ECONOMIC RECORD

THE ECONOMIC SOCIETY OF AUSTRALIA

ECONOMIC RECORD, VOL. 100, NO. 328, MARCH, 2024, 44–73

When Does the Gender Gap in Financial Literacy Begin*

ALISON PRESTON
UWA Business School, University of Western Australia, Perth, Western Australia, Australia

ROBERT E. WRIGHT
Adam Smith Business School, Glasgow, UK, School of Education, University of Glasgow, Glasgow, UK

Research to date has failed to generate a comprehensive understanding of the source of the gender gap in financial literacy in adulthood. Using microdata from the Household, Income and Labour Dynamics in Australia (HILDA) Survey and an analysis covering four age groups (15–19, 20–24, 25–29 and 30–34), this paper suggests that the gender gap starts young and well before individuals enter adulthood. The analysis also suggests that that raw (unadjusted) gender gap likely underestimates the underlying gap. It is important to establish whether the gap begins before or after children enter school, since policy aimed at addressing it would be very different.

I Introduction

Financial literacy is increasingly regarded as an essential life skill and an important determinant of health, income, financial resilience and general well-being (Razen *et al.,* 2021; Bottazzi & Oggero, 2023; Lusardi & Mitchell, 2023). Globally, however, financial literacy is low and differs markedly by sex (Fonseca *et al.,* 2012; Bucher-Koenen *et al.,* 2017; Cupák *et al.,* 2018; Preston & Wright, 2019; Lind *et al.,* 2020). In major advanced economies around 60 per cent of adult males are financially literate. The corresponding share for females is 50 per cent (see Hasler & Lusardi, 2017). Financial literacy among the young is particularly low, especially among females (Lusardi *et al.,* 2010; Lusardi & Mitchell, 2023). In the USA, for example, only 32 per cent of 18–29-year-olds were

*We are grateful to the anonymous referees and an associate editor for their constructive comments, which significantly improved the substantive content and readability of this paper. However, all remaining errors, shortcomings and omissions are the exclusive responsibility of the authors. Open access publishing facilitated by The University of Western Australia, as part of the Wiley - The University of Western Australia agreement via the Council of Australian University Librarians.

Disclaimer: The paper uses data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey. We acknowledge that the HILDA Project was initiated and is funded by the Australian Government Department of Social Services (DSS) and is managed by the Melbourne Institute of Applied Economic and Social Research (Melbourne Institute). The findings and views reported in this paper, however, are those of the authors and should not be attributed to either the DSS or the Melbourne Institute.

JEL classifications: B54, D14, D31, G18, I30, J26

Correspondence: Alison Preston, Department of Economics, UWA Business School, University of Western Australia, 35 Stirling Hwy, Crawley, Perth, WA 6009, Australia. Email: alison.preston@uwa.edu.au

doi: 10.1111/1475-4932.12785

able to correctly answer the 'Big Three' – three questions testing knowledge of three key financial concepts (Lusardi & Mitchell, 2023). These findings are concerning. Among other things, low financial literacy among the young is correlated with higher student debt, payday borrowing, higher rates of credit delinquency and a higher risk of economic abuse in relationships (Harvey, 2019; Kutin *et al.,* 2019; Artavanis & Kara, 2020; Urban *et al.,* 2020). If there is a causal relationship between financial literacy and financial outcomes, then the lower level of financial literacy among females is a clear disadvantage (Preston & Wright, 2019; Tinghög *et al.,* 2021).

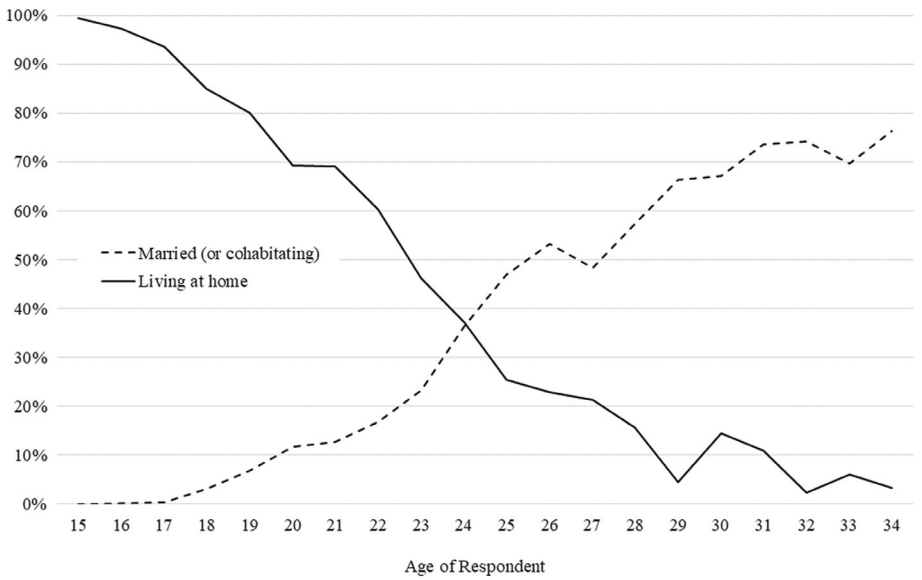
A variety of theories have been advanced to explain why females are, on average, less financially literate than males. The first attributes the gap to gender differences in financial decision-making and differences in the household division of labour (Fonseca *et al.,* 2012; Rao & Malapit, 2015; Hsu, 2016; Ward *et al.,* 2019; Rink *et al.,* 2021). A second, related, explanation emphasises social and cultural factors, including gender roles and gender stereotypes (Shim *et al.,* 2010; Agnew & Cameron-Agnew, 2015; Driva *et al.,* 2016; Bottazzi & Lusardi, 2021; Grohmann & Schoofs, 2021; Rink *et al.,* 2021; Tinghög *et al.,* 2021; Davoli & Rodriguez-Planas, 2022; Preston *et al.,* 2023). A third explanation suggests that the gap may arise from gender differences in non-cognitive factors – personality, self-confidence, perseverance, risk aversion (Arellano *et al.,* 2017; Longobardi *et al.,* 2018; Robson & Peetz, 2020; Tinghög *et al.,* 2021). A fourth explanation is that the gap stems from gender bias in the way financial literacy is measured. A lack of confidence, for example, may see females more likely to use the non-response or 'do not know' option in financial literacy tests (Ooi, 2020; Bucher-Koenen *et al.,* 2021; West *et al.,* 2023). A fifth explanation is that the gender gap is the product of gender differences in 'human capital' (such as education and labour market factors). Empirical research, however, finds little support for this hypothesis (Lusardi & Mitchell, 2014; Preston & Wright, 2019; Robson & Peetz, 2020).

It is our view that research examining the source of the gender gap in financial literacy has failed to generate a comprehensive, policy-relevant, understanding of why females are (on average) less financially literate than males. This paper explores an alternative explanation. Most empirical studies of the gender gap have been based on a sample of adults, usually of at least labour force age. Few studies specifically examine the size and source of the gap when individuals are young (exceptions include Driva *et al.,* 2016; Arellano *et al.,* 2017; Longobardi *et al.,* 2018; Bottazzi & Lusardi, 2021; Razen *et al.,* 2021; Tzora *et al.,* 2023; West *et al.,* 2023). This lack of research on young people is surprising given that, like other forms of disadvantage, the gender gap in financial literacy may begin when individuals are in school (Longobardi *et al.,* 2018) and possibly before they enter school (Heckman, 2006). If the gender gap is rooted in 'early-life' experience, then it is possible that the home environment, followed by the schooling system and labour market, exacerbates the gender gap, resulting in the near universally observed gender gap in financial literacy in adulthood.

With this background in mind, this paper empirically examines the relationship between gender and financial literacy among Australians aged 15–34. Individual-level data collected in 2016 in the Household, Income and Labour Dynamics in Australia (HILDA) Survey are used. There is considerable variation in financial literacy in this age range, with the slope of the age–financial literacy profile being quite steep (Lusardi *et al.,* 2010; Shim *et al.,* 2015). In addition, individuals aged 25–34 are more likely than individuals aged 15–24 to have completed their schooling, be living away from home, be married (or cohabiting), be working and be increasingly making their own financial decisions (see Figs 1,2). We examine this stage of life variation by focusing our analysis on four age groups which, for convenience, we term *adolescents* (aged 15–19 years), *emerging adults* (aged 20–24 years), *young adults* (aged 25–29 years) and *older-young adults* (aged 30–34 years).

Our empirical analysis has three main aims. The first is to identify the possible determinants of financial literacy at earlier

FIGURE 1
Percentage Share Living at Home and Percentage Share Married (or Cohabitating), Australians, Aged 15–34, 2016

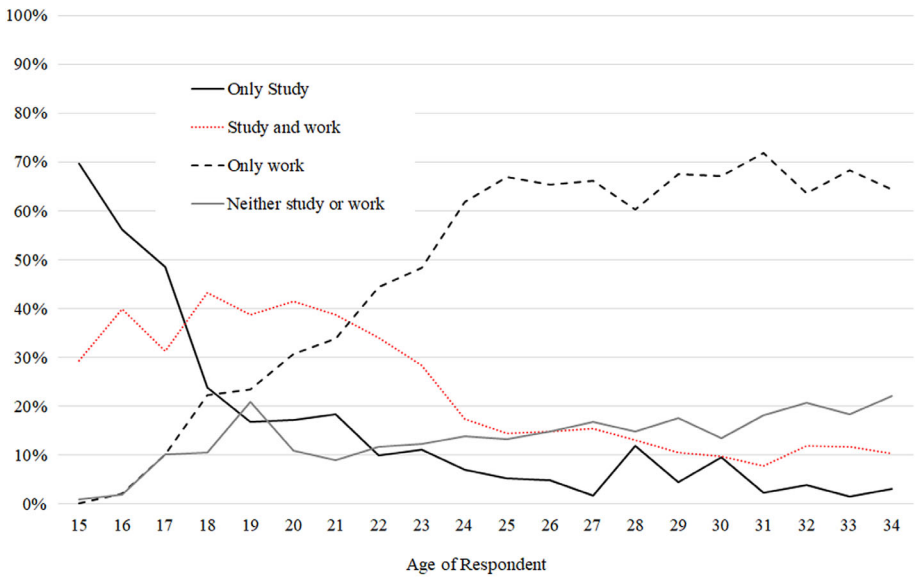


Source: Household, Income and Labour Dynamics, Australia (HILDA) Survey, Wave 16 (2016). Estimates weighted to reflect population values.

stages of the life course, as captured by the four selected age groups. The second aim is to examine if differences in the determinants of financial literacy between males and females help explain (in a statistical sense) the gender gap in financial literacy among young people. The third aim is to use the results of the analysis to speculate on the age at which the gender gap in financial literacy begins. As far as we are aware, the HILDA Survey is the only data source that can support these aims, given there is comparable financial literacy information for 15–19-year-olds and adults. We believe that understanding the determinants of financial literacy in the 15–19-year-old age group is particularly important. As mentioned, research has shown that the age–financial literacy relationship is both steep and upwards sloping in this age range. This implies that there is considerable financial literacy learning in this age range (both by males and females). Most importantly, there is already a sizeable gender gap at age 15. It is unclear if this gap gets larger or smaller as individuals move through their teenage years and enter into further/higher education and/or the labour market.

The remainder of the paper is organised as follows. Section II is a review of studies that have examined the determinants of financial literacy among young people. Few of these studies focus on the gender gap. Section III outlines the statistical approach used in this paper. Three measures of the gender gap in financial literacy, based on regression analysis and the Oaxaca–Blinder decomposition method, are outlined. Data from the HILDA Survey are used to calculate these measures for four age groups: 15–19, 20–24, 25–29 and 30–34. Results are presented in Section (iv). The analysis suggests that the gender gap, however measured, is large for 15–19-year-olds and that the raw (unadjusted) gender gap likely underestimates the underlying gender gap (and hence underestimates the degree of female disadvantage). A brief conclusion follows in Section V. The main conclusion is that the gender gap likely begins before individuals enter high school,

FIGURE 2
Percentage Share Studying and Percentage Share Working, Australians, Aged 15–34, 2016



Source: Household, Income and Labour Dynamics, Australia (HILDA) Survey, Wave 16 (2016). Estimates weighted to reflect population values.

either in primary school or before they enter the formal education system.

II Previous Research

It is important to stress that only a small number of studies have examined the determinants of financial literacy among young people, and even fewer studies have specifically examined the gender gap. Several studies employ data from the OECD 2012 Programme for International Student Assessment (PISA; Arellano *et al.,* 2017; Longobardi *et al.,* 2018; Bottazzi & Lusardi, 2021). Their findings, therefore, pertain to individuals aged 15 years. Others employ primary data from high school students in a variety of countries including Austria (Razen *et al.,* 2021), Germany (Driva *et al.,* 2016), Greece (Tzora *et al.,* 2023), New Zealand (Agnew & Cameron-Agnew, 2015) and Australia (de Zwaan & West, 2022). Several employ primary data from undergraduate university students (e.g., Jorgensen & Savla, 2010; Shim *et al.,* 2010, 2015; Serido & Shim, 2017; Gerrans & Heaney, 2019; Jorgensen *et al.,* 2019; Philippas & Avdoulas, 2020; West *et al.,* 2023). While many of these university studies control for gender in their analysis, as with the teenage studies, the magnitude and source of the gender gap is generally not the main focus of their analysis. Rather, these studies are mainly concerned with understanding the importance of financial socialisation agents (parents, school and work) on financial attitudes and behaviours.

Table 1 provides a summary of the main findings of these various studies. It also includes a paper by Lusardi *et al.* (2010) who employ data from the National Longitudinal Survey of Youth to study the determinants of financial literacy of males and females aged 23–28 years in 2007–9. Of the studies summarised in Table 1, only Lusardi *et al.* (2010), the three PISA studies and the paper by Tzora *et al.* (2023) are based on nationally representative data.

Several studies document a sizeable gender gap in financial literacy. Gender roles and gender stereotypes (which may be reinforced by financial socialisation), as well

TABLE 1
Financial Literacy Studies of Young People

Study	Data and approach	Some key findings
Agnew and Cameron-Agnew (2015)	Data: primary data from secondary school students in New Zealand; $N = 1271$; age = 14–15. Approach: OLS and descriptive	• The home environment is a very important correlate of financial literacy of young people • Age of first financial discussion matters • Father's schooling (but not mother's) matters. The authors suggests this may arise if the father is responsible for leading the financial culture of the household
Arellano *et al.* (2017)	Data: 2012 PISA; Spain; $N = 1108$; age = 15 Approach: financial literacy modelled as function of student's characteristics, family background and high school characteristics. OLS and mixed effects models	• Boys are, on average, more financially literate than girls • When controlling for self-confidence the gender gap (measured by a dummy variable approach) is 22% lower (consistent with their hypothesis that confidence is an important source of the gender gap in financial literacy)
Bottazzi and Lusardi (2021)	Data: 2012 PISA; Italy; $N = 4651$; age = 15 Approach: financial literacy modelled as a function of student's observable characteristics, family background characteristics (including the financial literacy of parents), education and cultural environment where student lives	• Boys are, on average, more financially literate than girls • Parental background matters (particularly mother's financial knowledge in predicting the financial literacy of girls) • The social and cultural environment where the student lives is an important driver of gender differences. The stronger the stereotype intensity index (more traditional) the lower the financial literacy of girls and boys, even when controlling for mathematics ability
De Zwaan and West (2022)	Data: primary data collected from students in four schools in Queensland, Australia. Age: 14–18 Approach: qualitative	• The home environment is very important, with students learning about money from parents • Girls exhibited a lack of confidence when talking about mathematics and money
Driva *et al.* (2016)	Data: primary data collected from 13 schools in Germany; $N = 418$; age = 13–15 Approach: studies the association between gender stereotypes and financial knowledge	• Observes a sizeable gender gap in financial literacy favouring boys • Adolescent females had neither lower numeracy than males nor different risk attitudes, self-confidence or cognitive ability. Both genders believe in a higher male competency in finance • Female financial knowledge deteriorates with gender stereotype intensity, whereas for males it increases • Finds no evidence of link between self-confidence and financial literacy

TABLE 1
(continued)

Study	Data and approach	Some key findings
Gerrans and Heaney (2019)	Data: primary data from students at an Australian university in 2013; $N = 1353$; age = average 20.4 years Approach: structural equation model to examine the effect of financial education on financial literacy	• Employs various measures of financial literacy as the dependent variable (from basic through to advanced). Observes a significant gender gap (as given by a dummy variable approach) • The socialisation variable (discussed finances at home) was positive and significant
Jorgensen and Savla (2010)	Data: primary data from university students collected in 2006. $N = 420$; age: 84% aged 18–22 Approach: structural equation modelling	• Young adults have inadequate financial knowledge, attitudes and behaviours • Perceived parental influence had a direct effect on financial attitude and an indirect effect on financial behaviour through attitude
Jorgensen *et al*. (2019)	Data: primary data collected in 2016 from university students and parents/grandparents. $N = 77$ students and 13 parents/grandparents Approach: qualitative. No specific gender focus	• Parents and grandparents play an important role in developing student financial attitudes and behaviours
Longobardi *et al*. (2018)	Data: 2012 PISA; Italy; $N = 3160$; age = 15. Approach: OLS and unconditional quantile regressions. Uses the Blinder–Oaxaca decomposition technique to shed light on the source of the gender gap	• The raw gap in financial literacy favours boys; 38% of the gap arises from differences in the observed characteristics of boys and girls (i.e., explained component). The gap is largely unexplained • Concludes boys and girls have different financial literacy production functions
Lusardi *et al*. (2010)	Data: NLSY97; USA; $N = 7417$; sample aged 23–28 in 2007–9 Approach: descriptive and probit models (1, 0) examining the probability of responding correctly to a particular financial literacy question	• Observed a gender gap (favouring men) across various specific questions • The gap was largest on the inflation and risk diversity questions (15%) • Family characteristics are important determinants (e.g., parental education) • Mother's education also matters
Philippas and Avdoulas (2020)	Data: primary data from survey of 456 university students in business and statistics in 2016. Senior students targeted. Age: 75% 18–22. Approach: OLS (of number of correct answers; logit (1, 0). Model (a) where =1 if correctly answered 4 or more questions; model (b) where = 1 if answer all correct, 0 if none correct	• Observes a significant gender gap (as given by a dummy variable approach) • Father's education shown to be an important determinant; mother's education not significant

TABLE 1
(continued)

Study	Data and approach	Some key findings
Razen *et al*. (2021)	Data: primary data collected in 2017–19 from Austrian schools; $N = 627$; age = average of 15.8 years Approach: Ordered logistic regression for dependent variable measuring financial literacy	• Finds that important predictors of financial literacy are gender (being male), mathematics skills, education level and education of father
Shim *et al*. (2010)	Data: primary data from cohort of 1st-year students in 2007 at a large public university in USA. $N = 2098$ Approach: structural equation model. No gender analysis	• Considerable heterogeneity in financial knowledge among young people • Financial literacy is a function of financial socialisation agents (parents, formal class learning, informal self-learning, work) • Financial socialisation by parents when young (aged 14–18) exerted a greater influence than high school and work (combined) on prudent financial decision-making
Shim *et al*. (2015)	Data: primary panel data collected in two waves when individuals aged 18–21 at wave 1 and 21–24 at wave 2 during 2007–8. Large US university Approach: structural equation model. Controls for gender but no specific gender analysis	• Parental influence particularly important determinant of financial attitudes and knowledge (e.g., frequency discussed financial matters) • Formal and informal education also affects financial attitudes and behaviours
Serido and Shim (2017)	Data: four waves of primary data from university students collected in 2008, 2010, 2013 and 2016. Age: 20s to 30s. Approach: descriptive	• Observes a gender gap (favouring males) in basic financial facts. Also finds a marked decline in financial knowledge among 30s which they believe may reflect a decline in test-taking skills • Men consistently related their financial knowledge higher than did women
Tzora *et al*. (2023)	Data: nationally representative primary data on financial knowledge and capability collected from 3028 school students in Greece. Age = 15 Approach: OLS using four different outcome measures	• Observes a significant gender gap (favouring boys) on financial capability (≥70% correct), financial knowledge score, financial behaviour score and financial attitude score • On financial knowledge the gender gap (captured by a female dummy) suggests that for the gender gap to be zero male financial knowledge would need to be 20% lower • Important correlates of financial knowledge include academic ability, school type, father's education and mother's education and household income • Pocket money inversely related to financial knowledge

TABLE 1
(continued)

Study	Data and approach	Some key findings
West *et al.* (2023)	Data: primary data from Australian university students; $N = 266$. Approach: probit analysis	• Finds that there is a gender bias in the way financial literacy is measured • Having an early interest in money enables individuals to acquire and build financial knowledge

as non-cognitive factors such as confidence, have received particular attention in these studies. Bottazzi and Lusardi's (2021) study of Italian students and Driva *et al.*'s (2016) study of German students, for example, highlight the importance of culture and gender stereotypes in explaining the gender gap. Bottazzi and Lusardi (2021) show that parental background is a particularly important predictor of financial literacy (and that mother's financial knowledge is especially important in understanding the financial literacy of girls). Their findings are consistent with adult-based studies examining the role of social norms and gender stereotypes on the gender gap in financial literacy (Grohmann & Schoofs, 2021; Rink *et al.,* 2021; Preston *et al.,* 2023).

Another focus in the literature concerns gender bias in survey design and, therefore, the measurement of financial literacy. Adult-based studies consistently show that when presented with a 'do not know' option in financial literacy tests females are more likely than males to select this option (Ooi, 2020; Bucher-Koenen *et al.,* 2021). West *et al.* (2023) also highlight this effect in their study of young people. It is thought to arise from underconfidence, with underconfidence greater for females than males. However, the extent to which the survey design and gender differences in confidence explain the gender gap in financial literacy is debateable. Tinghög *et al.* (2021), for example, find that the removal of the 'do not know' option does not change the magnitude of the gender gap in financial literacy.

Studies also show a positive correlation between mathematics ability (e.g., numeracy) and financial literacy (Bottazzi & Lusardi, 2021; Razen *et al.,* 2021; de Zwaan & West, 2022). This is not surprising since most financial literacy questions require a basic understanding of arithmetic to answer correctly. It is also well known that there is a gender gap in mathematics ability (females, on average, tend to do less well on standardised tests). The gender gap in financial literacy is, not, however, a story about the gender gap in mathematics. The gender gap in financial literacy persists even after controlling for mathematics ability (e.g., Preston & Wright, 2019; Bottazzi & Lusardi, 2021). That said, it is debatable whether mathematics ability should be included in empirical studies of the gender gap in financial literacy. There are several reasons for this. The first is that it effectively shifts the understanding of the gender gap in financial literacy onto understanding of the gender gap in mathematics ability. Not much is gained by this since the understanding of the gender gap in mathematics ability is not well understood. It seems more likely that there is a common root cause for both gaps or at least that a sizeable share of the root case is common. The second relates to the nature of the causal relationship between mathematics ability and financial literacy. Including mathematics ability on the right-hand side of a financial literacy regression assumes that it is exogenous. In other words, the researcher is assuming that the correct causal direction is from mathematics ability to financial literacy. This may or may not be case; we are aware of no research that has addressed this direction of causation issue. If mathematics ability is endogenous, it should not be included in such regressions unless its potential endogeneity is addressed via the use of instrumental variables and similarly

motivated statistical techniques. The third is that there is usually a mismatch in the way financial literacy and mathematics ability are collected in surveys that contain information on both. In all surveys that we are aware of, mathematics ability is self-assessed: respondents are simply asked to state, usually on some form of Likert scale, what they believe is their ability. This is very different from financial literacy, which is usually fact-based: individuals are asked questions with a factual correct answer. Such fact-based measures are less prone to measurement error than self-assessed measures. This partially explains why the correlation between the fact-based financial literacy and self-assessed mathematics ability is small (Preston & Wright, 2019).

In summary, studies of financial literacy among young people find a sizeable gender gap. The main conclusion of these studies is that factors such as gender stereotypes, family financial socialisation effects, schooling quality and an interest in financial matters are likely important in the understanding of gender gap. More importantly, these studies (as a group) suggest that a gender gap in financial literacy likely exists before individuals enter secondary school. Clearly more research focusing on young people is needed to establish if this is the case.

III Methodology

(i) Data

The data employed in this paper are from the HILDA Survey, an annual, nationally representative household panel survey, that began in 2001. At the time of writing there are 21 available waves of HILDA data covering the period 2001–21. Our approach, however, is cross-sectional and draws on data from five financial literacy questions, which were first asked in 2016 (wave 16). Although the questions were repeated in 2020, the data-gathering approach differed between these waves. In 2016 responses were collected via face-to-face interviews. In 2020, because of Covid-19 restrictions, the survey was via telephone. Aside from a concern about learning effects where respondents are asked the same questions twice (Bucher-Koenen *et al.,* 2021), we also believe that the use of different survey instruments may have led to non-systematic financial literacy measurement error (Preston & Wright, 2023).

A unique feature of HILDA is that the collection of data is from *all* household members aged 15 and over rather than one single household member such as the household head. A related feature, and one that matters for this study, is that the same set of survey questions are asked of all respondents. This differs from other studies where financial literacy questions are specifically tailored for the age group in question, such as PISA. It is the administration of the same set of survey questions to all respondents that allows us to directly compare the outcomes of teenagers with young adults and older-young adults and shed additional light on the male–female gap in financial literacy.

In terms of sample size, in the HILDA General Release 21 data set there were $N = 6385$ observations aged 15–34 years of age in wave 16. The sample is comprised of $N = 3281$ (51 per cent) females and 3104 (49 per cent) males. Even after partitioning the overall sample into the four specific age groups, the age-group-specific samples are large: *adolescents* (15–19), $N = 1407$; *emerging adults* (20–24), $N = 1609$; *young adults* (25–29), $N = 1778$; and *older-young adults* (30–34), $N = 1591$.

(ii) Dependent Variable

The five questions measuring financial literacy in the 2016 HILDA Survey are detailed below. All questions offered a 'do-not-know' response and a 'refuse-to-answer' response. The questions include the so-called 'Big Three' financial literacy questions developed by Lusardi and Mitchell (2008). These questions are now routinely used in studies of financial literacy globally (Bucher-Koenen *et al.,* 2021; Lusardi & Mitchell, 2023). The specific questions are:.

> Q1. *Interest Rate*: Suppose you put $100 into a no-fee savings account with a guaranteed interest rate of 2% per year. You don't make any further payments into this account and you don't withdraw any money. How much would be in the

account at the end of the first year, once the interest payment is made?

Q2. *Inflation*: Imagine now that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 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?

Q3. *Diversification*: Buying shares in a single company usually provides a safer return than buying shares in a number of different companies. [True, False].

Q4. *Risk*: An investment with a high return is likely to be high risk. [True, False].

Q5. *Money Illusion*: Suppose that by the year 2020 your income has doubled, but the prices of all of the things you buy have also doubled. In 2020, will you be able to buy more than today, exactly the same as today, or less than today with your income?

In our analysis, the dependent variable, *FL*, is the number of correctly answered financial literacy questions, which ranges from 0 correct responses (none) to 5 correct responses (all correct). We express the dependent variable in natural logarithms. As it is not possible to take the natural logarithm of 0, the small share scoring 0 (2.7 per cent of the overall sample) were allocated a small value, equal to 0.35, similar to the approach in other studies (e.g., von Gaudecker, 2015; Preston & Wright, 2019). In the robustness section we consider a measure that adjusts for degree of question difficulty and a measure where those scoring 0 are excluded. The latter shows that the transformation employed has no effects on the results. This is not surprising since only a small share of respondents scored 0.

(iii) Independent Variables

Research consistently shows that education is an important predictor of financial literacy. In the empirical analysis education is measured as the number of years of schooling completed, *School*. It captures years spent in secondary and post-secondary schooling and is derived from detailed information on the respondent's highest completed qualification and qualification level currently enrolled in (if studying). For example, students enrolled in the first year of a bachelor's degree and who did not have a gap year after completing high school are allocated 12.5 years of schooling.

It should be noted that although information on education level (e.g., certificate, degree) is available in HILDA and that a set of education-related dummy variables may provide more information on the relationship between education and financial literacy, such dummy variables are not appropriate in this study, given the inclusion of teenagers in the sample. Many teenagers are still in school and, therefore, have no post-school qualifications. The schooling measure permits the estimation of a comparable regression across age groups. Empirical studies show that school type may affect financial literacy through the quality of instruction and through peer effects (Bottazzi & Lusardi, 2021). In this study we control for school type via a dummy variable, *PrivSch*, set equal to 1 if the respondent attended a fee-paying school and 0 if they attended a government school. The base category also includes 0.3 per cent of respondents with missing information on school type. Unfortunately, we are unable to disaggregate further and control for sex composition of the school attended.

Previous studies have shown that labour market activity affects financial literacy, perhaps through work-based financial literacy programs and/or through peer socialisation effects. It may be that labour market activity correlates with financial decision-making (e.g., decisions regarding participation in pension schemes). Labour market activity is based on four categories. Four dummy variables are created: $WorkOnly = 1$ if the respondent is only working; $StudyOnly = 1$ if the respondent is only studying; $StudyWork = 1$ if the respondent is studying and working; and $NoStudyWork = 1$ if the respondent is neither working nor studying (e.g., unemployed). The excluded category in the regression is *WorkOnly*.

Since our analysis is focused on young people, a variable is included that captures

where the respondent lives in terms of living 'at home' or elsewhere. One would expect that in Australia the majority of teenagers live at home. One would also expect this share to decline rapidly as individuals grow older and leave their family home for further/higher education and/or employment. Such an age pattern is confirmed by Figure 1. The share of respondents aged 15–19 living at home is 91.0 per cent. The share of respondents aged 30–34 living at home is 7.8 per cent. This is a dramatic and fundamental change and no doubt affects many areas of life. In order to explore if this matters for financial literacy, a dummy variable, *AtHome*, is created and set to 1 if the respondent reports living at home and 0 otherwise. For the majority of respondents 'at home' usually means living with their parents, step-parents or other relatives.

Marital status has been shown to impact on financial literacy, with the usual finding being that financial literacy is higher for married (or cohabitating) individuals than for those single, widowed, divorced or separated. A dummy variable, *Marr*, is set to 1 if the individual is married or cohabitating and 0 if they are single, widowed, divorced or separated. There is a problem with using this variable in our regression analysis, which is illustrated in Figure 1. The share of respondents married or cohabitating in the *teenagers* age group (15–19) is only 2 per cent. This share is too small for *Marr* to be reliably included in regressions specific to this age group. In regression estimates not reported here, the coefficient of *Marr* was severely inflated and implausibly large. However, for the other age groups, the share of respondents married or cohabiting is sufficiently large. More specifically, 20.1 per cent for *emerging adults* (20–24); 54.0 per cent for *young adults* (25–29) and 72 per cent for *older-young adults* (30–34). Therefore, marital status variable is only included in the analysis of the three older age groups.

We also explore the potential impact of children on financial literacy by including a variable capturing the presence of dependent children in the household. A dependent child is defined as being aged 15 or younger. A dummy variable, *Kids*, is created which is set to 1 if the respondent reports the presence of a dependent child, otherwise the variable is set equal to 0. Like marital status, there is a problem using this variable in the analysis of the *teenagers* group. Only 0.5 per cent of respondents aged 15–19 report the presence of a dependent child. The shares for the other age groups are considerably higher: 6.5 per cent for *emerging adults* (20–24); 22.7 per cent for *young adults* (25–29) and 50.2 per cent for *older-young adults* (30–34). As was the case for marital status, the *Kids* variable is only included in the analysis of the three older age groups.

In order to evaluate if there are any so-called 'sibling effects' on financial literacy, two variables are included in the analysis. The first, *Sibs*, is the number of brothers and sisters that the respondent has. The second, *Eldest*, relates to birth order. It is a dummy variable set to 1 if the respondent is the eldest child. This variable is also set to 1 if the respondent is an only child. There is a large literature that concludes that sibling effects are important in the understanding of a number of socioeconomic outcomes. including learning and education attainment (see, for example, Kluger, 2012; Steelman *et al.,* 2002).

The remaining variables are aimed at capturing and proxying socioeconomic conditions relevant to the respondent's household. A dummy variable, *SingPar*, is created and set to 1 if the respondent resides in a single-parent household and 0 if they do not. The majority of teenagers (62 per cent) reside in a two-parent household. A variable is included concerned with whether the respondent's parents were separated (but not necessarily divorced) before they were aged 15. This is a dummy variable, *ParSep*, set to 1 if the respondent reports their parents being separated and 0 if they were not. Variables for housing tenure were constructed based on a three-category owner–renter distinction. The variables are: *Renting*, which is equal to 1 if the respondent reports living in a home that is rented; *NoMortgage*, which is equal to 1 if the respondent reports living in a home with no mortgage; and *Mortgage*, which is equal to 1 if the respondent reports living in a home with a mortgage. The excluded category in the regressions is *Renting*.

Two sets of area variables are included in the analysis. The first set of variables is

based on a measure of the socioeconomic deprivation of the neighbourhood where the respondent resides. This is based on the Australian Bureau of Statistics (ABS, 2023) Socio-Economic Indexes for Areas (SEIFA) index. The SEIFA index orders area by disadvantage into ten equally sized groups (with decile 1 being the most disadvantaged and decile 10 the most advantaged). In our analysis, neighbourhood deprivation is captured by three dummy variables: *PoorNeigh*, which is equal to 1 if the neighbourhood where the respondent lives is a low socioeconomic area, defined as being in the bottom 20th percentile; *RichNeigh*, which is equal to 1 if the neighbourhood where the respondent lives is a high socioeconomic area, defined as being in the top 20th percentile; and *MiddleNeigh*, which is equal to 1 if the neighbourhood where the respondent lives is a middle socioeconomic area, defined as being in the 20th to 60th percentiles. The excluded category in the regressions is *MiddleNeigh*. The second set of variables is based on whether the respondent lives in an urban or rural area. Three dummy variables, based on a three-way categorisation of rural–urban, are constructed: *MajUrban*, which is equal to 1 if the respondent resides in a major urban area (Sydney, Melbourne, Brisbane, Perth, Adelaide, Canberra, Hobart or Darwin); *OthUrban*, which is equal to 1 if the respondent resides in a non-major urban area; and *Rural*, which is equal to 1 if the respondent resides in a rural area. The excluded category in the regressions is *MajUrban*.

To capture the potential effects of family background on financial literacy, variables are included that measure the labour market status and education of the respondent's parents when the respondent was aged 14. Father's employment, *FatEmp*, is a dummy variable set to 1 if the respondent's father was employed when the respondent was age 14 (and the respondent was living with both parents). Likewise, mother's employment, *MotEmp*, is a dummy variable set to 1 if the respondent's mother was employed when the respondent was aged 14 (and the respondent were living with both parents). For both variables, the base category of 0 includes respondents who reported that their father and/or mother was/were deceased or they did not know their employment status. Across the whole sample (aged 15–34 years), 4.9 per cent reported that their father was either not present or deceased when they were aged 15 and 1.0 per cent reported that their mother was either not present or deceased when they were aged 15. We believe these small shares are unlikely to have little impact on our regression estimates. Therefore, these missing values were not imputed.

Father's education, *FatSch*, and mother's education, *MotSch*, are constructed using information on the highest level of education completed by the respondent's parents (as reported by the respondent). For both parents, father's and mother's education is measured by the number of years of schooling completed, which is the same as the way in which the respondent's education is measured. However, for both variables, a sizeable share of respondents did not report such information. More specifically, 9.5 per cent and 5.8 per cent of respondents had missing information for *FatSch* and *MotSch*, respectively. We believe that excluding such respondents from the sample (and subsequent analysis), would adversely affect the representativeness of our findings. As a consequence, we imputed these missing values following a two-step allocation using information about the occupation of the respondent's parents. In the first step, the mean number of years of schooling was calculated (separately for fathers and mothers) for each single-digit occupation group. For respondents whose parent's occupation was observed, the mean value of 'occupation-specific' mean years of schooling was assigned. This reduced the share of respondents with missing information on *FatSch* and *MotSch* by around half to 5.2 per cent and 3.3 per cent, respectively. In the second step, for respondents who had missing information on parental occupation the mean value of schooling for all fathers and mothers was assigned. We believe that imputing missing values of parental schooling is preferable to excluding respondents with missing values since it helps maintain the representativeness of the sample at the cost of increased measurement error. Since measurement error usually biases estimates towards zero, our regression estimates of the impact of parental schooling on financial

literacy are likely underestimates of the true effect.

(iv) Statistical Approach

Our empirical approach estimates three measures of the gender gap in financial literacy. The first measure, *Gap*, is the difference, measured as a percentage, in the mean values of financial literacy between males and females,

$$Gap = \left[\left(\overline{FL}_{\mathrm{M}} - \overline{FL}_{\mathrm{F}}\right)/\overline{FL}_{\mathrm{F}}\right] \cdot 100 \qquad (1)$$

where $\overline{FL}_{\mathrm{M}}$ is the mean value of financial literacy for males and $\overline{FL}_{\mathrm{F}}$ is the mean values for females. It is simply the raw gap and is not adjusted for any differences in the determinants of financial literacy between males and females. It has a straightforward interpretation: it is how much higher (in percentage terms) the financial literacy of females would need to be to equal the financial literacy of males. Although this may appear trite, there are two ways to 'achieve' gender equality in financial literacy. The first is to pursue policies aimed at increasing the financial literacy of females. The second is to pursue policies aimed at decreasing the financial literacy of males. Clearly policies aimed at lowering financial literacy are not justifiable or desirable. The fact that the only acceptable way to achieve gender equality is to increase the financial literacy of females must be reflected in any adjusted measures of the gender gap. In the measures discussed below, it not straightforward to build in this essential property.

The first adjusted gender gap measure, *Gap**, is based on the following financial literacy regression equation estimated with a sample of $i = 1, 2, \ldots, N$ individuals:

$$\ln(FL_i) = \alpha + \boldsymbol{\beta}\mathbf{X}_i + \gamma Male_i + e_i \qquad (2)$$

where $\ln(FL)$ is the natural logarithm of the number of correct financial literacy responses, FL; $\mathbf{X}$ is a vector of explanatory variables ($\mathbf{X} = X_1, X_2, \ldots, X_k$); *Male* is a dummy variable coded 1 if the respondent is male and 0 if female; α is a constant term; $\boldsymbol{\beta}$ is a vector of parameters ($\boldsymbol{\beta} = \beta_1, \beta_2, \ldots, \beta_k$); γ is a parameter to be estimated; and e is a random error term. All the right-hand-side variables included in Equation (2) are assumed to be exogenous. After estimating with ordinary least squares (OLS), an 'adjusted' measure of the gender gap, *Gap**, is:

$$Gap* = [\exp(\hat{\gamma}) - 1] \cdot 100 \qquad (3)$$

This is a measure of the gender gap in financial literacy (in percentage terms) that adjusts the raw gap for differences in the mean values of the explanatory variables. It should be noted that with this measure, the gender gap in financial literacy is captured by differences in the constant terms for males and females: $\hat{\alpha}_{\mathrm{F}} = \hat{\alpha}$, $\hat{\alpha}_{\mathrm{M}} = \hat{\alpha} + \hat{\gamma}$. If $\hat{\gamma} \neq 0$ then $\hat{\alpha}_{\mathrm{F}} \neq \hat{\alpha}_{\mathrm{M}}$. If $Gap* < Gap$ then the adjusted gender gap is smaller than the raw gap. If $Gap* > Gap$ then the adjusted gender gap is larger than the raw gap. Both possibilities are theoretically possible.

This adjustment is carried out assuming that the impact of the explanatory variables on financial literacy is the same for males and females (i.e., $\hat{\beta}_{\mathrm{M}} = \hat{\beta}_{\mathrm{F}}$). To illustrate, consider a single explanatory variable X (i.e., there is only one variable in $\mathbf{X}$). If the mean value of $\overline{X}$ is higher for males than for females (i.e., $\overline{X}_{\mathrm{M}} > \overline{X}_{\mathrm{F}}$), and the β associated with $\overline{X}$ is positive (i.e., $\hat{\beta} > 0$), then part of the gender gap is 'explained' by the gender difference in $\overline{X}$ (i.e., $\overline{X}_{\mathrm{M}} - \overline{X}_{\mathrm{F}} > 0$). This will be captured in the adjusted gender gap, which will be smaller than the raw gender gap (i.e., $Gap* < Gap$). In percentage terms, *Gap** is how much higher the financial literacy of females would need to be to equal the financial literacy of males *after* controlling for all the differences in the mean values of the explanatory variables. It is *not* an estimate of how much the financial literacy of females would need to increase to close the raw gender gap.

If *Male* was replaced in Equation (1) by a dummy variable, *Female* (coded 1 if the respondent is female and 0 if male), the resulting *Gap** measure would be an estimate (in percentage terms) of how much *lower* the financial literacy of males would need to be to equal that of females, after controlling for all the differences in the mean values of the explanatory variables. Clearly such an adjusted measure of the gender gap is not policy-relevant. Finally, if the mean value of $\overline{X}$ is higher for females

than for males (i.e., $\overline{X}_M < \overline{X}_F$), and the β associated with X is positive (i.e., $\hat{\beta} > 0$), then the adjusted gender gap will be larger than the raw gender gap (i.e., $Gap^* > Gap$). In other words, the raw gender gap underestimates the 'true' gender gap (given the assumptions of the approach). Therefore, from a policy point of view, the financial literacy of females would need to be increased more than the raw gender gap to achieve gender equality.

It seems unlikely that the magnitude of relationships between all explanatory variables and financial literacy is the same for males and females (i.e., $\hat{\beta}_M = \hat{\beta}_F$). Fortunately, it is not difficult to construct an adjusted measure of the gender gap, Gap^{**}, that controls for both gender differences in the mean values of explanatory variables and gender differences in parameters associated with these explanatory variables. The approach is based on the Oaxaca–Blinder decomposition technique (Blinder, 1973; Oaxaca, 1973). The latter is an increasingly favoured approach when examining the source of the gender gap in financial literacy. It is an approach commonly used in labour economics to study the gender wage gap (see Blau & Kahn, 2017). We believe that Fonseca *et al*. (2012) were the first to use this decomposition to quantify the determinants of the gender gap in financial literacy. Others have followed, such as Cupák *et al*. (2018) and Preston and Wright (2019) for adults and Longobardi *et al*. (2018) for young people.

The approach requires the estimation of two gender-specific financial literacy regressions (dropping the subscript i for clarity):

$$\ln(FL)_M = \alpha_M + \boldsymbol{\beta}_M \boldsymbol{X}_M + e_M \quad (4a)$$

$$\ln(FL)_F = \alpha_F + \boldsymbol{\beta}_F \boldsymbol{X}_F + e_F \quad (4b)$$

After estimation with OLS, subtracting Equation (4b) from (4a), and rearranging terms gives

$$\begin{aligned} Gap &= \ln\left(\overline{FL}\right)_M - \ln\left(\overline{FL}\right)_F \\ &= \left(\hat{\alpha}_M + \hat{\beta}_M \overline{X}_M\right) - \left(\hat{\alpha}_F + \hat{\beta}_F \overline{X}_F\right) \\ &= \left(\hat{\alpha}_M - \hat{\alpha}_F\right) + \hat{\beta}_M\left(\overline{X}_M - \overline{X}_F\right) + \left(\hat{\beta}_M - \hat{\beta}_F\right)\overline{X}_F \end{aligned} \quad (5)$$

This approach decomposes the raw gender gap, Gap, into two components. The first is the so-called 'explained component', $\hat{\beta}_M\left(\overline{X}_M - \overline{X}_F\right)$. This is the amount of the gender gap that can be attributed to male–female differences in the mean values of the explanatory variables (i.e., $\overline{X}_M - \overline{X}_F$) weighted by the male parameter estimates (i.e. $\hat{\beta}_M$). The second component is the so-called 'unexplained component', $\left(\hat{\alpha}_M - \hat{\alpha}_F\right) + \left(\hat{\beta}_M - \hat{\beta}_F\right)\overline{X}_F$. This is the amount of the gender gap that can be attributed to male–female differences in the parameters associated with the explanatory variables (i.e., $\hat{\beta}_M - \hat{\beta}_F$), weighted by the mean values of the explanatory variables for females ($\overline{X}_F$), and the male–female differences in the constant terms (i.e. $\hat{\alpha}_M - \hat{\alpha}_F$). It is this unexplained component that is usually attributed to discrimination in studies of male–female differences in wages and earnings.

An adjusted measure of the gender gap, Gap^{**}, based on this decomposition method is

$$Gap** = \left[\exp\left(\left(\hat{\alpha}_M - \hat{\alpha}_F\right) + \left(\hat{\beta}_M - \hat{\beta}_F\right)\overline{X}_F\right) - 1\right] \cdot 100 \quad (6)$$

This expression transforms the unexplained component of the raw gender gap into an adjusted measure of the gender gap with an interpretation that is consistent and compatible with Gap and Gap^*. In percentage terms, Gap^{**} is how much higher the financial literacy of females would need to be to equal the financial literacy of males *after* controlling for male–female differences in the mean values of the explanatory variables *and* for male–female differences in parameter values and constant terms. It controls for differences in the mean values of the explanatory variables in a manner analogous to Gap^*. It controls for differences in parameter values by estimating how much of the raw gap can be attributed to parameter differences and the female mean values of the explanatory values. Therefore, it maintains the property of summarising in

percentage terms how much female financial literacy would need to increase to achieve gender equality. Like *Gap**, it is *not* an estimate of how much the financial literacy of females would need to increase to close the raw gender gap. It is simply an extension of *Gap** that controls for parameter and constant term differences between females and males.

It is important to stress that *Gap*, *Gap** and *Gap*** are directly comparable across subgroups of the same sample and across different samples. Therefore, all three are very useful in comparing the gender gap across different groups. They can also be used as a criterion for robustness testing. If $Gap^* \approx Gap$, then differences in the mean values of the explanatory between males and females do not explain much of the raw gap, *Gap*. If $Gap^{**} \approx Gap$, then differences in the mean values of the explanatory variables between males and females, coupled with differences in the parameter values of these explanatory variables between males and females, do not explain much of the raw gap, *Gap*. Table 2 presents a summary of the three measures of the gender gap used in our analysis.

IV Results

Table 3 reports the variable names, definitions and descriptive statistics for all the variables included in the analysis separately for each of the four age groups. Before discussing these estimates, consider Figure 3. This shows the mean number of correct financial literacy responses for each single year of age, from 15 to 80+ years, for males and females separately. Given that some of the samples are small, it is not surprising that there is a certain amount of noise in the estimated age–financial literacy profiles. However, despite this, there is a clear pattern. First, the relationship for both males and females is an inverted U-shape, with financial literacy lowest in the teen years, increasing to a maximum to around age 50 and decreasing afterwards. Second, for almost all the single-year age groups, financial literacy is lower for females than for males. It appears that the gender gap in financial literacy is persistent across the age range and there appears to be no obvious convergence with age.

Figure 4a shows the mean number of correct responses for males and females, separately for the 15–19, 20–24, 25–29 and 30–34 age groups, taken from Table 3. Four points relating to this figure are worth noting. The first is that across the age range these age groups represent, there is an increase in financial literacy for both males and females. This is illustrated by the trend line in Figure 4a. The second point is that for all four age groups, the mean number of correct responses is higher for males than for females. This confirms that there is a sizeable 'raw' gender gap in financial literacy in this age range (and confirms what was shown in Fig. 3). This gender gap, in percentage terms, is shown in Figure 4b. For the 15–19 age group, male financial literacy is 21.4 per cent higher than female financial literacy. This declines to 15.2 per cent for the 20–24 age group and to 8.3 per cent for the 25–29 age group. The gender gap is slightly higher for the 30–34 age group at 10.8 per cent, compared to the 25–29 age group, but the

TABLE 2
Summary Measures of the Gender Gap in Financial Literacy

Measure	Definition	Controls for differences in:		
		Explanatory variables (X)	Constant term (α)	Parameter values (β)
Gap	$\left[\left(\overline{FL}_M - \overline{FL}_F\right)/\overline{FL}_F\right] \cdot 100$	No	No	No
*Gap**	$\left[\exp(\hat{\gamma}) - 1\right] \cdot 100$	Yes	Yes	No
*Gap***	$\left[\exp\left((\hat{\alpha}_M - \hat{\alpha}_F) + \left(\hat{\beta}_M - \hat{\beta}_F\right)\overline{X}_F\right) - 1\right] \cdot 100$	Yes	Yes	Yes

Note: See text for details.

TABLE 3
Variable Names, Definitions, Means (and Standard Deviations) of Variables Included in Financial Literacy Regressions, by Age Group, Australians, 2016

		Teenagers			Emerging adults			Young adults			Older-young adults		
		15–19			20–24			25–29			30–34		
Variable	Definition	Persons	Males	Females	Persons	Males	Females	Persons	Males	Females	Persons	Males	Females
FL	= Number of correct financial literacy responses (range 0–5)	3.1 (1.4)	3.4 (1.3)	2.8 (1.4)	3.6 (1.3)	3.8 (1.2)	3.3 (1.4)	3.7 (1.2)	3.9 (1.2)	3.6 (1.3)	3.9 (1.2)	4.1 (1.2)	3.7 (1.2)
ln(*FL*)	= Natural logarithm of *FL*	1.0 (0.6)	1.1 (0.6)	0.9 (0.7)	1.2 (0.6)	1.3 (0.5)	1.1 (0.6)	1.2 (0.5)	1.3 (0.5)	1.2 (0.5)	1.3 (0.5)	1.3 (0.5)	1.2 (0.5)
Male	= 1 if male; = 0 if female	51.4%	100%	0.0%	50.3%	100%	0.0%	50.7%	100%	0.0%	48.3%	100%	0.0%
School	= Years of schooling	11.7 (1.3)	11.6 (1.3)	11.8 (1.3)	13.7 (1.8)	13.6 (1.8)	13.8 (1.7)	13.9 (2.2)	13.6 (2.2)	14.3 (2.2)	14.4 (2.3)	14.1 (2.4)	14.6 (2.3)
PrivSch	= 1 if attended/ attending a private school; 0 if not	36.7%	34.6%	38.9%	34.8%	34.7%	35.0%	33.4%	31.7%	35.0%	31.1%	29.0%	33.0%
WorkOnly	= 1 if employed and not studying; = 0 otherwise (excluded category)	11.7%	11.1%	12.3%	43.8%	47.6%	40.0%	65.3%	72.0%	58.4%	67.3%	76.0%	59.2%
StudyOnly	= 1 if studying and not working; 0 otherwise	42.7%	45.8%	39.5%	12.8%	8.9%	16.7%	5.6%	3.4%	7.9%	4.2%	4.2%	4.1%
StudyWork	= 1 if studying and working; 0 otherwise	36.7%	33.1%	40.4%	31.9%	33.1%	30.7%	13.8%	11.3%	16.3%	10.2%	10.2%	10.3%
NoStudyWork	= 1 if neither studying nor working; 0 otherwise	8.9%	10.0%	7.8%	11.4%	10.4%	12.5%	15.3%	13.3%	17.4%	18.3%	9.6%	26.4%

TABLE 3
(continued)

Variable	Definition	Teenagers 15–19			Emerging adults 20–24			Young adults 25–29			Older-young adults 30–34		
		Persons	Males	Females	Persons	Males	Females	Persons	Males	Females	Persons	Males	Females
AtHome	= 1 if still living at home; 0 if not	91.0%	91.5%	90.4%	56.4%	58.7%	54.0%	18.6%	21.9%	15.1%	7.8%	12.6%	3.4%
Marr	= 1 if married (or cohabitating); 0 if not	2.1%	1.4%	2.8%	20.1%	13.6%	26.7%	53.8%	47.9%	59.9%	71.8%	71.0%	72.5%
Kids	= 1 if dependent children in household; = 0 if not	0.5%	0.1%	1.0%	6.5%	2.1%	11.0%	22.7%	13.6%	32.2%	50.2%	41.4%	58.4%
Sibs	= Number of siblings	2.1 (1.6)	2.1 (1.7)	2.2 (1.5)	2.0 (1.5)	2.1 (1.5)	2.0 (1.5)	2.2 (1.6)	2.2 (1.5)	2.2 (1.7)	2.1 (1.6)	2.1 (1.7)	2.1 (1.6)
Eldest	= 1 if oldest child (or only child); 0 if not	39.3%	40.9%	37.6%	38.0%	36.3%	39.8%	41.6%	42.5%	40.6%	38.5%	37.5%	39.4%
SingPar	= 1 if single parent household; 0 if not	22.1%	21.2%	23.0%	16.0%	17.1%	14.9%	13.7%	13.1%	14.3%	8.2%	5.4%	10.8%
ParSep	= 1 if parents separated before respondent was aged 15; 0 if not	27.8%	27.4%	28.3%	25.9%	27.7%	24.0%	25.4%	25.6%	25.2%	17.9%	18.5%	17.3%
Renting	= 1 if living in a rented home (excluded category); 0 if otherwise	38.1%	35.9%	40.3%	54.4%	56.2%	52.7%	59.3%	60.3%	58.3%	48.1%	46.2%	50.0%
NoMortgage	= 1 if living in a home with no mortgage; 0 if otherwise	12.6%	11.8%	13.4%	12.6%	12.5%	12.7%	6.3%	8.3%	4.2%	5.9%	8.6%	3.3%

TABLE 3
(continued)

Variable	Definition	Teenagers			Emerging adults			Young adults			Older-young adults		
		15–19			20–24			25–29			30–34		
		Persons	Males	Females	Persons	Males	Females	Persons	Males	Females	Persons	Males	Females
Mortgage	= 1 if living in a home with a mortgage; 0 if otherwise	49.4%	52.3%	46.3%	33.0%	31.4%	34.7%	34.4%	31.4%	37.5%	46.0%	45.2%	46.7%
PoorNeigh	= 1 if neighbourhood is low socioeconomic area (bottom 20th percentile); 0 if otherwise	18.7%	20.4%	16.8%	17.1%	15.5%	18.8%	19.5%	18.2%	20.7%	20.0%	20.9%	19.2%
MiddleNeigh	= 1 if neighbourhood is middle socioeconomic area (middle 60th percentile) (excluded category); 0 if otherwise	60.3%	57.3%	63.4%	60.4%	63.9%	56.8%	63.6%	64.5%	62.7%	62.3%	61.6%	63.0%
RichNeigh	= 1 if neighbourhood is high socioeconomic area (top 20th percentile); 0 if otherwise	21.1%	22.3%	19.7%	22.5%	20.6%	24.4%	16.9%	17.3%	16.5%	17.6%	17.5%	17.8%

TABLE 3
(continued)

Variable	Definition	Teenagers			Emerging adults			Young adults			Older-young adults		
		15–19			20–24			25–29			30–34		
		Persons	Males	Females	Persons	Males	Females	Persons	Males	Females	Persons	Males	Females
MajUrban	= 1 if resides in major urban area (excluded category); 0 if otherwise	63.5%	63.9%	63.0%	71.6%	71.2%	71.9%	68.9%	68.1%	69.7%	71.0%	71.3%	70.7%
OthUrban	= 1 if resides in another urban area; 0 if otherwise	20.6%	21.2%	20.1%	16.6%	16.6%	16.7%	18.8%	19.3%	18.3%	15.8%	16.2%	15.4%
Rural	= 1 if resides in a rural area; 0 if otherwise	15.9%	14.9%	16.9%	11.8%	12.2%	11.3%	12.3%	12.6%	12.0%	13.2%	12.6%	13.9%
MotEmp	= 1 if mother was in paid employment when respondent was age 14 (and respondent was living with both parents); 0 = otherwise	72.5%	72.1%	72.9%	69.4%	66.5%	72.4%	66.5%	66.1%	66.9%	56.2%	56.6%	55.8%
FatEmp	= 1 if father was in paid employment when respondent was age 14 (and respondent was living with both parents); 0 = otherwise	85.4%	84.9%	85.9%	86.4%	85.7%	87.1%	86.5%	85.8%	87.3%	84.9%	86.0%	83.9%

TABLE 3
(continued)

Variable	Definition	Teenagers 15–19 Persons	Males	Females	Emerging adults 20–24 Persons	Males	Females	Young adults 25–29 Persons	Males	Females	Older-young adults 30–34 Persons	Males	Females
MotSch	= Mother's years of schooling	12.6	12.5	12.7	12.6	12.6	12.7	12.6	12.5	12.7	12.6	12.6	12.6
		(2.1)	(2.3)	(1.8)	(2.0)	(2.2)	(1.9)	(2.0)	(2.2)	(1.8)	(2.0)	(2.0)	(2.0)
FatSch	= Father's years of schooling	12.5	12.4	12.6	12.6	12.5	12.7	12.6	12.5	12.7	12.7	12.7	12.7
		(2.9)	(3.1)	(2.6)	(2.7)	(2.9)	(2.4)	(2.7)	(2.8)	(2.5)	(2.3)	(2.3)	(2.4)
N		1407	696	711	1609	776	833	1778	868	910	1591	764	827

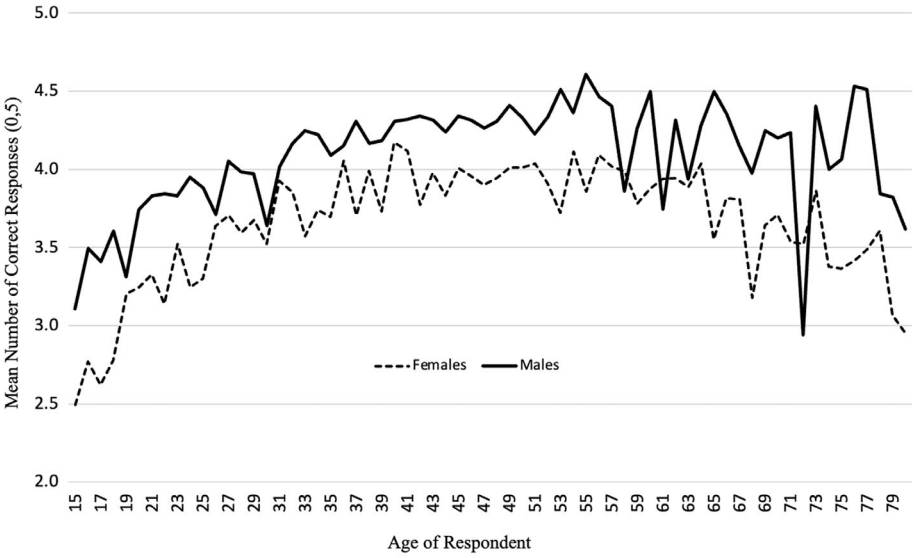
Notes: [†]Estimates weighted to reflect population values. [‡]Standard deviations in parentheses.
Source: HILDA Survey, wave 16, 2016.

difference of 2.5 percentage points is not massive. The third point is that the gender gap in financial literacy is declining across the age range (15–34). This was not clear from Figure 3. For males, the percentage increase in financial literacy between age 15–19 to age 30–34 is 21 per cent. For females, the corresponding percentage increase is 32 per cent. In this age range, there is some convergence between male and female financial literacy. The fourth point is that financial literacy is low for 15–19-year-olds. Comparing the 15–19 age group to either the 25–29 or 30–34 age groups suggests a raw gender gap that is around twice as large.

Table 4 reports the regressions estimates of Equations (3), (4a) and (4b) for each of the four age groups. Columns (1), (4), (7) and (10) are the estimates of Equation (3) that only capture gender differences in financial literacy by including a dummy variable for gender (*Male*). This regression is estimated using a combined sample of male and female respondents. The remaining columns are the estimates of Equations (4a) and (4b) based on separate samples for males and females. More specifically, columns (2), (5), (8) and (11) are the estimates for males while columns (3), (6), (9) and (12) are the estimates for females.

It is important to note that these regressions include a large number of independent variables (explanatory factors) that the literature suggests are possible determinants of financial literacy. Given this premise, it is surprising that there is little consistency across the different age groups and different specifications in terms of what variables are the important ones in terms of variance explained. The only consistent effect is schooling (*School*). This variable is positive (as expected) and highly statistically significant ($P < 0.01$) in all specifications. This is the only variable that is statistically significant in all specifications. It is also interesting to note that in the 15–19, 20–24 and 25–29 age groups, the marginal effect of schooling is larger for females than for males. There is some evidence that private schooling (*PrivSch*) is associated with higher financial literacy. This effect is clear for the 15–19 age group, with the marginal effect being larger for females than for males. The effect of private schooling is

FIGURE 3
Mean Number of Correct Financial Literacy Responses, Male and Female Australians, Aged 15–80+, 2016



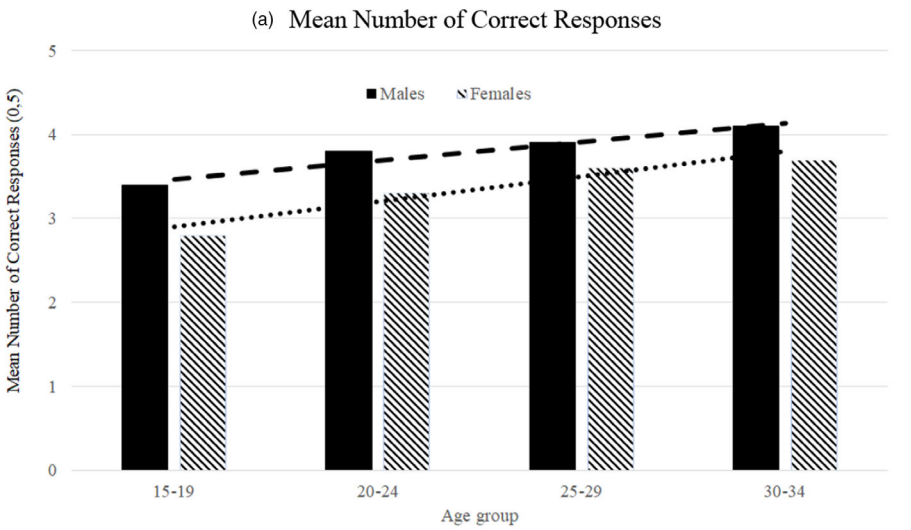
Source: Household, Income and Labour Dynamics, Australia (HILDA) Survey, Wave 16 (2016). Estimates weighted to reflect population values.

not well defined for the other age groups. Given the strong effect of schooling, it not surprising that studying and/or working (compared to neither working nor studying) is associated with higher financial literacy. All the coefficients of the variables *WorkOnly*, *StudyOnly* and *StudyWork* are positive but not always statistically significant even at the 10% level. As for the remaining variables, the estimates show little consistency between males and females or across the age groups. While these regression estimates confirm the importance of schooling, and perhaps employment, they do not present a simple explanation for the gender gap in financial literacy in any of the selected age groups.

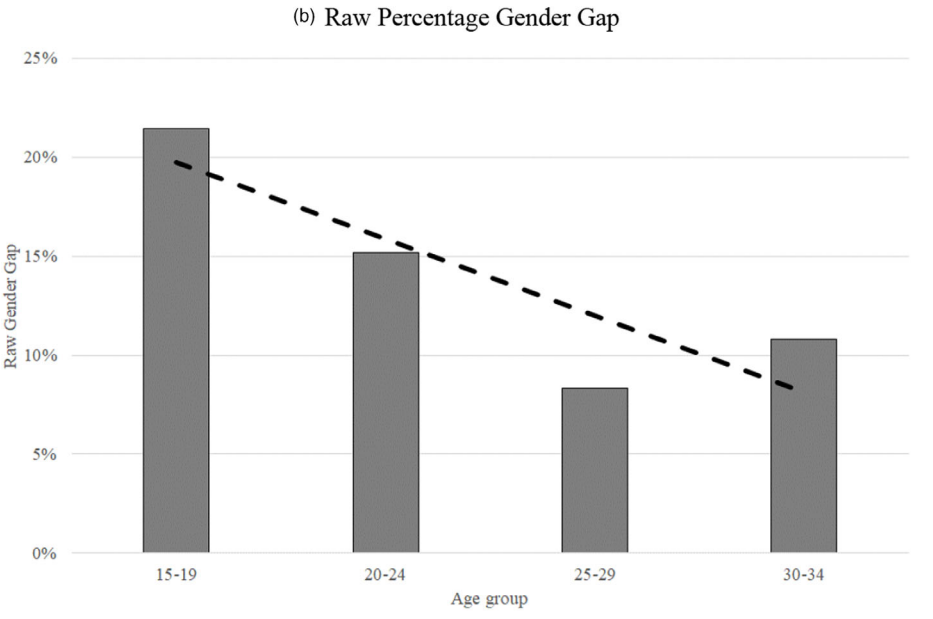
Turning first to the estimates of Equation (3), the gender dummy variable (male) is positive and statistically significant at the 1% level in all four age groups. This finding is consistent with previous research. The magnitude of this effect gets smaller (less positive) across the four age groups. However, this effect is estimated assuming the effects of the other variables are the same for males and females. As already mentioned, this is not the case with respect to some of the included variables such as schooling, studying and working. Therefore, it not a realistic assumption. The remainder of the estimates in Table 4 relax this assumption by estimating regressions separately for males and females (Eqns 4a and 4b) and then carrying out an Oaxaca–Blinder decomposition of the difference in male and female financial literacy. The details of this decomposition are summarised in Table 5.

Figure 5a summarises the main findings of our empirical analysis in a simple manner. It shows the three gender gap measures (*Gap*, *Gap** and *Gap***; see Table 2) in percentage terms, for each of the four age groups. *Gap** and *Gap*** are adjusted measures of the gender gap. *Gap* is the raw or unadjusted gender gap. This is also shown in Figure 5a and is included again in Figure 5b to assist with the comparison. A key finding illustrated in Figure 5a is that, regardless of how the gap is measured, it is much larger for

FIGURE 4
Mean Number of Correct Financial Literacy Responses and Raw Percentage Gender Gap in Financial Literacy, by Age Group, Australians, 2016



Source: Household, Income and Labour Dynamics, Australia (HILDA) Survey, Wave 16 (2016). Estimates weighted to reflect population values.



Source: Household, Income and Labour Dynamics, Australia (HILDA) Survey, Wave 16 (2016). Estimates weighted to reflect population totals.

TABLE 4
Financial Literacy Regression Estimates, by Age Group, Australians, 2016

#	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Age group:		15–19			20–24			25–29			30–34	
Variable:	Persons	Males	Females	Persons	Males	Females	Persons	Males	Females	Persons	Males	Females
Male	0.274***	–	–	0.226***	–	–	0.155***	–	–	0.104***	–	–
	(0.041)			(0.036)			(0.037)			(0.043)		
School	0.072***	0.062***	0.079***	0.071***	0.059***	0.080***	0.042***	0.034***	0.050***	0.035***	0.037***	0.037**
	(0.015)	(0.016)	(0.027)	(0.013)	(0.017)	(0.018)	(0.008)	(0.012)	(0.010)	(0.010)	(0.009)	(0.015)
PrivSch	0.136***	0.097**	0.149**	0.069*	0.094*	0.027	0.048	0.083*	−0.001	0.037	−0.008	0.019
	(0.041)	(0.049)	(0.062)	(0.037)	(0.053)	(0.052)	(0.036)	(0.043)	(0.057)	(0.041)	(0.040)	(0.052)
WorkOnly	0.307**	0.461***	0.114	0.259***	0.133	0.368***	0.109**	0.162**	0.054	0.177***	0.215**	0.110
	(0.135)	(0.166)	(0.140)	(0.086)	(0.109)	(0.136)	(0.042)	(0.066)	(0.055)	(0.065)	(0.092)	(0.077)
StudyOnly	0.338***	0.450***	0.222*	0.314***	0.192	0.395**	0.119*	0.320***	0.013	−0.289	−0.872**	0.382***
	(0.128)	(0.160)	(0.122)	(0.104)	(0.117)	(0.157)	(0.063)	(0.090)	(0.090)	(0.372)	(0.427)	(0.096)
StudyWork	0.398***	0.502***	0.266**	0.264***	0.163	0.334**	0.182***	0.214***	0.140**	0.232***	0.239**	0.155*
	(0.130)	(0.162)	(0.121)	(0.089)	(0.112)	(0.145)	(0.046)	(0.077)	(0.059)	(0.078)	(0.108)	(0.085)
AtHome	0.045	−0.113	0.163	0.011	0.004	0.038	−0.126**	−0.101*	−0.156*	−0.254	−0.326***	0.149
	(0.075)	(0.087)	(0.108)	(0.047)	(0.066)	(0.066)	(0.051)	(0.060)	(0.082)	(0.188)	(0.126)	(0.118)
Marr	–	–	–	0.068	0.103*	0.060	0.005	−0.026	0.029	0.044	0.102*	−0.063
				(0.043)	(0.055)	(0.057)	(0.042)	(0.055)	(0.057)	(0.055)	(0.058)	(0.064)
Kids	–	–	–	0.036	0.013	0.080	0.014	0.077	−0.033	0.032	0.023	0.017
				(0.087)	(0.078)	(0.120)	(0.043)	(0.047)	(0.061)	(0.036)	(0.036)	(0.059)
Sibs	0.007	−0.010	0.014	−0.017	−0.026	−0.010	0.006	0.000	0.014	−0.045**	−0.014	−0.054
	(0.015)	(0.017)	(0.023)	(0.013)	(0.021)	(0.016)	(0.010)	(0.012)	(0.015)	(0.020)	(0.012)	(0.033)
Eldest	0.059	−0.007	0.140**	0.072*	0.031	0.121**	0.011	0.001	0.028	−0.066**	−0.063*	−0.077
	(0.043)	(0.052)	(0.063)	(0.039)	(0.049)	(0.056)	(0.033)	(0.042)	(0.053)	(0.033)	(0.037)	(0.052)
SingPar	−0.050	−0.081	−0.009	−0.075	−0.205**	0.020	−0.059	−0.099	0.001	−0.052	0.023	−0.202**
	(0.056)	(0.067)	(0.084)	(0.062)	(0.097)	(0.072)	(0.057)	(0.081)	(0.083)	(0.076)	(0.092)	(0.093)
ParSep	0.139***	0.132**	0.134*	0.109***	0.125**	0.098*	−0.004	0.009	−0.029	0.096***	0.052	0.146***
	(0.048)	(0.058)	(0.075)	(0.041)	(0.059)	(0.053)	(0.033)	(0.046)	(0.052)	(0.033)	(0.042)	(0.049)
NoMortgage	0.069	0.086	0.038	−0.040	0.025	−0.096	0.073	0.042	0.147	0.047	0.239**	−0.425
	(0.071)	(0.064)	(0.116)	(0.080)	(0.114)	(0.097)	(0.072)	(0.093)	(0.105)	(0.150)	(0.094)	(0.270)
Mortgage	0.033	−0.036	0.113	0.003	0.082	−0.084	0.070*	0.048	0.083	−0.062	−0.029	−0.022
	(0.052)	(0.054)	(0.081)	(0.045)	(0.061)	(0.063)	(0.041)	(0.055)	(0.059)	(0.053)	(0.050)	(0.051)
PoorNeigh	−0.103	−0.143*	−0.013	−0.005	−0.002	−0.003	−0.022	−0.038	−0.022	0.016	0.088	−0.097

TABLE 4
(continued)

#	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Age group:		15–19			20–24			25–29			30–34	
Variable:	Persons	Males	Females	Persons	Males	Females	Persons	Males	Females	Persons	Males	Females
	(0.070)	(0.086)	(0.080)	(0.053)	(0.056)	(0.086)	(0.041)	(0.062)	(0.055)	(0.070)	(0.057)	(0.081)
RichNeigh	0.010	0.123**	−0.091	−0.004	−0.063	0.055	0.026	−0.013	0.056	0.091**	0.110**	0.060
	(0.052)	(0.051)	(0.087)	(0.052)	(0.070)	(0.065)	(0.047)	(0.074)	(0.059)	(0.046)	(0.054)	(0.065)
OthUrban	−0.045	−0.068	−0.039	0.052	0.023	0.067	−0.028	−0.039	−0.020	0.020	0.000	0.049
	(0.050)	(0.062)	(0.075)	(0.044)	(0.061)	(0.062)	(0.060)	(0.062)	(0.103)	(0.044)	(0.049)	(0.065)
Rural	−0.061	0.001	−0.110	−0.010	−0.068	0.032	0.025	−0.001	0.044	0.042	0.054	0.056
	(0.054)	(0.059)	(0.088)	(0.058)	(0.082)	(0.081)	(0.040)	(0.053)	(0.061)	(0.042)	(0.054)	(0.061)
MotEmp	0.041	−0.084	0.175**	0.098**	0.078	0.120*	−0.022	−0.015	−0.038	0.042	0.115**	−0.004
	(0.057)	(0.063)	(0.086)	(0.046)	(0.064)	(0.065)	(0.034)	(0.048)	(0.049)	(0.039)	(0.047)	(0.049)
FatEmp	0.114*	0.256***	−0.025	0.158**	0.159*	0.168	0.032	0.076	−0.012	−0.021	0.019	−0.039
	(0.068)	(0.093)	(0.092)	(0.071)	(0.091)	(0.108)	(0.053)	(0.076)	(0.053)	(0.051)	(0.073)	(0.063)
MotSch	0.007	0.023	−0.022	0.007	0.012	0.007	0.016*	0.010	0.027	0.005	−0.010	0.019
	(0.012)	(0.014)	(0.021)	(0.012)	(0.016)	(0.018)	(0.008)	(0.007)	(0.019)	(0.009)	(0.012)	(0.014)
FatSch	0.007	0.003	0.016	−0.011	−0.019**	−0.003	0.002	0.000	0.004	0.001	0.000	−0.006
	(0.008)	(0.010)	(0.012)	(0.008)	(0.009)	(0.013)	(0.007)	(0.010)	(0.008)	(0.006)	(0.009)	(0.009)
Constant	−0.773***	−0.418	−0.644	−0.372*	0.215	−0.739**	0.186	0.496**	−0.002	0.577***	0.635***	0.635*
	(0.293)	(0.335)	(0.474)	(0.219)	(0.232)	(0.344)	(0.169)	(0.211)	(0.289)	(0.219)	(0.221)	(0.327)
Observations	1407	696	711	1609	776	833	1778	868	910	1591	764	827
R-squared (%)	14%	20%	10%	18%	19%	17%	11%	11%	11%	19%	42%	14%

Notes: Statistical significance levels: ***$P < 0.01$; **$P < 0.05$; *$P < 0.1$. †Estimates weighted to reflect population values. ‡Standard errors in parentheses.
Source: HILDA Survey, wave 16, 2016.

TABLE 5
Oaxaca–Blinder Decomposition of the Male–Female Financial Literacy Gap by Age Group, Australians, 2016

	(1)	(2)	(3)	(4)
Age group:	15–19	20–24	25–29	30–34
Mean value males $= \ln(\overline{FL})_M$	1.10	1.26	1.29	1.31
Mean value females $= \ln(\overline{FL})_F$	0.86	1.07	1.18	1.22
Difference $= \ln(\overline{FL})_M - \ln(\overline{FL})_F$	0.241***	0.192***	0.110***	0.093*
Explained component	−0.041	−0.036*	−0.047***	−0.002
	(0.026)	(0.011)	(0.017)	(0.050)
Unexplained component	0.282***	0.228***	0.157***	0.095**
	(0.039)	(0.035)	(0.033)	(0.043)
*Gap*** = [exp(unexplained component) − 1] × 100	32.6%	25.6%	17.0%	10.0%
N	1407	1609	1778	1591

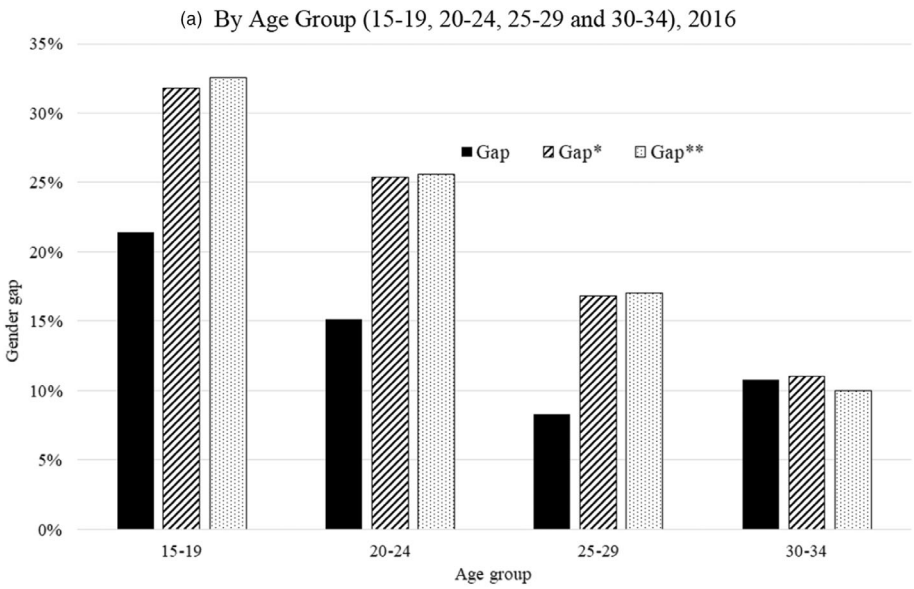
Notes: Statistical significance levels: ***$P < 0.01$; **$P < 0.05$; *$P < 0.1$. †Standard errors in parentheses. ‡Estimates weighted to reflect population values.
Source: HILDA Survey, wave 16, 2016.

15–19-year-olds than for the older age groups. With respect to the three youngest age groups, 15–19, 20–24 and 25–29, all three gender gap measures become smaller as age increases. For these three age groups, the two adjusted gender gap measures (*Gap*** and *Gap**) are larger than the unadjusted gender gap (*Gap*). This suggests that the raw gender gap is an underestimate of the true underlying gender gap in financial literacy among young people. In other words, the raw gender gap underestimates the financial literacy disadvantage of young females. Put simply, given their **X** characteristics, their financial literacy should be much higher. For the 30–34 age group, the raw gender gap is a fair estimate of the true underlying gender gap in financial literacy. For this group, there is not much difference between the three gender gap measures.

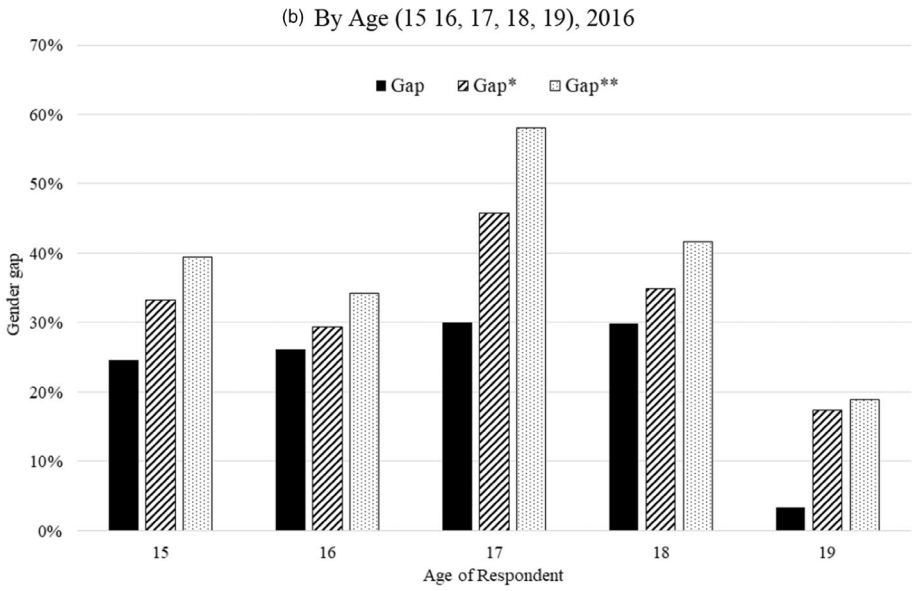
The analysis suggests that the gender gap is large for 15–19-year-olds. In order to explore this age group further, *Gap*, *Gap** and *Gap*** have been estimated for 15-, 16-, 17-, 18- and 19-year-olds separately. These gender gap estimates are shown in Figure 5b, which is the same in structure as Figure 5a. For brevity, the full regression results are not included but are available upon request. Given the single year of age samples are small, one must be cautious in the interpretation of these estimates. For each of these age groups, the raw or unadjusted gender gap is smaller than both adjusted gender gap measures (*Gap** and *Gap***). This confirms what was found when 15–19-year-olds were analysed as a single group. This consistency is encouraging. Additionally, the estimates suggest that *Gap*** > *Gap** > *Gap*. However, none of the measures consistently increase or decline consistently across this age range. It is noteworthy that all three measures are considerably smaller at age 19 than at younger ages. In summary, Figure 5b suggests that there is no evidence that the gender gap in financial literacy declines in the 15–18 age range. Given that the gender gap is large at age 15, then the gap is likely also to be large (or larger) at ages 13 and 14. Individuals in Australia typically start high school at age 13, so it is likely that there is a sizeable gender gap before individuals enter high school. In other words, the origin of the gender gap in financial literacy is likely in primary school if not earlier in life.

Table 6 is a summary of some robustness checks.. The robustness criterion is *Gap***. The checks focused on a measure of the dependent variable adjusted for degree of question difficulty (row (2)) and a sample where those scoring zero correct are excluded (row (3)). Checks were also carried

FIGURE 5
Percentage Gender Gaps in Financial Literacy (Gap, Gap, Gap**), Australians*



Source: Tables 3, 4 and 5.



Source: author calculations

TABLE 6
Robustness Checks for Oaxaca–Blinder Decomposition of the Male–Female Financial Literacy Differential, Gap**, *by Age Group, Australians, 2016*

			Age group			
	Dependent variable:	*N*	15–19	20–24	25–29	30–34
1	Baseline	6385	32.6%	25.6%	17.0%	10.0%
2	ln(*FL*) adjusted for degree of difficulty	6385	34.5%	28.1%	19.2%	10.8%
3	ln(*FL*), excluding those with $FL = 0$	6212	26.7%	21.7%	16.5%	10.2%
4	Baseline + self-assessed mathematics ability	6380	26.4%	19.7%	15.4%	8.8%
5	Baseline + backwards digit score	6254	32.3%	25.0%	17.3%	14.5%
6	Baseline + pronunciation score (short NART)	6268	35.3%	23.9%	15.5%	12.5%
7	Baseline + symbol digit modalities score	6381	35.8%	27.2%	21.0%	19.0%
8	Baseline + extroversion score	5171	31.1%	26.6%	17.9%	12.1%
9	Baseline + agreeableness score	5169	32.9%	25.4%	19.1%	15.1%
10	Baseline + conscientiousness score	5168	30.9%	26.9%	19.1%	11.4%
11	Baseline + emotional stability score	5169	30.9%	24.6%	17.9%	10.6%
12	Baseline + openness to experience score	5167	30.6%	27.1%	17.3%	9.7%

Notes: †Raw gap by age: 15–19 = 21.4%; 20–24 = 15.2%; 25–29 = 8.3%; 30–34 = 10.8%. ‡Dependent variable: ln(*FL*). §Table S1 explains how these additional variables were derived and contains associated descriptive statistics. ¶Estimates weighted to reflect population values.
Source: HILDA Survey, wave 16, 2016.

out by including an additional independent variable. These variables were not collected for all respondents, which explains why some samples are smaller. In the regressions where personality is controlled for (rows (8)–(12)) the sample is around 1216 observations smaller (i.e., around 24 per cent less). The sample representativeness (even after population weighting) is, therefore, questionable in these regressions.

The first of these additional independent variables was self-assessed mathematics ability, which has been shown to be correlated with financial literacy. The results, shown in row (4) of Table 6, show that *Gap*** with self-assessed mathematics controlled for is smaller than the baseline case without. *Gap*** nevertheless remains large and is largest for 15–19-year-olds. The second set of checks control for cognition. Three measures were considered: backwards digit score, pronunciation score (short NART) and symbol digit modalities score (rows (5)–(7)). Finally, five personality traits were examined: extroversion, agreeableness, conscientiousness, emotional stability and openness to experience.

Across all robustness checks concerning those aged 15–19, 20–24 and 25–29, all estimates show that the adjusted gender gap, *Gap***, is larger than the unadjusted (raw) gender gap, *Gap*. These checks suggest that our baseline estimates are robust.

V Conclusion

Research to date has not generated a comprehensive understanding as to why there is a gender gap in financial literacy in most countries. Australia is no exception to this generalisation, despite ranking highly in international comparisons of both male and female financial literacy (see Preston & Wright, 2019). This paper explores, with Australian data, an alternative explanation of the gender gap in financial literacy. It is an explanation which to date has not received much attention in empirical research. In keeping with many other forms of disadvantage, we believe that the gender gap in financial literacy may begin when individuals are young and before they enter adulthood. If this is the case it suggests that the gender gap is rooted in 'early-life' experience. It is, therefore, possible that the home environment, followed by the schooling system and the labour market, exacerbates the gender gap, resulting in the near universal observed gender gap in

financial literacy in adulthood. The key question becomes: 'At what age does the gender gap in financial literacy begin?'

We have tried to partially answer this question by analysing the financial literacy of males and females aged 15–34 in Australia. Our empirical analysis suggests that the gender gap, however measured, is large for 15–19-year-olds. In addition, our empirical approach suggests that the observed (raw) gender gap underestimates the true gender gap, in the sense that the observed gap underestimates the financial literacy disadvantage of females. The finding that the gender gap is large for 15–19-year-olds suggests there is likely a large gender gap before individuals enter high school. The beginnings of the gender gap in financial literacy may be in primary school. It may also be before individuals enter formal education. Agnew and Cameron-Agnew (2015) show that the age at which a person has their first financial discussion in the home is a key predictor of their financial literacy in later years. They also show that males have their first financial discussion at an earlier age than females. These effects all relate to socialisation effects. Clearly, it is important to establish whether the gender gap emerges before or after children enter school, since policy aimed at addressing it would be very different. More research that focuses on gender differences in the production of financial literacy among children, teenagers and young people is urgently needed.

Supporting Information

Additional Supporting Information may be found in the online version of this article:

Table S1. Means (and standard deviations) and definitions of financial literacy regression variables in robustness tests, Australians, age 15–19, 20–24, 25–29, 30–34, 2016.

REFERENCES

Agnew, A. and Cameron-Agnew, T. (2015), 'The Influence of Consumer Socialisation in the Home on Gender Differences in Financial Literacy', *International Journal of Consumer Studies*, **39**, 630–38.

Arellano, A., Cámara, N. and Tuesta, D. (2017), 'Explaining the Gender Gap in Financial Literacy: The Role of Non-Cognitive Skills', *Economic Notes: Review of Banking, Finance and Monetary Economics*, **47**, 495–518.

Artavanis, N. and Kara, S. (2020), 'Financial Literacy and Student Debt', *European Journal of Finance*, **26**, 382–401.

Australian Bureau of Statistics (ABS) (2023), 'Socio-Economic Indexes for Areas (SEIFA), Australia Methodology,' Released 27 April 2023.

Blau, F.D. and Kahn, L.M. (2017), 'The Gender Wage Gap: Extent, Trends, and Explanations', *Journal of Economic Literature*, **55**, 789–865.

Blinder, A. (1973), 'Wage Discrimination: Reduced Form and Structural Estimates', *Journal of Human Resources*, **84**, 436–455.

Bottazzi, L. and Lusardi, A. (2021), 'Stereotypes in Financial Literacy: Evidence from PISA', *Journal of Corporate Finance*, **71**, 101831.

Bottazzi, L. and Oggero, N. (2023), 'Financial Literacy and Financial Resilience: Evidence from Italy', *Journal of Financial Literacy and Wellbeing*, **1**, 1–26.

Bucher-Koenen, T., Lusardi, A., Alessie, R. and van Rooij, M. (2017), 'How Financially Literate Are Women? An Overview and New Insights', *Journal of Consumer Affairs*, **51**, 255–283.

Bucher-Koenen, T., Lusardi, A., Alessie, R. and van Rooij, M. (2021), 'Fearless Women: Financial Literacy and Stock Market Participation', NBER Working Paper No. 28723, National Bureau of Economic Research, Cambridge MA.

Cupák, A., Fessler, P., Schneebaum, A. and Silgoner, M. (2018), 'Decomposing Gender Gaps in Financial Literacy: New International Evidence', *Economic Letters*, **168**, 102–6.

Davoli, M. and Rodriguez-Planas, N. (2022), 'Culture, Gender and Financial Literacy', Institute for the Study of Labor Discussion Paper No. 15054, IZA, Bonn, Culture, Gender, and Financial Literacy.

de Zwaan, L. and West, T. (2022), 'Financial Literacy of Young Australians', Report, Financial Basics Foundation, Brisbane.

Driva, A., Lührmann, M. and Winter, J. (2016), 'Gender Differences and Stereotypes in Financial Literacy: Off to an Early Start', *Economic Letters*, **146**, 143–46.

Fonseca, R., Mullen, K., Zamarro, G. and Zissimopoulos, J. (2012), 'What Explains the Gender Gap in Financial Literacy? The Role of Household Decision Making', *Journal of Consumer Affairs*, **46**, 90–106.

Gerrans, P. and Heaney, R. (2019), 'The Impact of Undergraduate Personal Finance Education on

Individual Financial Literacy, Attitudes and Intentions', *Accounting and Finance*, **59**, 177–217.
Grohmann, A. and Schoofs, A. (2021), 'Financial Literacy and Intra-Household Decision Making: Evidence from Rwanda', *Journal of African Economies*, **30**, 225–250.
Harvey, M. (2019), 'Impact of Financial Education Mandates on Younger Consumers' Use of Alternative Financial Services', *Journal of Consumer Affairs*, **53**, 731–769.
Hasler, A. and Lusardi, A. (2017), 'The Gender Gap in Financial Literacy: A Global Perspective', Global Financial Literacy Excellence Center, George Washington University, Washington, DC.
Heckman, J.J. (2006), 'Skill Formation and the Economics of Investing in Disadvantaged Children', *Science*, **312**, 1900–1902.
Hsu, J. (2016), 'Aging and Strategic Learning: The Impact of Spousal Incentives on Financial Literacy', *Journal of Human Resources*, **51**, 1036–67.
Jorgensen, B., Allsop, D., Runyan, S., Wheeler, B.E., Evans, D. and Marks, L. (2019), 'Forming Financial Vision: How Parent's Prepare Young Adults for Financial Success', *Journal of Family and Economic Issues*, **40**, 553–563.
Jorgensen, B.L. and Savla, J. (2010), 'Financial Literacy of Young Adults: The Importance of Parental Socialization', *Family Relations*, **59**, 465–478.
Kluger, J. (2012), *The Sibling Effect*. Riverhead Books, New York.
Kutin, J.J., Reid, M. and Russell, R. (2019), 'What is this Thing Called Money? Economic Abuse in Young Adult Relationships', *Journal of Social Marketing*, **9**, 111–128.
Lind, T., Ahmed, A., Skagerlund, K., Strömbäck, C., Västfjäll, D. and Tinghög, G. (2020), 'Competence, Confidence, and Gender: The Role of Objective and Subjective Financial Knowledge in Household Finance', *Journal of Family and Economic Issues*, **41**, 626–638.
Longobardi, S., Pagliuca, M.M. and Regoli, A. (2018), 'Can Problem Solving Attitudes Explain the Gender Gap in Financial Literacy? Evidence from Italian Students' Data', *Quality & Quantity*, **52**, 1677–1705.
Lusardi, A. and Mitchell, O.S. (2008), 'Planning and Financial Literacy: How Do Women Fare?', *American Economic Review*, **98**, 413–17.
Lusardi, A. and Mitchell, O.S. (2014), 'The Economic Importance of Financial Literacy: Theory and Evidence', *Journal of Economic Literature*, **52**, 5–44.
Lusardi, A. and Mitchell, O.S. (2023), 'The Importance of Financial Literacy: Opening a New Field', National Bureau of Economic Research Working Paper Series, Working Paper 31145.
Lusardi, A., Mitchell, O.S. and Curto, V. (2010), 'Financial Literacy Among the Young', *Journal of Consumer Affairs*, **44**, 358–380.
Oaxaca, R. (1973), 'Male-Female Wage Differentials in Urban Labour Markets', *International Economic Review*, **14**, 693–709.
Ooi, E. (2020), 'Give Mind to the Gap: Measuring Gender Differences in Financial Knowledge', *Journal of Consumer Affairs*, **54**, 931–950.
Philippas, N.D. and Avdoulas, C. (2020), 'Financial Literacy and Financial Well-Being Among Generation-Z University Students: Evidence from Greece', *European Journal of Finance*, **26**, 360–381.
Preston, A., Qiu, L. and Wright, R.E. (2023), 'Understanding the Gender Gap in Financial Literacy the Role of Culture', *Journal of Consumer Affairs*. https://doi.org/10.1111/joca.12517
Preston, A. and Wright, R.E. (2019), 'Understanding the Gender Gap in Financial Literacy: Evidence from Australia', *Economic Record*, **95** (S1), 1–29.
Preston, A. and Wright, R.E. (2023), 'Financial Literacy and Self Employment', *Economic Papers*, **42**, 236–266.
Rao, S. and Malapit, H.J.L. (2015), 'Gender, Household Structure and Financial Participation in the United States', *Journal of Family and Economic Issues*, **36**, 606–620.
Razen, M., Huber, J., Hueber, L., Kirchler, M. and Stefan, M. (2021), 'Financial Literacy, Economic Preferences and Adolescents Field Behavior', *Finance Research Letters*, **40**, 101728.
Rink, U., Walle, Y.M. and Klasen, S. (2021), 'The Financial Literacy Gender Gap and the Role of Culture', *Quarterly Review of Economics and Finance*, **80**, 117–134.
Robson, J. and Peetz, J. (2020), 'Gender Differences in Financial Knowledge, Attitudes, and Behaviors: Accounting for Socioeconomic Disparities and Psychological Traits', *Journal of Consumer Affairs*, **54**, 813–835.
Serido, J., and Shim, S. (2017), 'Approaching 30: Adult Financial Capability, Stability and Well'being', Arizona Pathways to Life Success for University Students (APlus), Wave 4, May. https://www.aplushappiness.org/current-findings.
Shim, S., Barber, B., Card, N., Xiao, J. and Serido, J. (2010), 'Financial Socialization of First-Year College Students: The Roles of Parents, Work and Education', *Journal of Youth Adolescence*, **39**, 1457–70.
Shim, S., Serido, J., Tang, C. and Card, N. (2015), 'Socialization Processes and Pathways to Healthy Financial Development for Emerging

Young Adults', *Journal of Applied Developmental Psychology*, **38**, 29–38.
Steelman, L.C., Powell, B., Werum, R. and Carter, S. (2002), 'Reconsidering the Effects of Sibling Configuration: Recent Advances and Challenges', *Annual Review of Sociology*, **28**, 243–269.
Tinghög, G., Ahmed, T.A., Barrafrem, K., Lind, T., Skagerlund, K. and Västfjäll, D. (2021), 'Gender Differences in Financial Literacy: The Role of Stereotype Threat', *Journal of Economic Behavior and Organization*, **192**, 405–416.
Tzora, V.A., Philippas, N.D. and Panos, G.A. (2023), 'The Financial Capability of 15-Year Olds in Greece', *Economic Letters*, **225**, 111044.
Urban, C., Schmeiser, M., Collins, J.M. and Brown, A. (2020), 'The Effects of High School Personal Finance Education Policies on Financial Behavior', *Economics of Education Review*, **78**, 101786.
von Gaudecker, H. (2015), 'How Does Household Portfolio Diversification Vary with Financial Literacy and Financial Advice?', *Journal of Finance*, **70**, 489–507.
Ward, A.F., Lynch, J.G., Lee, L. and Gita, J. (2019), 'On a Need-to-Know Basis: How the Distribution of Responsibility Between Couples Shapes Financial Literacy and Financial Outcomes', *Journal of Consumer Research*, **45**, 1013–36.
West, T., de Zwaan, L. and Johnson, D. (2023), 'Do Women Have Lower Levels of Financial Literacy, or Are They Opting Out? A Look at the Non-response Gender Bias in Financial Literacy Measurement', *Financial Services Review*, **31**, 55–71.