proposal.

• Therefore, the volume of FTTN traffic (denoted by $V_{FTTN}$) will depend on both the investments in FTTN and the investments in Copper Pairs (among other factors). We express this relationship as follows:

$$V_{FTTN} = V(I_{FTTN}, I_{CP})$$  \hspace{1cm} (1)

• We make the standard assumption that the function $V$ is strictly increasing and strictly concave.

• Telstra incurs a per-unit cost (denoted by $C_{CP}$) of providing Copper Pairs services. Under the T Proposal, FANOC would pay a regulated per-unit price (denoted by $P_{CP}$) for using Telstra’s Copper Pairs services.

• Telstra will participate in the retail market while FANOC will not. Telstra’s retail margin and market share are denoted by $M_T$ and $S_T$, respectively.

24 We will first analyze investment incentives under the T Proposal and then under the G9 Proposal.

3.2. INCENTIVES TO INVEST UNDER THE TELSTRA FTTN PROPOSAL

25 Under the T Proposal, Telstra will choose both how much to invest in FTTN assets and how much to invest in Copper Pairs assets. Telstra will make these investment decisions with the objective to maximize the total profits from its upstream (FTTN and Copper Pairs) and downstream (retail market) operations.

26 Formally, Telstra will set the investment levels $I_{FTTN}$ and $I_{CP}$ in order to maximize:

$$(P_{FTTN} - C_{FTTN} - C_{CP} + S_T M_T) V_{FTTN} - (1 + r)(I_{FTTN} + I_{CP})$$  \hspace{1cm} (2)

The term $(P_{FTTN} - C_{FTTN} - C_{CP} + S_T M_T) V_{FTTN}$ represents Telstra’s total profits gross of investment costs. The latter are equal to $(1 + r)(I_{FTTN} + I_{CP})$, where $r$ denotes the cost of capital.

27 The first-order conditions of profit-maximization are:

$$(P_{FTTN} - C_{FTTN} - C_{CP} + S_T M_T) \frac{\partial V}{\partial I_{FTTN}} = 1 + r$$  \hspace{1cm} (3)
These standard conditions say that the return on the last dollar invested (in both FTTN and Copper Pairs) is equal to the cost of capital.

### 3.3. Incentives to Invest Under the G9 FTTN Proposal

Under the G9 Proposal, FANOC would choose how much to invest in FTTN assets, while Telstra would choose how much to invest in Copper Pairs assets. FANOC would invest in FTTN with the objective of maximizing FTTN profits, while Telstra would invest in Copper Pairs with the objective to maximize the total profits from its Copper Pairs and retail operations.

FANOC will set the FTTN investment level, \( I_{\text{FTTN}} \), in order to maximize:

\[
(P_{\text{FTTN}} - C_{\text{FTTN}} - P_{\text{CP}}) V_{\text{FTTN}} - (1 + r) I_{\text{FTTN}}
\]  

The term \((P_{\text{FTTN}} - C_{\text{FTTN}} - P_{\text{CP}}) V_{\text{FTTN}}\) represents FANOC’s profits gross of investment costs. The latter are equal to \((1 + r) I_{\text{FTTN}}\), where the cost of capital, \(r\), is assumed to be same as under the T Proposal.

Telstra will set the Copper Pairs investment level, \( I_{\text{CP}} \), in order to maximize:

\[
(P_{\text{CP}} - C_{\text{CP}} + S_t M_T) V_{\text{FTTN}} - (1 + r) I_{\text{CP}}
\]

The term \((P_{\text{CP}} - C_{\text{CP}} + S_t M_T) V_{\text{FTTN}}\) represents Telstra’s total profits (from its Copper Pairs and retail operations) gross of investment costs, and the latter are equal to \((1 + r) I_{\text{CP}}\).

The first-order conditions of profit-maximization are:

\[
(P_{\text{FTTN}} - C_{\text{FTTN}} - P_{\text{CP}}) \frac{\partial V}{\partial I_{\text{FTTN}}} = 1 + r
\]

\[
(P_{\text{CP}} - C_{\text{CP}} + S_t M_T) \frac{\partial V}{\partial I_{\text{CP}}} = 1 + r
\]

Again, these conditions say that the return on the last dollar invested is equal to the cost of capital.
3.4. **Comparison of the Two Proposals**

The comparison of Equations (3)-(4) and Equations (7)-(8) leads to the following result.\(^6\)

**Proposition 1.** The T Proposal will create stronger incentives to undertake value-enhancing investments in FTTN and Copper Pairs assets than the G9 Proposal would (*ceteris paribus*).

**Proof.** Under the G9 Proposal, the investment returns per unit of incremental traffic – i.e., \(P_{\text{FTTN}} - C_{\text{FTTN}} - P_{\text{CP}}\) for FTTN and \(P_{\text{CP}} - C_{\text{CP}} + S_T M_T\) for Copper Pairs – are positive and add up to \(P_{\text{FTTN}} - C_{\text{FTTN}} - C_{\text{CP}} + S_T M_T\), which is the investment return per unit of incremental traffic, for both FTTN and Copper Pairs, under the T Proposal. Therefore, the investment returns per unit of incremental traffic are higher under the T Proposal than under the G9 Proposal. Since the incremental traffic per dollar invested – i.e., \(\partial V / \partial I_{\text{FTTN}}\) for FTTN and \(\partial V / \partial I_{\text{CP}}\) for Copper Pairs – exhibits diminishing returns, it follows that Equations (3)-(4) imply higher investment levels than Equations (7)-(8).

Intuitively, the T Proposal is superior to the G9 Proposal because, when Telstra will evaluate the return on a given value-enhancing investment in FTTN assets, Telstra will account for the additional FTTN revenues as well as the additional Copper Pairs and Telstra retail revenues that the increased traffic will generate. In contrast, under the G9 Proposal, FANOC will account only for the additional FTTN revenues. As a result, under the T Proposal, Telstra will have a greater incentive to undertake the investment that FANOC would under the G9 Proposal.

Similarly, under the T Proposal, Telstra will have a greater incentive to invest in its Copper Pairs assets than Telstra would under the G9 Proposal. This is because Telstra will account for incremental FTTN revenues that its investment in Copper Pairs will generate (in addition to the incremental Copper Pairs and retail revenues), while it would not have an incentive to account for these incremental FTTN revenues under the G9 Proposal.

4. **Comparative Economic Analysis of the Two Proposals with Respect to the Incentives to Compete in the Retail Market**

The two proposals are also different with respect to their likely impact on downstream competition in retail markets. In particular, the T Proposal will lead to more vigorous retail competition – and thus to higher output and lower retail prices – than the G9 Proposal.

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\(^6\) For simplicity, we assume that \(\partial^2 V / \partial I_{\text{FTTN}} \partial I_{\text{CP}} = 0\). The superiority of the T Proposal is even greater if – as is likely – the investments exhibit complementarities, i.e., if \(\partial^2 V / \partial I_{\text{FTTN}} \partial I_{\text{CP}} > 0\).
42 On the one hand, if retailers attempt to coordinate on key competitive variables (such as price or quality of service), then the T Proposal is superior to the G9 Proposal because the risk that such tacit or explicit coordination would succeed will be substantially lower than it would be under the G9 Proposal. On the other hand, in the event that retailers will not attempt to engage in coordinated interaction, then the T Proposal is again superior because it will lead to more intense retail competition than the G9 Proposal would.

43 The following sections derive these results formally.

4.1. INCENTIVES TO COORDINATE IN RETAIL MARKETS

4.1.1. General concerns raised by the G9 Proposal

44 The G9 Proposal would create a risk of coordinated interaction in the retail market for several reasons. First, the members of the G9 consortium are significant players in the retail market. They are close competitors and their profits would increase significantly if they could reach an agreement to coordinate and reduce the intensity of retail competition.

45 Second, under the G9 Proposal, the G9 firms would have frequent opportunities to meet in the context of FANOC’s operations. We understand that a number of Directors and Executives of FANOC would be appointed by the G9 consortium. This would create a risk that FANOC could be used as a forum for information exchanges and make it easier for the G9 firms to reach an agreement on the terms of the coordination. Information exchange and coordination could also occur through the BAS Manager.

46 Third, the G9 Proposal would create a risk that FANOC could be used as a mechanism for side-payments among the G9 firms (e.g., through reallocations of financial interests and control rights, adoption of policies and decisions that favour particular members, etc.). This also could facilitate a coordination agreement among the G9 firms. So too would the voting mechanism for the BAS Manager, which creates scope for “log-rolling” as an indirect form of benefit exchange.

47 Fourth, the G9 Proposal could make it easier for the G9 firms to detect cheating from the coordination agreement. In particular, if the coordination agreement involves a slowdown in product innovation, it would be difficult for a would-be cheater to develop a new product secretly, because that would require the collaboration of FANOC at a relatively early stage of the product development phase, and thus the other members of the cartel would learn about the “secret” plan very early on. Additionally, the approval of the BAS Manager appears to be required for new product development to occur, with the underlying principle seeming to be that developments should be available to all. This would plainly reduce the incentive to cheat – that is, to compete by product innovation – in the first place, and thus would facilitate coordination.
Fifth, the G9 Proposal would create a risk that FANOC could be used to implement and enforce a punishment scheme in the event that a member of the cartel decided to cheat and, for example, cut retail prices below the level agreed upon. Through FANOC, the other members could retaliate against the cheater by vetoing certain decisions and policies of FANOC that would have been favourable to the cheater. Alternatively, they could adopt decisions and policies that are costly to the cheater.

For all these reasons, we believe that the G9 Proposal will create a risk of coordinated interaction in retail markets.

The following subsections present a comparative analysis of the retailers’ incentives to engage in coordinated interaction under each of the two proposals. This comparative analysis complements the above general discussion and provides additional support to our conclusion that the G9 Proposal would be more likely to facilitate coordination in retail markets than the T Proposal.

4.1.2. Assumptions and notation

We make the following simplifying assumptions:

- The retail price and the quantity sold to consumers will depend on the amount of retail competition. If retailers will compete against each other, the retail price will be equal to $P$ and the retail volume will be equal to $V$. If instead retailers will engage in coordinated interaction, the retail price will increase to $P + \Delta$ and the retail volume will decrease to $V - L$.

- The volume of FTTN traffic will depend on the amount of retail competition. It will be equal to either $V$ under retail competition or $V - L$ under retail coordination.

- The price of FTTN service, $P_{FTTN}$, will be regulated and hence fixed over the relevant time period, regardless of the amount of retail competition.

- Under the G9 Proposal, the access price to Telstra’s Copper Pairs, $P_{CP}$, will also be regulated and hence fixed over the relevant time period, regardless of the amount of retail competition.

- The per-unit incremental costs of FTTN and Copper Pairs services are constant and denoted by $C_{FTTN}$ and $C_{CP}$, respectively.

7 The analysis applies mainly to coordinated interaction on retail prices. However, the analysis of coordinated interaction on non-price strategies is similar. For example, coordinated interaction on the quality of retail services leads to higher quality-adjusted retail prices and lower sales volumes.
Telstra and the G9 firms will be present in the retail market. The retail margin and market share of Telstra are denoted by $M_T$ and $S_T$. The retail margin and market share of a G9 firm are denoted by $M_G$ and $S_G$. We make the neutral assumption that retailers have equal margins, i.e., $M_T = M_G = M$.

### 4.1.3. Incentives to coordinate under the Telstra FTTN Proposal

Under the T Proposal, coordination in the retail market would increase the profits of a G9 firm by the following amount:

$$ S_G (V - L) \Delta - S_G LM $$

(9)

Intuitively, coordination would reduce the industry's total output by $L$ units, and thus the firm's output by $S_G L$ units. This would correspond to a loss of $S_G LM$ dollars, hence the second term in Equation (9). The first term, $S_G (V - L) \Delta$, is the gain that the firm would obtain from selling the remain volume at a higher price.

For Telstra, coordination in the retail market would increase profits by the following amount:

$$ S_T (V - L) \Delta - (S_T M + P_{FTTN} - C_{FTTN} - C_{CP}) L $$

(10)

All else equal, the output reduction caused by coordination would be more costly to Telstra than to any other retailer, because Telstra would lose FTTN and Copper Pairs revenues (in addition to losing retail revenues). In fact, Equation (10) likely would be negative, in which case Telstra would have an incentive to make sure that any attempt to coordinate would fail.

### 4.1.4. Incentives to coordinate under the G9 FTTN Proposal

Under the G9 Proposal, coordination in the retail market would increase Telstra's profits by the following amount:

$$ S_T (V - L) \Delta - (S_T M + P_{CP} - C_{CP}) L $$

(11)

The difference with respect to the T Proposal (see Equation (10)) is that Telstra would not lose any FTTN revenues as a result of the output reduction. Thus, under the G9 Proposal, Telstra would have a stronger incentive to engage in coordinated interaction (or a weaker incentive to disrupt any attempt to coordinate by other firms) than under the T Proposal.

For a G9 firm, coordination in the retail market would increase profits by the following amount:
\[ S_G (V - L) \Delta - (S_G M + f(P_{FTTN} - C_{FTTN} - P_{CP})) L \]  

59 The difference with respect to the T Proposal (see Equation (9)) is that each member of the G9 consortium would lose a fraction \( f \) of the FTTN revenues, where the fraction \( f \) is the member’s financial interest in FANOC.

60 As each G9 member would have a small share in FANOC, the incentive not to collude would be weak. Moreover, the BAS Manager structure itself would facilitate collusion relative to decision-making processes under the T proposal.

### 4.1.5. Comparison of the two proposals

61 The above analysis strongly suggests that the risk of coordinated interaction in retail markets will be smaller under the T Proposal than it would be under the G9 Proposal. This follows from two observations:

62 First, under the T Proposal, the firm with the weaker incentive to engage in coordinated interaction (i.e., the “maverick”) is Telstra. This is because a vertically integrated firm like Telstra has more to gain by keeping retail prices low and maintaining high volumes of traffic at all levels of the vertical chain. Moreover, we note that the G9 claim that Telstra will have significantly higher wholesale prices and margins on its sales to third parties than would be allowed to FANOC. If this is correct, it means that Telstra has even less incentive to encourage or accommodate coordinated interaction in retail markets, as that coordinated interaction would deprive it of some part of those high upstream margins.

63 Second, under the G9 Proposal, the “maverick” would be either Telstra or one of the G9 firms, depending on whether \( (P_{CP} - C_{CP}) / S_G \) would be greater or smaller than \( f(P_{FTTN} - C_{FTTN} - P_{CP}) / S_G \), respectively. In any event, that firm would be less vertically integrated than Telstra will be under the T Proposal. Therefore, that firm would have a weaker incentive to behave as a “maverick” and the risk of coordinated interaction would be greater than under the T Proposal. The proposed BAS Manager structure would make this risk all the greater.

### 4.2. INCENTIVES TO COMPETE IN RETAIL MARKETS

64 Despite the higher risk of coordinated interaction under the G9 proposal, it is possible that the firms will compete most of the time. In this section, we show that this competition will be more intense under the T Proposal than under the G9 Proposal.
We consider both the standard Cournot model and the standard Bertrand model. In the Cournot model, retailers sell a homogeneous product (or “commodity”) and compete by choosing the capacity of their operations. In the Bertrand model, retailers sell differentiated products (or “brands”) and compete by setting the price of their brands. We analyze each model in turn.\(^8\)

### 4.3. The Cournot Model

There are \(N\) retailers indexed by \(i = 1, \ldots, N\). Each retailer \(i\) chooses its capacity or quantity, \(q_i\), to maximize its own profit given by:

\[
\Pi_i = p_i q_i - C_i(q_i) - W q_i + \beta_i (W - C)Q
\]

Equation (13)

Here, \(Q = \sum q_j\) denotes the total quantity supplied by all the retailers, \(p_i = P(Q)\) denotes the retail market price, \(C_i(q_i)\) denotes the total cost incurred by retailer \(i\) (excluding the cost of FTTN service), \(W\) denotes the regulated price of FTTN service, and \(C\) denotes the per-unit cost of FTTN service.

In Equation (13), the parameter of interest is \(\beta_i\) and denotes retailer \(i\)’s financial interest in FTTN. Intuitively, when retailer \(i\) has a larger financial interest in FTTN, retailer \(i\) has a stronger incentive to expand capacity and increase output \((Q)\) because retailer \(i\) captures a larger fraction of the FTTN margin \((W - C)\).\(^9\) This efficiency benefit from vertical integration is commonly referred to as the (partial) “elimination of double marginalization”.\(^10\)

The above Cournot model can be solved explicitly if one assumes that market demand and the firms’ total costs are linear functions. In this case, the solution (i.e., Nash equilibrium) clearly demonstrates that the T Proposal is superior to the G9 Proposal because it will lead to a greater amount of vertical integration. We next present this “linear case” as an illustrative example.

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\(^8\) Each of these two models is highly stylized and captures only certain aspects of the real world. The fact that both models produce similar results suggests that our conclusions are robust to different model specifications.

\(^9\) For simplicity, we are ignoring the fact that Telstra also has a financial interest in Copper Pairs. Accounting for this fact would strengthen the results.

**Example.** Assume that market demand and the firms’ cost functions are linear, i.e.,

\[ P(Q) = a - bQ \quad \text{and} \quad C_i(q_i) = c_i q_i, \]

where \( a \), \( b \) and \( c_i \) are positive values. Then, the firms’ first-order conditions of profit maximization are:

\[ a - bQ - c_i - bq_i - W + \beta_i(W - C) = 0 \quad (\text{for } i = 1, ..., N) \quad (14) \]

Adding up these equations and solving for total industry output, one finds:

\[ Q = \frac{N(a - W) - \sum_i c_i + (W - C) \sum_i \beta_i}{(N + 1)b} \quad (15) \]

Equation (15) shows that total industry output \( Q \) is higher when the retailers’ total financial interest in the FTTN assets \( \sum_i \beta_i \) is higher. Intuitively, the higher the retailers’ financial interest in the upstream assets (i.e., the higher the degree of vertical integration) the smaller the amount of double marginalization, and thus the smaller the retail price and the larger the industry output.

In the context of the above linear Cournot model, the T Proposal is superior to the G9 Proposal because the amount of vertical integration will be greater – i.e., \( \sum_i \beta_i = 1 \) under the T Proposal while only \( \sum_i \beta_i < 1 \) under the G9 Proposal due to the presence of outside investors. As a result, retail competition will be more intense under the T Proposal that it would be under the G9 Proposal.

In the more general Cournot model described earlier, it is not possible to derive an explicit solution. However, the following result will allow us to reach the same conclusion as in the previous illustrative example, that is, the T Proposal will lead to more competitive retail market than the G9 Proposal would.

**Proposition 2.** In the Cournot model, if all the retailers have access to FTTN service at the same regulated price, then the average price-cost markup of the final good is the lowest when all the financial interest in FTTN is concentrated in the hands of the retailer(s) with the largest market share.\(^{11}\)

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Proof. From the first-order conditions of profit-maximization, one obtains the following expression for the share-weighted average price-cost markup in the vertical production chain:

$$\sum_i \beta_i = \frac{HHI}{E} + \frac{W-C}{P} \left(1 - \sum_i s_i \beta_i\right)$$  \hspace{1cm} (16)

Here, $c_i = \frac{\partial C_i}{\partial q_i}$ is the marginal cost faced by retailer $i$ (excluding the cost of FTTN service), $s_i = q_i / Q$ is the volume-share of retailer $i$, $HHI = \sum_i s_i^2$ is the standard HHI, and $E = -P/(QP')$ is the price elasticity of demand. The result follows from the fact that $\sum_i s_i \beta_i$ is the largest possible if and only if $\beta_i = 0$ whenever $s_i < \max\{s_1, \ldots, s_N\}$. ■

Intuitively, Proposition 2 says the following: For the price-cost markup to be as low as possible, the retailer with the largest market share should be given the strongest incentive to eliminate double marginalization, and thus should be given the largest financial interest in the upstream assets. This is obviously at odds with what is proposed in the G9 structure.

4.3.1. The Bertrand model

As above, there are $N$ retailers indexed by $i = 1, \ldots, N$. Each retailer $i$ chooses price, $p_i$, to maximize its own profit given by:

$$\Pi_i = p_i q_i - C_i(q_i) - Wq_i + \beta_i(W-C)Q$$  \hspace{1cm} (17)

Here, $q_i = D_i(p_1, \ldots, p_N)$ denotes the demand for the product of retailer $i$. All the other variables (i.e., $Q$, $W$, $C$, $C_i(q)$ and $\beta_i$) are defined as in the Cournot model).\(^\text{12}\)

Proposition 3. In the Bertrand model, if all the retailers have access to FTTN service at the same regulated price, then the average price-cost markup of the final good is the lowest when all the financial interest in FTTN is concentrated in the hands of the retailer(s) with the largest value of $(1 - \delta_i)s_i / p_i$.

\(^\text{12}\) Again, we are ignoring the fact that Telstra also has a financial interest in Copper Pairs. Accounting for this fact would strengthen the results.
82 Proof. From the first-order conditions, one obtains:

\[
\sum_{i=1}^{N} \frac{P_i - c_i - C}{p_i} = \sum_{i=1}^{N} \frac{S_i}{\eta_i} + (W - C) \sum_{i=1}^{N} [1 - (1 - \delta_i) \beta_i] \frac{S_i}{p_i}
\]  

(18)

83 Here, \( \eta_i = -(\partial D_i / \partial p_i) (p_i / D_i) \) and \( \delta_i = -\sum_{j \neq i} (\partial D_j / \partial p_i) / (\partial D_i / \partial p_i) \) denote the own-price elasticity of the demand and the aggregate diversion ratio of product \( i \).

The result follows from the fact that \( \sum_{i=1}^{N} [1 - (1 - \delta_i) \beta_i] s_i / p_i \) is minimized if and only if \( \beta_i = 0 \) whenever \( (1 - \delta_i) s_i / p_i < \max \{ (1 - \delta_j) s_j / p_j \} \).

84 In general, the firm with the largest value of \( (1 - \delta_i) s_i / p_i \) is not necessarily the firm with the largest market share \( s_i \). However, since retail prices \( (p_i) \) and aggregate diversion ratios \( (\delta_i) \) are fairly similar across the retailers, the firm with the largest market share is very likely to be the firm with the largest value of \( (1 - \delta_i) s_i / p_i \). If so, then Proposition 3 is basically the same as Proposition 2, and thus also implies that the Telstra Proposal is superior to the G9 Proposal.

85 Note that, even if Telstra is not the firm with the largest value of \( (1 - \delta_i) s_i / p_i \), the Telstra Proposal is nevertheless likely to be superior to the G9 Proposal. To see this, let firm 1 be Telstra and let firm 2 be Optus (the largest of the G9 firms). In addition, suppose – for the sake of the argument only – that Optus is the firm with the highest value of \( (1 - \delta_i) s_i / p_i \). Furthermore, assume – still for the sake of the argument – that all the other G9 members would transfer their financial interest in FANOC to Optus. Thus, in this hypothetical scenario, Optus would have the largest possible financial interest in FANOC, say, \( \beta_2 = 50\% \) while the remaining financial interest would be in the hands of outside investors.

86 From above, under the T Proposal, we would have:

\[
\sum_{i=1}^{N} [1 - (1 - \delta_i) \beta_i] \frac{S_i}{p_i} = - (1 - \delta_i) \frac{S_i}{p_i} \beta_i + \sum_{i=1}^{N} \frac{S_i}{p_i}
\]  

(19)

where \( \beta_i = 100\% \). In contrast, under the G9 Proposal we would have:

\[
\sum_{i=1}^{N} [1 - (1 - \delta_i) \beta_i] \frac{S_i}{p_i} = - (1 - \delta_i) \frac{S_i}{p_i} \beta_2 + \sum_{i=1}^{N} \frac{S_i}{p_i}
\]  

(20)
where $\beta_2 = 50\%$. In addition, Telstra’s retail share ($s_1$) is much larger than the retail share of Optus ($s_2$). Therefore, Equation (19) is very likely to be smaller than Equation (20), even if Telstra has a higher retail price and a higher aggregate diversion ratio than Optus. It follows that the average price-cost markup (Equation (18)) very likely also will be smaller under the T Proposal than it would under the G9 Proposal.

5. CONCLUDING REMARKS

We conclude with a brief summary of the above results and a few remarks on certain claims made by NERA.

5.1. THE G9 FTTN PROPOSAL

In this Report, we have shown that the T Proposal is superior to the G9 Proposal in two important dimensions. First, under the T Proposal, Telstra will have a stronger incentive and a greater ability to undertake value-enhancing investments in FTTN assets, relative to the incentive and ability that FANOC would have under the G9 Proposal. The FTTN network therefore will be more valuable and more utilized under the T Proposal than it would with the G9 Proposal. In addition, under the T Proposal, Telstra will have a stronger incentive to invest in its Copper Pairs than Telstra would have with the G9 Proposal.

Second, under the T Proposal, the risk of coordinated interaction in retail markets will be lower than under the G9 Proposal, and thus the likelihood that Access Seekers will actively compete in the marketplace will be higher. In addition, this retail competition will be more intense under the T Proposal than it would be under the G9 Proposal.

5.2. REMARKS ON NERA’S CLAIMS

We now comment on several claims made by NERA.\(^{13}\)

Claim 1 “FANOC will have no incentive to engage in price or non-price sabotage against particular Access Seekers (as no single Access Seeker, or group of Access Seekers, will control FANOC)” (p. 19)

\(^{13}\) In this appendix, we do not respond to all the claims that NERA has made explicitly or implicitly. We respond only to those claims that are related to the issues analyzed in this appendix. The main text of the report discusses these and other claims made by NERA.
This claim by NERA is misleading for several reasons. First, “control” is not an all-or-nothing concept. Control usually is shared among shareholders and key decision makers through a careful allocation of “control rights”. Therefore, different shareholders or decision makers may have different degrees of control and different abilities to influence a firm’s decisions. Even if it was true that the G9 consortium would not have total control over FANOC/BAS, this would not imply that the G9 consortium would have no incentive (or no ability) to discriminate against non-G9 competitors.

Second, the members of the G9 consortium and other Access Seekers (including Telstra) would not be similarly situated with respect to both their financial interests in FANOC and their control rights over the operations of FANOC/BAS. In particular, the G9 consortium would have a financial interest in FANOC while other Access Seekers would not. Therefore, the G9 consortium likely would be in a better position to exercise control or influence over the decisions of FANOC/BAS, relative to the position of other Access Seekers. This could give the G9 consortium the incentive and the ability to discriminate against non-G9 competitors.

Third, the argument that discrimination would not happen because FANOC’s Directors would be constrained by fiduciary duty obligations is not convincing. In effect, this is an argument the ACCC has not accepted in other contexts (for example, in the evaluation of vertical mergers, such as AGL-Loy Yang and Toll-Patrick).

Fourth, the implicit allegation in NERA’s claim is that Telstra will engage in price and non-price discrimination against its downstream competitors. However, this allegation is unfounded because (i) there are a number of effective regulatory safeguards that would prevent Telstra from engaging in discrimination or sabotage (assuming that Telstra would have this kind of incentives), and (ii) it is rather speculative to implicitly assume that Telstra would have the incentive to discriminate without having properly analyzed this issue. That is, NERA did not analyze the potential benefits that Telstra would obtain, nor did NERA analyze the potential costs that Telstra would incur, if Telstra decided to engage in discrimination or sabotage.\(^\text{14}\)

For these reasons, the Commission cannot reasonably be satisfied as to the merits of NERA’s claims.

Claim 2 “FANOC will have to engage in efficient pricing at the wholesale level rather than at the retail level (as FANOC will not have any retail operations). This ensures that all Access Seekers face the same true economic wholesale prices” (p. 19)

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\(^{14}\) The issue of whether a vertically integrated firm would have an incentive to engage in discrimination or sabotage against downstream competitors can be analyzed using a “vertical arithmetic” technique. See, for example, D. Sibley and M. Doane, ‘Raising the Costs of Unintegrated Rivals’, in Measuring Market Power, D. Slottje (ed.), Elsevier, 2002, which applies this type of analysis to the proposed merger of Barnes & Noble and Ingram Book Company in the U.S. The technique was also recently applied in the context of the European Commission investigation of Saint-Gobain/British Plaster Board, and in the context of the ACCC investigation of Toll/Patrick.
This claim by NERA seems wrong. “Efficient pricing” at the wholesale level will involve charging a markup over the marginal cost of production in order to recoup the large fixed-cost investments that will be necessary to build, maintain and operate the FTTN network. This is true both under TSLRIC and under a "global price cap" as proposed by FANOC. However, these “efficient prices” are not the “true economic wholesale prices”. The true economic prices are the marginal costs of production. Therefore, it is unlikely that wholesale prices will provide Access Seekers with the correct signals about the true costs of wholesale services.

This is not to say that it would be necessarily desirable to ensure that Access Seekers would face the true economic wholesale prices. Indeed, as noted by NERA themselves, efficient Ramsey prices depend on both the marginal costs of production and the elasticities of demand. Our point is simply that, in this context, efficient prices are generally not the true economic prices.

In addition, it is not correct that “all Access Seekers face the same [...] wholesale prices”. The members of the G9 consortium would be partially vertically integrated because they would have financial interests in FANOC. Therefore, each G9 firm would behave as if wholesale prices were lower, and more so the larger its financial interest in FANOC. In contrast, there would be no such partial elimination of double marginalization for non-G9 members (as they would not have any financial interest in FANOC).

We therefore also disagree with this second claim by NERA.

Claim 3 “All Access Seekers are able to have input into FANOC’s budget priorities through the Speedreach vehicle – rather than those priorities being determined primarily to suit the vertically integrated arm of the infrastructure owner. This includes ensuring that the build of the HFTP makes the maximum use of the existing infrastructure owned by all Access Seekers.” (p. 20)

We also disagree with this claim by NERA for three main reasons. First, as we explained in Section II, we have serious doubts about the effectiveness of decision making under the proposed FANOC/BAS structure. Second, the G9 Proposal would not ensure “maximum use of the existing infrastructure owned by all Access Seekers” since it would reduce Telstra’s incentive to maintain and upgrade its Copper Pairs assets (see Section III). Finally, as we explained in Section IV, the G9 Proposal would lead to reduced retail competition and thus reduced output relative to the T Proposal. This clearly would not ensure maximum use of the existing infrastructure.
APPENDIX A – CV

SERGE MORESI
Vice President

Ph.D. Economics
Massachusetts Institute of Technology

M.A. Economics
Université de Lausanne (Switzerland)

B.A. Economics
Université de Lausanne (Switzerland)

Dr. Moresi is the Director of Competition Modelling. He is an expert in the theory of industrial organization and specializes in applied game theory, including auction and bargaining models. In addition to developing theoretical models and simulation programs dealing with strategic pricing behavior, Dr. Moresi has provided clients with expert economic consulting services in many antitrust and merger cases. He has contributed to several staff filings before federal agencies in a variety of industries. Before joining CRA, Dr. Moresi taught economics at Georgetown University. His research interests include several topics in the economics of information and uncertainty.

PRIOR PROFESSIONAL EXPERIENCE

• Electricity industry restructuring projects (simulation models, auction design).
• Antitrust cases: price fixing (gasoline), discrimination (gas pipeline).

1991–1998 Assistant Professor, Georgetown University, Washington, D.C.
• Ph.D. courses: general equilibrium theory, game theory, contract theory.
• B.A. courses: microeconomic theory, applied game theory.

1995 Invited Professor, Université de Lausanne, Switzerland
• Graduate lectures on the microstructure of financial markets.

1994 Visiting Researcher, University of Maryland, College Park, MD
• Research on the competitiveness of decentralized markets.

1994 Economic Consultant, World Bank, Washington, D.C.
• Analysis of the international competitiveness of Morocco.

1989  
Economic Consultant, State of Ticino, Switzerland  
• Econometric analysis of the housing rental market.

SELECTED CONSULTING EXPERIENCE

In the context of the Harland/Clarke merger: Development of theoretical economic models of tournament competition (e.g., “beauty contests” and “bidding contests”) with risky investments in product quality.

In the context of the Sprint/Nextel merger: Development of a merger simulation model with capacity constraints and potential coordinated effects.

In the context of DOT’s NPRM proposals regarding computer reservation system regulations: Development of theoretical and simulation models of vertical foreclosure in bargaining markets.

In the context of the proposed GE/Honeywell merger: Development of theoretical economic models of mixed bundling strategies.

In the context of the proposed Heinz/Beechnut merger: Development of a merger simulation model that accounts for (a) potential price effects at both the manufacturing level and the retailing level, and (b) potential efficiencies in the form of cost savings and quality increases.

In the context of the CBS/Viacom merger: Development of a theoretical economic model of the entry investment process in the programming industry.

SELECTED CONSULTING REPORTS


**Publications**


**Unpublished Articles**


WORK IN PROGRESS

“A Model of Sequential Bargaining.” With Steven C. Salop and Yianis Sarafidis.


“Bilateral Bargaining: A Pedagogical Note.” With Steven C. Salop.

REFEREE REPORTS