

Memo

To: ANZ
From: Dr Philip Williams, Dr James Key and Dinesh Kumareswaran
Date: 7 December 2023
Subject: **Review of Link Economics report on behalf of Kiwibank**



Executive summary

Introduction

1. On 5 October 2023, the Commerce Commission (**the Commission**) published cross-submissions in relation to its Preliminary Issues paper on the Commission's market study into personal banking services. One of those cross-submissions was by Kiwibank, which attached a report by Link Economics (**the Link Economics report**).¹
2. The Link Economics report makes two substantive claims based on econometric modelling that Link Economics has performed:
 - a. First, Link Economics finds that none of the large four banks (ANZ, ASB, BNZ and Westpac) responded to Kiwibank's sustained reduction in its published home loan variable rate beginning in mid-June 2020.² Link Economics concludes from this finding that "Kiwibank does not place a significant competitive constraint on the large Australian-owned banks", and that "the market structure for the supply for home lending is best described as an oligopoly of 4 large banks, that faces little constraint from the competitive fringe."³
 - b. Second, Link Economics finds that if two banks charge the same one-year interest rate, but one bank is big and the other is small, then the big bank will win approximately double the number of new purchase home loans.⁴ Link Economics concludes from this that smaller

¹ Link Economics, *The nature of competition for personal banking services*, 5 October 2023.

² Link Economics report, para. 21.

³ Link Economics report, para. 29.

⁴ Link Economics report, para. 41.



banks such as Kiwibank have limited ability to gain new or refinanced home loans through offering favourable interest rates.

3. Frontier Economics has been asked by ANZ to review these findings in the Link Economics report, and the analysis supporting those findings. This memo presents our conclusions.
4. ANZ has provided us with Link Economics' econometric modelling data and output files. We have analysed those files to ensure that we have understood properly Link Economics' modelling approach and to confirm that we are able to replicate Link Economics' key modelling results.

Our key conclusions

The empirical evidence suggests that ANZ's variable rate has historically responded to changes in Kiwibank's headline variable rates

5. Link Economics has made two serious errors when investigating empirically how responsive the four larger banks are to changes in Kiwibank's headline variable rates:
 - a. The Link Economics report examines the relationship between the variable rate of each of the four larger banks and the Kiwibank variable rate, while including as a single variable the average of the variable rates of the other three larger banks. By averaging the rates of the other three larger banks, the Link Economics analysis hides the impact of each of the other three larger banks. The correct approach is to estimate the impact of *each* of the other three larger banks on the bank in question.
 - b. The analysis in the Link Economics report is performed on published headline variable rates collected from interest.co.nz. These headline variable rates do not accurately reflect the effective rates offered by the four larger banks, because they do not account for the discounts to the published headline rates offered by the larger banks to their customers.
6. We show in section 1 of this memo that once these two errors are corrected, at least in respect of ANZ, Link Economics' conclusion that the four larger banks are unresponsive to changes in Kiwibank's headline variable rates cannot be supported.
7. We show that, once the econometric analysis is performed correctly, it is not possible to conclude from the empirical evidence that ANZ's effective lending rates are:
 - a. unresponsive to Kiwibank's published rates; or
 - b. less responsive to Kiwibank's published rates than to the published rates of the larger banks.
8. In other words, there is no empirical support for Link Economics' conclusion that the four larger banks face little competitive constraint from smaller banks such as Kiwibank. To the contrary, the empirical evidence suggests that ANZ's variable rate has historically been positively related to changes in Kiwibank's headline variable rate.
9. The Appendix to this memo details a number of other issues with the econometric analysis presented in the Link Economics report that we have identified and addressed in our own modelling in section 1.



Link Economics' finding that larger banks tend to attract more customers than smaller banks is neither surprising nor relevant to an assessment of the state of competition in the market

10. We explain in section 2 that Link Economics has simply shown that large banks attract more customers than smaller banks do. This is an entirely unremarkable result. Indeed, it would be surprising if this were not the case.
11. More importantly, this finding by Link Economics is irrelevant for the purposes of the Commission, because it sheds no light on the state of competition in the market. All markets have some suppliers that are larger than others. In retailing markets, larger size may result from such factors as consumer preferences for differences in product range, a larger geographic footprint, greater investment in technology, and so on. These factors are merely aspects of product differentiation.



1. Responsiveness of the big banks to changes in Kiwibank's headline variable rate

12. Link Economics observes that in mid-June 2020 Kiwibank lowered its published variable rate by 100 basis points, and that none of the large 4 banks responded with a cut to their published variable rates: all left their published variable rates unchanged.
13. To investigate more formally how responsive the headline variable lending rates of the four larger banks have historically been to changes in Kiwibank's headline variable rate, Link Economics estimates econometrically, for each larger bank, the following relationship using published variable rates over the period April 2018 to August 2023:⁵

$$LargerRate_t = \alpha_0 + \alpha_1 AverageMajor_t + \alpha_2 OCR_t + \alpha_3 KiwiRate_t + \alpha_4 KiwiUp_t + \varepsilon_t,$$

where

- a. $LargerRate_t$ is the published headline variable rate for the larger bank in question at the end of month t ;
 - b. α_0 is a constant term;
 - c. $AverageLarger_t$ is the average published headline variable rate for the remaining three larger banks at the end of month t . For instance, if the model being estimated relates to ANZ, then the dependent variable $LargerRate_t$ would be the published headline variable rate for ANZ at the end of month t and the explanatory variable $AverageLarger_t$ would be computed as the average of the published variable rates at the end of month t for ASB, BNZ and Westpac. In other words, $AverageLarger_t$ is a composite of the rates for each of the other larger banks;
 - d. OCR_t is the official cash rate at the end of month t ;
 - e. $KiwiRate_t$ is the published headline variable rate for Kiwibank at the end of month t ;
 - f. $KiwiUp_t$ is a variable that reflects all of the accumulated 'up' movements in Kiwibank's published headline variable rate as at the end of month t ; and
 - g. ε_t is the regression error term for the larger bank in question.
14. Link Economics finds that:⁶
 - a. Kiwibank's headline variable rates have no statistically significant effect on the headline variable rates of ANZ, ASB and Westpac at the 5% level of significance;
 - b. For BNZ, Kiwibank's headline rates are statistically significant at the 5% level of significance but the effect of Kiwibank's headline rates on BNZ's headline rates are much weaker than other explanatory variables; and

⁵ Details of the specification of the econometric models estimated by Link Economics are presented in Appendix A of the Link Economics report.

⁶ Link Economics report, para. 26.



c. The OCR is the primary driver of the headline variable rates of all four of the larger banks.

15. Link Economics' overall conclusion is the following:

The regression results indicate that Kiwibank does not place a significant competitive constraint on the large Australian-owned banks. Based on this analysis, we conclude the market structure for the supply for home lending is best described as an oligopoly of 4 large banks, that faces little constraint from the competitive fringe. Reducing the barriers (such as customer inertia and switching costs) that small banks face in competing for customers would force the large 4 banks to compete with smaller banks by responding to their pricing initiatives, bringing the benefit of greater price competition to consumers.⁷

16. In our view, this conclusion is erroneous and unsupported by the empirical evidence. Link Economics is led to this incorrect conclusion due to two serious flaws in its regression analysis, which we explain and correct below.

Use of an average variable to capture the influence of the other larger banks

17. The Link Economics report examines the relationship between the headline variable rate of each of the larger banks and the Kiwibank headline variable rate, while including as a single variable the average of the variable rates of the other three larger banks (i.e., *AverageLarger_t*).
18. By averaging the rates of the other three larger banks, the Link Economics analysis masks the impact of each of the other three larger banks. The correct approach is to estimate the impact of each of the other banks on the bank in question.
19. Columns 2 and 3 of Table 1 present the results of the regression model for ANZ including a single variable that averages the variable rates of ASB, BNZ and Westpac. These results suggest that changes in ANZ's headline variable rate are positively related to changes in Kiwibank's headline variable rate (i.e., the estimated coefficient on the Kiwibank rate is 0.064) and this effect is statistically significant at the 5% level (i.e., the p value is 0.0483).
20. This result differs from the result presented in Figure 14 of the Link Economics report because we have omitted from the model presented in Table 1 the *KiwiUp* variable, which Link Economics includes in its model. As explained in the Appendix, we omit the *KiwiUp* variable because the *KiwiUp* variable is highly correlated with the *KiwiRate* variable. Consequently, the inclusion of the *KiwiUp* variable makes it difficult for the econometric model to isolate the effect of the *KiwiRate* variable on ANZ's variable rate. Exclusion of the *KiwiUp* variable results in a more reliable estimate of the effect of Kiwibank's headline variable rate on ANZ's headline variable rate. Hence, excluding the *KiwiRate* variable results in a more reliable specification of the econometric model.

⁷ Link Economics report, para. 29.



21. Columns 4 and 5 of Table 1 present the results of the regression model for ANZ where the headline variable rates offered by ASB, BNZ and Westpac are included individually as explanatory variables, rather than averaged and included as a single 'larger bank' variable.
22. This model suggests that ANZ's headline variable rate is responsive to the headline variable rates published by ASB, BNZ and Kiwibank (e.g., the estimated coefficient on the Kiwibank rate is 0.072). The effect of the headline variable rates of each of these three banks on ANZ's headline variable rate is statistically significant at the 5% level (e.g., the p value of the estimated coefficient on the Kiwibank rate is 0.0279).
23. There is no evidence from the model presented in columns 4 and 5 that ANZ's headline variable rate is responsive to changes in Westpac's headline variable rate. The likely explanation for this counterintuitive result is that the variable rates of all of the larger banks often follow the same trends, such that the model has difficulty distinguishing statistically between the effects of the individual larger banks on ANZ's headline variable rate.
24. The key point from this analysis, however, is that there is no evidence to suggest that Kiwibank's published variable rate exerts no influence on ANZ's headline variable rate. This finding is contrary to the conclusion reached in the Link Economics report.

Table 1: ANZ variable rate regression – impact of disaggregating impact of other larger banks' rates

| | Combine larger banks | | Separate larger banks | |
|----------------------|----------------------|---------|-----------------------|---------|
| | Coefficient | p value | Coefficient | p value |
| Constant | 2.408 | 0.0000 | 2.788 | 0.0000 |
| <i>AverageLarger</i> | 0.374 | 0.0003 | n/a | |
| <i>ASB</i> | n/a | | 0.256 | 0.0210 |
| <i>BNZ</i> | n/a | | 0.309 | 0.0177 |
| <i>Westpac</i> | n/a | | -0.275 | 0.0703 |
| <i>KiwiRate</i> | 0.064 | 0.0483 | 0.072 | 0.0279 |
| <i>OCR</i> | 0.471 | 0.0000 | 0.530 | 0.0000 |
| R-squared | 99.7% | | 99.7% | |

Source: Frontier Economics analysis

Use of headline rather than effective variable rates as the dependent variable

25. The second serious flaw in the Link Economics analysis is that it was performed on published variable rates collected from interest.co.nz. These headline variable rates do not accurately reflect the rates actually offered by banks to retail customers as they do not reflect the (sometimes material) discounts applied by the banks to the published headline variable rates.



26. We have been provided with information on interest charged on variable rate home loans by ANZ from June 2018 to October 2023. Using this information, we were able to calculate the effective variable rate charged by ANZ over that period as the total interest charged on variable rate home loans divided by the average balance over the course of the calendar month, adjusted to an annual rate.
27. We then regressed the effective ANZ variable rate (as opposed to the published headline variable rate) against a constant term, the individual headline variable rates published by the other three larger banks, Kiwibank's headline variable rate, and the official cash rate. This regression allowed us to investigate how responsive ANZ's variable rate (which reflects discounts ANZ offered to its customers over the relevant period) to the headline variable rates of Kiwibank and the other three larger banks, controlling for changes in the official cash rate. The results of this regression are presented in the final two columns of Table 2 below.

Table 2: Analysis of ANZ variable rates

| | Headline ANZ variable rate | | Effective ANZ variable rate | |
|-----------------|----------------------------|---------|-----------------------------|---------|
| | Coefficient | p value | Coefficient | p value |
| Constant | 2.832 | 0.0000 | -0.529 | 0.6563 |
| <i>ASB</i> | 0.326 | 0.0050 | 1.186 | 0.0008 |
| <i>BNZ</i> | 0.121 | 0.2893 | 0.098 | 0.7735 |
| <i>Westpac</i> | -0.181 | 0.2473 | -0.563 | 0.2296 |
| <i>KiwiRate</i> | 0.092 | 0.0070 | 0.412 | 0.0001 |
| <i>OCR</i> | 0.514 | 0.0000 | -0.410 | 0.0359 |
| R-squared | 99.7% | | 95.2% | |

Source: Frontier Economics analysis of Interest.co.nz, RBNZ, ANZ data. Note: The results presented in this table reflect historical data over the period June 2018 to October 2023, rather than April 2018 to August 2023 (as in the Link Economics report).

28. Contrary to Link Economics' findings, the results from this model suggest that ANZ's effective variable rate did respond to changes in Kiwibank's headline variable rate (i.e., the estimate coefficient on the Kiwibank headline variable rate is approximately 0.4 and statistically significant even at the 1% level).
29. Once the main shortcomings of Link Economics' modelling are addressed, it is not possible to conclude that ANZ's effective lending rates are:
- unresponsive to Kiwibank's published rates; or
 - less responsive to Kiwibank's published rates than to the published rates of the larger banks.



30. We performed a test to assess whether there is any evidence of a statistical difference between the effect exerted by Kiwibank on ANZ's effective variable rate and the effect of the three other larger banks on ANZ's effective variable rate. We could not reject the null hypothesis that Kiwibank exerted the same effect as the other larger banks on ANZ's effective variable rate (i.e., the p value of the difference between Kiwibank and the highest coefficient estimate of the other larger banks was 8.3%).⁸

2. Ability of small banks to attract customers

31. Section 3 of the Link Economics report is headed "The ability of small banks to win customers through switching". The argument in the section is based on the assumption that retail banking is a homogeneous commodity in which one would expect consumers to be indifferent between suppliers if they were charging similar prices. For example, the Link Economics report states:

Panel data regression analysis indicates that if two banks charge the same one-year interest rate but one bank is big and the other is small, then the big bank will win approximately double the number of new purchase home loans. For refinanced home loans that switch lender, the big bank will win more loans than the small bank, but the effect is not as strong as for new purchases.⁹

32. This is an entirely unremarkable finding. Link Economics has simply shown that large banks tend to attract more customers than smaller banks. It is not at all surprising that small retailers (such as dairies and corner shops) attract fewer customers than large retailers (such as supermarkets). Similarly, it is not at all surprising that large banks attract more customers than smaller banks. Indeed, it would be quite remarkable if the opposite turned out to be true.
33. These results are not only expected; they are also irrelevant for the purposes of the Commission, because they shed no light on the state of competition in the market. All markets have some suppliers that are larger than others. In retailing markets, larger size may result from such factors as consumer preferences for differences in product range, a larger geographic footprint, greater investment in technology, and so on. Economics treats these factors as aspects of product differentiation.
34. A very odd feature of section 3 of the Link Economics report is that it points to evidence of product differentiation and then denies that any differences in the product offerings of banks exist. It states:

⁸ We tested for differences between the impact of Kiwibank and the impact of the other three larger banks. The F-statistic for the hypothesis test that the impact of the Kiwibank rate is equal to the impact of the ASB rate was 5.05. Similarly, we find F-statistics of 0.68 and 3.77 for the tests comparing Kiwibank to BNZ and Westpac respectively. Thus, the highest F-statistic is 5.05. The corresponding p-value is 8.3%, which means that there is an 8.3% chance of obtaining at least 5.05 from the maximum of three F-statistics.

⁹ Link Economics report, para. 41.



... it is not obvious that differences in quality of service or other aspects of home loan product offerings by small banks explain the difficulties of small banks in acquiring home loan customers.¹⁰

35. What could explain the market shares in consumer banking other than “aspects of home loan offerings”?
36. In our view, the Commission should not be persuaded by Kiwibank’s complaints that its market share is not growing as rapidly as it would like. The job of the Commission is not to create equal market shares – it is to foster competition.

¹⁰ Link Economics, para. 52.



Appendix – Additional issues in Link Economics’ econometric analysis

Error in regression for BNZ variable rates

37. In examining the analysis underpinning Figures 14, 17, 20 and 23 of the Link Economics report, we were able to replicate exactly the Figures 14, 17 and 23. However, we observe materially different results for Figure 20. Upon analysing the data used in this regression, it became apparent that an error was made in the construction of the variable averaging of the larger banks other than BNZ; for most months the supposed average of the ANZ, ASB and Westpac rates was higher than the maximum of the ANZ, ASB and Westpac rates. It is unclear how the variable used was constructed. This error only affects the regression results where BNZ’s headline rate is treated as the dependent variable. A comparison of the results is provided below.¹¹

Table 3: Regression results for BNZ variable rates

| | Link economics | | Corrected | |
|----------------------|----------------|---------|-------------|---------|
| | Coefficient | p value | Coefficient | p value |
| Constant | 3.429 | 0.0000 | -0.143 | 0.7371 |
| <i>AverageLarger</i> | 0.055 | 0.4427 | 1.003 | 0.0000 |
| <i>OCR</i> | 0.553 | 0.0000 | -0.118 | 0.1716 |
| <i>KiwiRate</i> | 0.203 | 0.0003 | 0.064 | 0.0697 |
| <i>KiwiUp</i> | -0.049 | 0.1304 | -0.010 | 0.5901 |
| R-squared | 99.2% | | 99.6% | |

Source: Frontier Economics analysis, Link Economics

Use of the KiwiUp variable

38. As noted in paragraph 85 of the Link Economics report, the *KiwiUp* variable used in the Link Economics analysis requires some explanation. Though it was not clear in the Link Economics report, we have verified that the cumulative sum of the *KiwiUp* variable is used in the regressions. This variable is calculated as the sum of all increases in the Kiwibank variable rate from April 2018 to the month of the observation. The series is presented below in Figure 1.
39. As can be seen from Figure 1, the changes over time in the *KiwiUp* variable mirror very closely the changes over time in the Kiwi rate. For this reason, we consider the inclusion of the *KiwiUp* variable to be inappropriate. The high degree of correlation between Kiwibank’s variable rate in individual

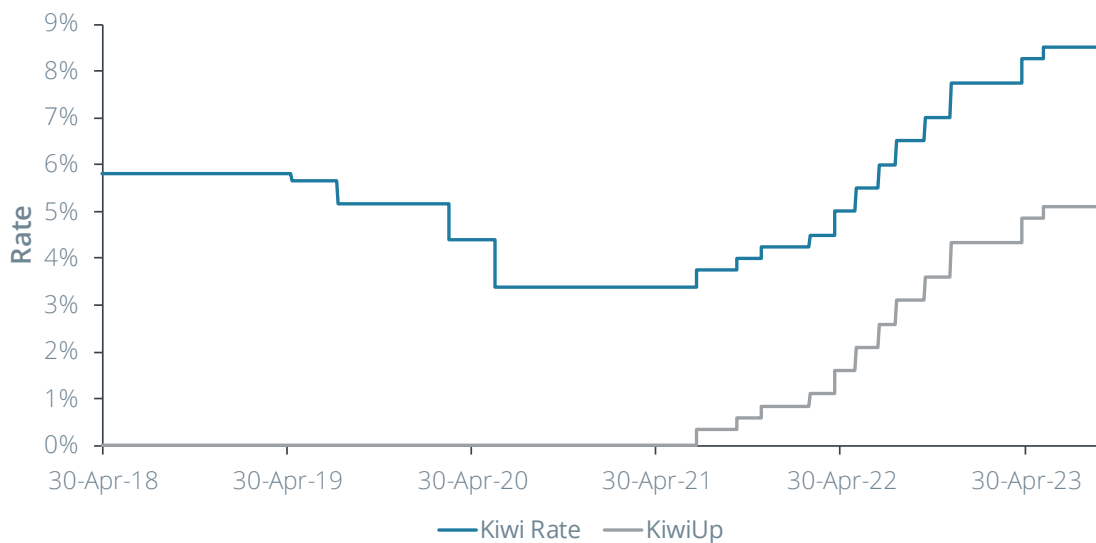
¹¹ Analogous variables used in Figures 14, 17 and 23 did not exhibit this error.



months and the *KiwiUp* variable makes it very difficult for the econometric model to disentangle the effects of these two variables. This, in turn, makes it very difficult to estimate precisely the effect of Kiwibank's headline variable rate on the variable rates of the larger banks.

40. Moreover, the *KiwiUp* variable does not have any intuitive economic meaning. For example, why should one expect ANZ's variable rate in any given month to depend on the cumulative increases in ANZ's variable rate in past months? Should ANZ's variable rate today be affected at all by whether Kiwibank raised its variable rate 18 months ago, or 24 months ago, and so on?

Figure 1: Comparison of *KiwiRate* and *KiwiUp*



Source: Frontier Economics analysis

41. For the reasons explained above, we consider that the *KiwiUp* variable should be omitted from the econometric models, and we have done so in the analysis presented in section 1 of this memo.