Exploring the 'Confidence Gap'

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Abstract

Previous Reserve Bank research has shown that female students and students from less advantaged backgrounds are more likely to report having a poor understanding of economics and lower confidence in their economics proficiency than other students. This is consistent with their falling participation in the subject. Using data from a survey administered by the Bank, this article investigates whether these negative perceptions are in line with students' observed proficiency or whether there is a 'confidence gap'. It finds that females continue to report having poorer understanding and less confidence even after accounting for their observed proficiency, indicating a confidence gap. By contrast, students' self-perceptions by socio-economic status look to be in line with variations in their observed proficiency. These findings have implications for the design of interventions to encourage greater participation by these students and support increased diversity amongst the economics student body.

Introduction

The diversity amongst students studying high school economics in Australia has fallen significantly over the past few decades (Dwyer 2017; Livermore and Major 2020). In particular, the share of female students and those from lower socio-economic backgrounds has been trending downwards sharply. Consistent with this, students from these groups tend to have less favourable perceptions of economics – that is, they are less likely to report having a good understanding of economics, less

likely to feel confident in their ability to study the subject and more likely to perceive greater risks with doing so because they do not know what it is about or where it will lead (Livermore and Major 2020, 2021).

Self-perceptions tend to influence students' decisions to undertake further study in a particular field (Perez-Felkner, Nix and Thomas 2017; Parker *et al* 2012). It is therefore useful to investigate whether differences in students' *self-perceived* proficiency in economics by sex and socio-economic status are in

line with differences in their *observed* proficiency or whether there is a 'confidence gap'. In other words, do female students or those from less advantaged backgrounds tend to underestimate their own proficiency? Identifying confidence gaps amongst these groups can inform the design of interventions aimed at increasing participation in economics and encouraging a more diverse group of students to pursue further study or a career in this field. Greater diversity has been shown to improve the performance of teams, decision-makers and businesses more generally (Woolley *et al* 2010; Hoogendoorn, Oosterbeek and van Praag 2013). This influence on performance is important given those with economics backgrounds often go on to work in roles where their decisions affect many people. Furthermore, as those who study economics shape the discipline and are involved in setting public policies, there are wider social benefits when they are more representative of society (Dwyer 2018; Bayer and Wilcox 2017).

What we already know about confidence gaps

Much of the literature on confidence gaps has focused on the differences between genders in non-economics fields and their implications. Females typically rate their ability more negatively than males in an array of disciplines, including science, technology, engineering and mathematics (STEM), even after accounting for their actual ability (Anaya, Stafford and Zamarro 2021). This can adversely affect enrolments in these disciplines (Kanny, Sax and Riggers-Piehl 2014).

There is also evidence that the confidence gap persists beyond schooling years. Sarsons and Xu (2015) found that female economists at top US universities continue to be less confident than their male counterparts even after controlling for their educational background and achievements in academia. However, relatively few studies examine confidence gaps between those from higher and lower socio-economic backgrounds; those that do typically find that socio-economic status is positively correlated with a student's confidence in their ability (Filippin and Paccagnella 2012; Seyedi-Andi *et al* 2019).

Similarly, studies on the *drivers* of confidence gaps have primarily focused on gender-related differences rather than socio-economic status. Research into the gender confidence gap generally attributes it to both intrinsic factors (reflecting inherent gender differences) and environmental factors. Intrinsic factors include the tendency for females to update their beliefs about their ability more conservatively than males after receiving positive feedback, resulting in lower confidence overall (Mobius *et al* 2011). External factors include societal stereotypes about gender differences in 'innate' ability (with males perceived to be naturally better at STEM subjects) (Xie, Fang and Shauman 2015; Heyder, Steinmayr and Kessels 2019). Karaarslan and Sungur (2011) posited that students from higher socio-economic backgrounds may report greater confidence in their abilities because they are more likely to have access to intellectually stimulating home environments (e.g. access to more books) than those who are less well-off; however, they did not account for the role of students' actual ability in their analysis.

Surveying economic proficiency

To understand how students' self-perceived proficiency varies after accounting for their observed proficiency, this research drew on information from a survey administered by the Reserve Bank of Australia (RBA) in 2021. The survey was initially conducted as part of a randomised control trial to assess the effectiveness of the RBA's school talks program (where RBA economists discuss and answer questions on monetary policy and current economic conditions) (Rickards 2021).[1] The dataset comprises the survey responses from almost 2,000 Year 11 and 12 economics students at 75 schools across Australia. Each student's response to the survey was augmented with data from the Australian Curriculum, Assessment and Reporting Authority (ACARA) on the characteristics of the student's school, and information on each teacher's sex.[2] The variables in the dataset can be broadly grouped into three categories:

- *Student-, teacher- and school-level characteristics* – including the student's self-reported sex and

year level, the teacher's sex and the school's type and socio-economic profile.[3]

- *Students' self-perceived proficiency* – students were asked to rate their understanding of economics and confidence in the subject on a scale of 1 to 5 (lowest to highest rating). Specifically, students rated their 'understanding of monetary policy', 'understanding of current economic conditions' and 'confidence in understanding and completing their economics subject'.

- *Students' observed proficiency* – students received a score (expressed as a percentage) based on their performance on a series of knowledge-based multiple choice questions. These questions – listed in Appendix A – tested their understanding of economic concepts, including the transmission of monetary policy, inflation and unemployment. This score was used as a proxy for their economic proficiency at the current point in time.

There are two main caveats with using these survey data:

1. The surveyed schools are a subset of those schools that offer economics and were confined to those that have participated in the RBA's school talks program. The surveyed population was slightly more skewed towards students from higher socio-economic backgrounds. While school talks are offered to all schools, participation in both the talks and the survey tended to be greater amongst more advantaged schools, potentially because these schools are better resourced and so are more able to participate (particularly in online activities). The surveyed students were more likely to come from independent schools and single-sex schools than the overall Year 11 and 12 economics cohort, and all attended schools in metropolitan areas.[4]

2. Measurement of students' self-assessed and current economic proficiency was based only on their responses to questions on macroeconomic topics, such as monetary policy and unemployment. While this is likely to be a reasonable indicator of their economic

proficiency, it is a less comprehensive measure of economics understanding than a measure that also captures microeconomic topics.

Stylised facts on self-perceived and observed proficiency

Comparing female and male students

Without controlling for any other characteristics, female students were more likely to report having a lower understanding of economics and less confidence in the subject than males (Graph 1). For example, the share of females reporting a *poor* understanding of monetary policy (a rating of 1 or 2) was around 35 per cent, compared to just over 20 per cent for males (top panel of Graph 1). Additionally, the share of females reporting a *good* understanding (a rating of 4 or 5) was smaller at 30 per cent, compared to 45 per cent for males. This is consistent with the findings in Livermore and Major (2020, 2021).

Females remained more likely to report having a poorer understanding of economics than males irrespective of whether they attended a co-educational or single-sex school (Graph 2). That said, the difference between the shares of male and female students rating their economics understanding a 1 or 2 was greater at co-educational than single-sex schools.[5] Females at co-educational schools were much more likely to give themselves lower ratings than other students. These results continued to hold even when

Graph 1

Self-reported Understanding and Confidence
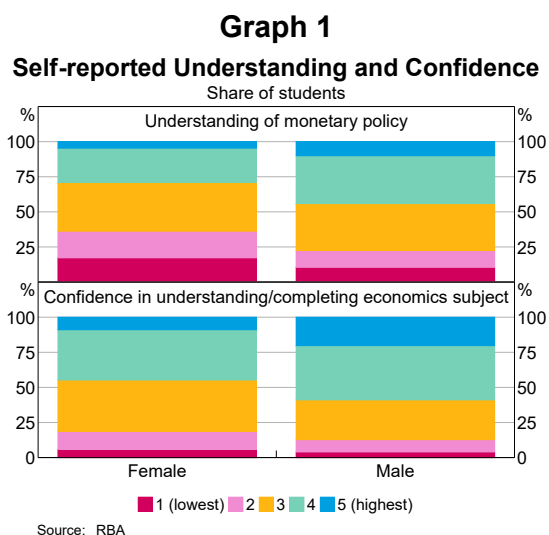
considering students' responses to the other 'self-perception' questions on the survey, such as their understanding of current economic conditions.

Using performance on the knowledge-based questions as a proxy for current proficiency, female students in the sample also tended to score lower than males at both co-educational and single-sex schools (Graph 3). At co-educational schools, around one-quarter of females achieved a high score above 75 per cent (dark teal bars) in the test, compared to over 35 per cent of males. Similarly, at single-sex schools, two-fifths of female students achieved a score above 75 per cent, relative to over half of males. The share of students with low scores below 25 per cent (dark orange bars) was greatest for females at co-educational schools but was relatively similar for female and male students at single-sex schools.

By socio-economic status

Students who reported having a good understanding of economics and greater confidence were more likely to come from more advantaged backgrounds (Graph 4). For instance, around one-quarter of students who rated their understanding of monetary policy a 5 had an Index of Community Socio-educational Advantage (ICSEA) score above 1,200, compared with only 5 per cent of those who selected a rating of 1.[6] The ICSEA score measures the socio-educational background of a school and accounts for factors including parental occupation and education, as

well as the school's geographical location. The median ICSEA score is 1,000 and the standard deviation is 100. However, the schools offering economics, and therefore our sample, tend to be more advantaged with a median ICSEA score of around 1,100.

Students who performed well on the knowledge-based survey questions also tended to come from more advantaged schools (Graph 5). For example, around one-quarter of students with a score above 75 per cent attended a school with an ICSEA score above 1,200, compared to around 5 per cent of students who scored below 25 per cent.

Graph 3

Distribution of Scores*

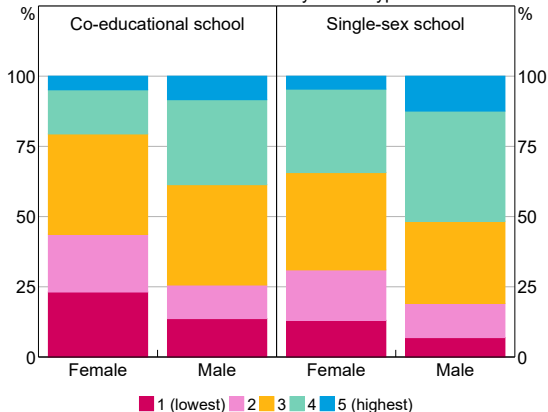Share of students by school type
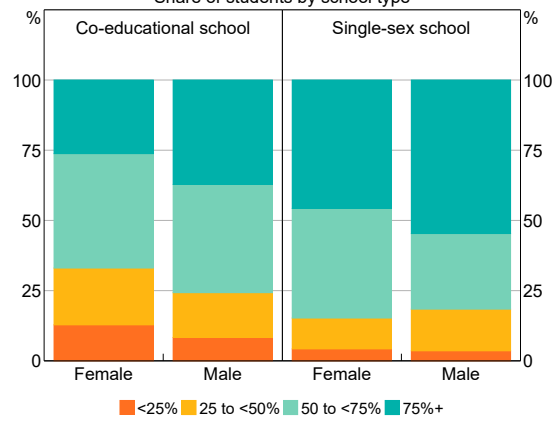
* Based on performance on knowledge-based questions.
Sources: ACARA; RBA

Graph 2

Self-reported Understanding of Monetary Policy
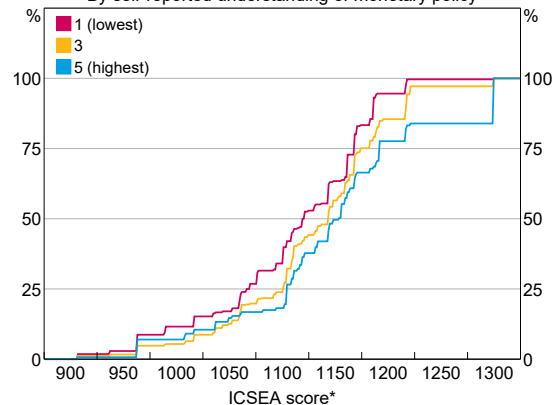
Share of students by school type

Sources: ACARA; RBA

Graph 4

Socio-economic Distribution

By self-reported understanding of monetary policy

* Measure of students' socio-educational background.
Sources: ACARA; RBA

Identifying a confidence gap

The findings in the previous section showed that females and students from lower socio-economic backgrounds tended to have more negative perceptions of their economics understanding *and* also performed worse than other students on the set of knowledge-based questions in the survey. However, this does not tell us whether there is a confidence gap. To identify whether a confidence gap exists, it must be established that female and/or less advantaged students are systematically under-assessing their proficiency. To answer this question, the analysis examined how a student's self-perception correlated with being female and their socio-economic status before and after accounting for their observed proficiency, also controlling for other student- and school-level characteristics.[7] The control variables included each student's year level (as Year 12 students may view their economics understanding more favourably given their greater exposure to economics-related content than Year 11 students), the school type (co-educational or single-sex schools) and the state location of the school.

As the dependent variable – namely, students' self-reported understanding or confidence – is a discrete and ordered variable taking the values of 1 to 5, an ordinal logistic regression was employed and the results are presented as average marginal effects.[8] The estimated models are presented in Appendix B as 'odds ratios' – that is, the exponent of
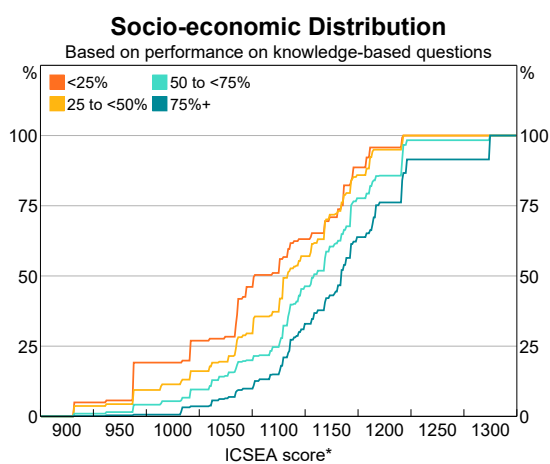
the estimated coefficient in the model. The results reported below used students' self-perceived understanding of monetary policy as the dependent variable as this most closely aligned with the topics that the knowledge-based questions covered. The findings are robust to using students' confidence in their ability to study their economics subject as the dependent variable. The results are also consistent when considering a partial proportional odds model (presented in Appendix B).

Amongst female students

In line with the correlations presented above, females were statistically significantly more likely to report having a poorer understanding of monetary policy than males even after accounting for other characteristics (Graph 6). In a model that does not control for students' observed proficiency (pink bars), female students were around 9 percentage points more likely than males to rate their understanding of monetary policy a 1 (lowest rating) and more than 5 percentage points less likely to select a rating of 5 (highest rating) on average.

Importantly, the gap for female students remained even after accounting for students' observed proficiency (blue bars). Females continued to be more likely than males to choose a lower rating for their self-perceived understanding and less likely to choose a higher rating. The gap remained

Graph 5

Socio-economic Distribution

Based on performance on knowledge-based questions

*   Measure of students' socio-educational background.
Sources: ACARA; RBA

Graph 6

Effect of Being Female*

On probability of selecting a particular rating
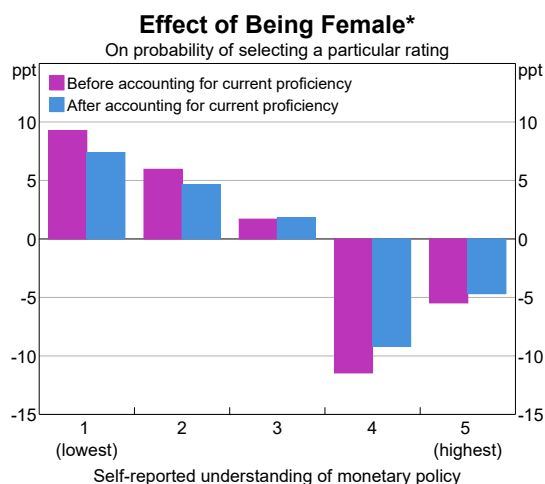
*   Average marginal effect.
Sources: ACARA; RBA

statistically significant but narrowed relative to the previous model (which excludes a variable measuring students' observed proficiency). In this second model, females were 7½ percentage points more likely to rate their understanding a 1 and around 4½ percentage points less likely to rate it a 5 on average. This provides evidence of a confidence gap for female students that exists over and above the influence of their observed proficiency.

By socio-economic status

In a model that does not control for observed proficiency, students from more advantaged backgrounds were statistically significantly more likely to report having a good understanding of economics and greater confidence in the subject. However, the correlation between socio-economic status and self-perceived proficiency was no longer statistically significant after accounting for students' observed proficiency in the model. This suggests that the tendency for students from more advantaged backgrounds to have more positive perceptions of their understanding and greater confidence (Graph 4) was in line with their tendency to perform better on the survey (Graph 5). This does not necessarily imply that students at more advantaged schools are inherently more talented, as other factors such as the school's access to resources are likely contributing to the outcome.
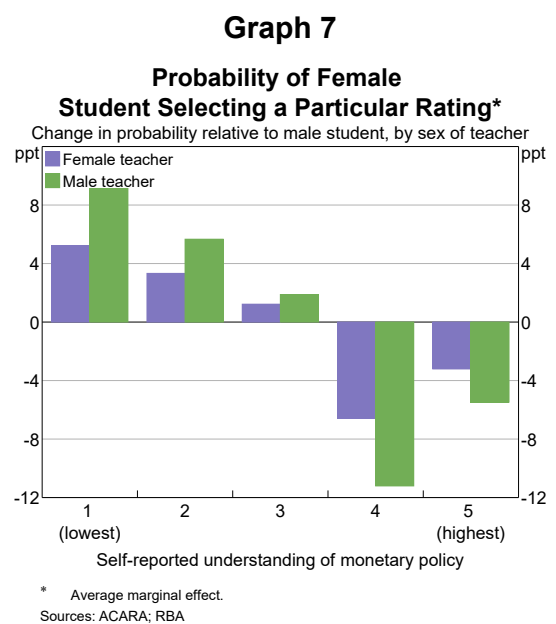
Role of teachers

The presence of a confidence gap for female students may implicitly deter some female students from studying economics at university and contribute to the low share of female enrolments (as has been the case for STEM subjects). Accordingly, it is useful to consider interventions that seek to narrow the confidence gap. One option is to increase the presence of female role models. Studies have shown that having a female teacher improved female students' self-perceived proficiency in both the mathematics and science fields but had little impact on male students (Xu and Li 2018; Cotner *et al* 2011).

Overall, female students with female teachers (purple bars) tended to have more positive

perceptions of their understanding compared with females with male teachers (green bars) even after controlling for observed proficiency (Graph 7). Female students were around 9 percentage points more likely to rate their understanding a 1 if they were taught by a *male* teacher (relative to male students). The presence of a *female* teacher lessened this gap to 5 percentage points. Additionally, female students with male teachers were around 5½ percentage points less likely to rate their understanding a '5' (compared to male students) but the gap closed somewhat (to 3 percentage points less likely) when taught by a female teacher.

However, irrespective of the sex of the teacher, female students continued to have more negative self-perceptions than male students. They were still more likely to report lower ratings (illustrated by the positive bars associated with the lower ratings) and less likely to report higher ratings (shown by the negative bars). This suggests that the confidence gap may be narrowed but not eliminated when female students are taught by a female teacher. For male students, the teacher's sex did not appear to have a statistically significant impact on their self-perceived proficiency. These findings are consistent with those in other studies for other disciplines.

Graph 7

**Probability of Female
Student Selecting a Particular Rating***

Change in probability relative to male student, by sex of teacher

*   Average marginal effect.
Sources: ACARA; RBA

Implications

As the presence of confidence gap for female students may inhibit female students from pursuing further study in economics and exacerbate their under-representation in economics enrolments, it is important for the economics community to consider how to address this issue. The finding that female teachers have a positive impact on female students' self-perceptions suggests one possible intervention is to increase the presence of female role models. This could be in the form of more female teachers, more publicly visible female economists or more effort by the RBA to have female presenters deliver school talks or advocate for economics.

Furthermore, this analysis indicates that the tendency for less advantaged students to report having a poor understanding of and low confidence in economics is in line with their tendency to perform less well at the subject. This suggests that measures aimed at boosting economics understanding will likely benefit these students. In particular, Rickards (2021) found that the RBA's school talks improved both students' self-perceived and actual economics understanding. Thus, the RBA could further expand, refine and raise awareness of its school talks program and suite of online student resources with an emphasis on targeting less advantaged schools.

Conclusion

Both female and less advantaged students tend to express having a poorer understanding of economics and lower confidence in the subject relative to other students. After accounting for students' observed proficiency, however, these negative perceptions persist only for females. This suggests there is a confidence gap for female students. This gap can act as an implicit barrier, deterring female students from entering the economics discipline. For students from less advantaged backgrounds, their tendency to hold less favourable self-perceptions appears to be consistent with their poorer performance in the subject than those from higher socio-economic backgrounds.

These findings suggest that interventions intended to narrow the confidence gap for female students are likely to have positive effects on females looking to study economics or work in the economics profession. For example, both the RBA and those working in the economics field could consider increasing the representation of female role models amongst their economists, female economics teachers and female advocates for economics in the public domain. Finally, students from less advantaged schools (which may be less well-resourced) could benefit from interventions aimed at increasing their actual understanding of the subject through active engagement with activities and resources that are designed to improve learning outcomes.

Appendix A: Knowledge-based questions on student survey

There were two surveys in total with each student given one survey out of the two options. The surveys were largely identical but there were slight variations to some questions. For the full set of survey questions, see Rickards (2021).

Table A1: Knowledge-based Questions on Student Survey

Question	Response options
Imagine that you've just received a pay rise of 2% at your job. Inflation is expected to be 3% per year. After one year, would you be able to buy more than today, exactly the same as today, or less than today with your pay? **OR** Imagine that the interest rate on your savings account was 3% per year and inflation was 2% per year. After one year, would you be able to buy more than today, exactly the same as today, or less than today with the money in this account?	More than today Exactly the same as today Less than today Not sure
What is the Reserve Bank's inflation target? Inflation between:	0 – 1 per cent 1 – 2 per cent 2 – 3 per cent 3 – 4 per cent 4 – 5 per cent 5 – 6 per cent Not sure
Throughout 2020 and the COVID pandemic, the unemployment rate was: (*Hint: the NAIRU is the level of the unemployment rate where inflation is stable and in-line with the RBA's inflation target*)	Below the NAIRU (natural rate) At the NAIRU (natural rate) Above the NAIRU (natural rate) Not sure
Throughout 2020 and the COVID pandemic, the inflation rate was:	Below the RBA's target range Within the RBA's target range Above the RBA's target range Not sure
When the RBA changes monetary policy, it mainly influences …?	Taxes Government spending Interest rates Not sure
It's decision time! It is 2025 and Philip Lowe, Governor of the Reserve Bank, is asking you for advice on what to do with the cash rate. The unemployment rate is 8 per cent and inflation is 1 per cent. To help the RBA board fulfil their mandates, what should you tell Phil? **OR** After acing your Economics subject, Phillip Lowe has asked you to join the RBA Board. Inflation is 4 per cent and the unemployment rate is 2 per cent. Keeping in mind the RBA's objectives, what should you and the RBA board do?	Increase the cash rate Don't change the cash rate Decrease the cash rate Not sure
If the RBA decided to **raise** the cash rate (make monetary policy **more contractionary**), what would likely happen to the unemployment rate?	Decrease Stay the same Increase Not sure
If the RBA decided to **lower** the cash rate (make monetary policy **more expansionary**), what would likely happen to housing prices?	Decrease Stay the same Increase Not sure
If the RBA decided to **lower** the cash rate, what would typically happen to the **exchange rate**? **OR** If the RBA decided to **raise** the cash rate, what would typically happen to the	Depreciation Stay the same Appreciation Not sure

Question	Response options
exchange rate?	
Imagine that you have passed the driving test and have just got your provisional license. You have bought a new car to cruise around in. To pay for the car you took out a loan with an interest rate of 5 per cent. If the RBA **lowers** the cash rate, what do you expect to happen to the interest rate on your car loan and the repayments you must make? **OR** Let's flash forward a little bit. You've been CEO of the hottest tech start-up in Australia for the past few years, researching clean energy. You've decided to reward yourself and buy a house, borrowing money from the bank and taking out a variable-rate mortgage. A year later, the RBA **lowers** the cash rate. What will the RBA decision likely do to your monthly loan repayments, and your disposable income? (Hint: your disposable income is your income after taxes and interest)	Increase Decrease Stay the same Not sure **OR** Increase my monthly repayments, decrease my disposable income Decrease my monthly repayments, decrease my disposable income Increase my monthly repayments, increase my disposable income Decrease my monthly repayments, increase my disposable income Not sure
Congratulations! Your application to work at the RBA just got accepted. After a few months of working you have some savings in your bank account. The RBA then decides to **raise** the cash rate. What would this RBA cash rate decision do to your likelihood of spending money on a car? **OR** Imagine that you own an apple-picking business in Australia and would like to borrow money to invest in more apple-picking machines. The RBA decides to **increase** the cash rate. How is this likely to change your decision?	More likely to spend money on a car Less likely to spend money on a car Not sure
What typically happens to Australian asset prices and wealth when the RBA **lowers** the cash rate?	Asset prices and wealth decrease No change to asset prices and wealth Asset prices and wealth increase Not sure
How would you describe the RBA's overall stance of monetary policy over 2020 and the COVID pandemic?	Expansionary (trying to speed-up the economy) Neutral Contractionary (trying to slow-down the economy) Not sure
How would you describe the Government's overall stance of fiscal policy over 2020 and the COVID pandemic?	Expansionary (trying to speed-up the economy) Neutral Contractionary (trying to slow-down the economy) Not sure

Appendix B: Regression results

The odds ratios for each variable is measured as the odds of a student choosing a specific rating or a higher rating for their self-reported understanding or confidence relative to the odds they choose a lower rating. An odds ratio above (below) 1 for a particular explanatory variable suggests a student with that characteristic is more (less) likely to choose a higher rating.

Table B1: Ordinal Logistic Regression Results
Odds ratios[a]

	Self-reported			
	Understanding of monetary policy	Understanding of monetary policy	Confidence in understanding and completing economics subject	Confidence in understanding and completing economics subject
Observed proficiency[b]		1.04***		1.03***
Female indicator	0.42***	0.46***	0.49***	0.53***

	Self-reported			
	Understanding of monetary policy	Understanding of monetary policy	Confidence in understanding and completing economics subject	Confidence in understanding and completing economics subject
ICSEA score	1.16**	0.90	1.17**	0.97
Single-sex school indicator	1.50***	1.39***	1.29***	1.22**
Year 12 indicator	5.05***	3.07***	1.66***	1.08
NSW indicator	3.76***	3.37***	1.48**	1.25
QLD indicator	1.75***	2.32***	1.39*	1.59**
VIC indicator	0.88	0.94	0.86	0.86

(a) *,**,*** denotes statistical significance at the 10, 5 and 1 per cent levels; robust standard errors.

(b) Using performance across knowledge-based questions as the measure of current proficiency.

Sources: ACARA; RBA

Robustness check using a partial proportional odds model

One caveat with using the ordinal logistic model is that it is underpinned by the proportional odds (PO) assumption. This assumption implies that the estimated coefficient for each explanatory variable is the same across all outcomes of the dependent variable. Specifically, the coefficient in a specification that describes the odds of a student rating their understanding a 1 over a higher category will be the same as the coefficient that describes the odds of a student rating their understanding a 2 over a higher category. A Brant test suggests the assumption does not hold for these specified models, although the PO assumption is often violated in practice (Williams 2006). The study therefore also considered a partial proportional odds model that relaxed the assumption and allowed some coefficients to differ. The findings for females and socio-economic status are almost identical to those from the ordinal logistic model. This is because the few variables that violate the PO assumption were control variables instead of variables of interest. ⚓

Table B2: Partial Proportional Odds Regression Results
Odds ratio[a]

	Dependent variable: Self-reported understanding of monetary policy			
	Rating of 2 and above (relative to lower rating)	Rating of 3 and above (relative to lower rating)	Rating of 4 and above (relative to lower rating)	Rating of 5 (relative to lower rating)
Observed proficiency[b]	1.05***	1.04***	1.04***	1.01***
Female indicator	0.44***	0.44***	0.44***	0.44***
ICSEA score (/100)	0.91	0.91	0.91	0.91
Single-sex school indicator	1.40***	1.40***	1.40***	1.40***
Year 12 indicator	4.12***	3.29***	2.70***	1.94***
NSW indicator	3.55***	3.55***	3.55***	3.55***
QLD indicator	2.31***	2.31***	2.31***	2.31***
VIC indicator	0.94	0.94	0.94	0.94

(a) *,**,*** denotes statistical significance at the 10, 5 and 1 per cent levels; robust standard errors; only the 'observed proficiency' and 'Year 12 indicator' variables violated the proportional odds assumption and therefore have different coefficients.

(b) Using performance across knowledge-based questions as the measure of current proficiency.

Sources: ACARA; RBA

Endnotes

[*] The author completed this work while in the Public Access and Education team. The author is grateful for assistance and guidance from Keaton Jenner, Benjamin Beckers, Jacqui Dwyer, Richard Evans, Ryan Couston, Christina You and members of the Educators Advisory Panel.

[1] The original survey was administered such that students completed two surveys (some students completed a survey before and after an RBA school talk, while others completed both surveys before the school talk); however, as this study was interested in students' self-perceptions and observed proficiency prior to any treatment, only responses from the first completed survey, for which there was a larger sample, were used.

[2] This question was not part of the original survey; rather, the teacher's sex was inferred from the details of the Bank's correspondence with the school and existing teacher relationships. It was not possible to infer the teacher's sex for schools that accounted for around 2 per cent of the student sample. This was partly because some names were unisex and there were multiple contacts at some schools.

[3] Students were asked 'how would you describe your gender?' with four response options: 'male'; 'female'; 'other'; and 'prefer not to say'. However, this study only included students who identified as either male or female in the analysis, given the small number of students reporting non-binary genders or indicating they 'prefer not to say'.

[4] Due to the limited availability of economics enrolments data, data on New South Wales Year 11 and 12 economics enrolments was used as a proxy for the overall Year 11 and Year 12 economics cohort.

[5] This is consistent with Sullivan (2009) who found that attending a single-sex school reduced the gender gap in students' self-confidence.

[6] The distribution of ICSEA scores for the sample was skewed towards schools with higher socio-economic backgrounds. This reflects the fact that schools that offer economics tend to be more advantaged.

[7] This analysis focuses on the correlation between self-perceived and observed proficiency as opposed to establishing the direction of causality. For example, consistently achieving high marks may cause a student to rate their understanding more highly. On the other hand, a student who lacks confidence may work harder thereby improving their performance. Data limitations prevented further investigation into the nature of the causality.

[8] Ordinary least squares is no longer appropriate as it requires the dependent variable to be a continuous variable. Results are presented as marginal effects because the non-linear nature of the logit model means that the estimated coefficients do not have intuitive interpretations. Calculation of average marginal effects involves computing the marginal effect for each observation and averaging it across all observations. Marginal effects differ across observations in non-linear models as they depend on the values of the other explanatory variables.

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