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ABSTRACT

Financial Literacy Amongst Young People: When Does the Gender Gap Begin?*

Using micro-data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey, and the Oaxaca-Blinder decomposition technique, this paper contributes to knowledge on gender-gaps in financial literacy (FL) via a study of teenagers, emerging adults and young adults. The analysis suggests that important predictors of FL include schooling, high school-type, labour market activity and parental employment. There are large unexplained gaps, equal to 31.6%, 19.3% and 11.9% amongst those aged 15-19, 20-24 and 25-29, respectively. Very little of the gap may be explained by gender differences in human capital variables and other characteristics, including mathematics ability, cognitive ability and personality. The main conclusion is that the gap starts young and likely derives from gender stereotype beliefs.

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

Keywords: financial literacy, gender gap in financial literacy, gender stereotypes, adolescence, Oaxaca-Blinder decomposition

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1. INTRODUCTION

Financial literacy is increasingly regarded as an essential life skill and an important determinant of health, income and general well-being (Razen et al., 2021). Globally, however, financial literacy is poor. Within major advanced economies and within adult populations, around 60% of men and 50% of women are considered financially literate (Hasler and Lusardi, 2017). Financial literacy amongst the young is particularly poor and, similarly, features large gender gaps (Lusardi, Mitchell and Curto, 2010). In the US, for example, fewer than 20% of 25-29 year-old are considered financially literate (Hasler, 2018). The share amongst those younger than 25 is even less (*ibid.*). The risks associated with low financial literacy are innumerable and, amongst the young, include a higher likelihood of payday borrowing, higher rates of credit delinquency and a higher risk of economic abuse in relationships (Harvey, 2019; Urban et al., 2020; Kutin, Reid and Russell, 2019). Young women are a particularly at-risk group given their very low levels of financial literacy.

A variety of reasons have been proposed to explain why males have higher financial literacy than females. One theory attributes the gap to the gendered division of labour within households such that males are responsible for financial matters, thus removing or delaying the incentive for females to invest in the acquisition of financial literacy (e.g., Hsu, 2016). Others hypothesise that the gap is driven by gender differences in psychological traits such as personality and locus of control (e.g., Robson and Peetz, 2020). A third theory emphasises cultural and social factors, including gender roles and gender stereotypes (e.g., Shim et al., 2010; Driva, Lührmann and Winter, 2016; Bottazzi and Lusardi, 2021; Rink, Walle and Klasen, 2021; Grohmann and Schoofs, 2021; Davoli and Rodriguez-Planas, 2022). Empirical studies of the gender gap commonly find that gender differences in characteristics such as education, labour market status and marital status explain only a small share of the gender gap in financial literacy. Indeed, large unexplained gaps feature even within studies controlling for cognitive

and non-cognitive factors such as numeracy, cognitive ability and personality (Lusardi and Mitchell, 2014; Preston and Wright, 2019; Robson and Peetz, 2020; Bottazzi and Lusardi, 2021). The source of the gender gap in financially literate, therefore, remains an on-going puzzle.

Most studies of the gender gap in financial literacy focus on adults, such that there is relatively little information on the source of the gap amongst young people. This is somewhat surprising as a focus on the latter has the potential to inform the gender gap at older ages. There are, of course, exceptions. Bottazzi and Lusardi (2021), Arellano, Cámara and Tuesta (2017) and Longobardi, Pagliuca and Regoli (2018), for example, all employ data from the 2012 Programme for International Student Assessment (PISA) to study the gender gap in financial literacy of boys and girls aged 15. Razen et al. (2021), Driva, Lührmann and Winter (2016), Lührmann, Serra-Garcia and Winter (2015) and Agnew and Cameron-Agnew (2015) also examine the source of the gender gap amongst young people with their analyses drawing on primary data from studies of high-school students. In Lusardi, Mitchell and Curto (2010) the focus is on young people aged 23 to 28 years. These studies point to factors such as gender stereotypes, family financial socialisation effects, schooling quality and, relatedly, an interest in financial matters, as factors driving the gender gap.

In this paper we build on these studies and employ data from the Household, Income and Labour Dynamics in Australia (HILDA) survey to study the source of the gender gap in financial literacy amongst 15-29 year-olds. There is considerable heterogeneity in the financial literacy of young people that undoubtedly relates to stage of life (Lusardi, Mitchell and Curto, 2010; Shim et al., 2015). Young adults aged 25-29, for example, are more likely than younger individuals to have completed their schooling, be living away from home, married or cohabiting and increasingly making major financial decisions (see Figures 1 and 2). We exploit this and focus our analysis on three age groups: adolescents (aged 15-19 years); emerging

adults (aged 20-24 years) and young adults (aged 25-29 years). Our aims are (a) to describe the correlates of financial literacy of males and females at key stages in the life-course (captured by these age ranges); and (b) to examine the source of the gender gap within each age group. Our goal is to shed light on the puzzle of the large unexplained gender gaps in financial literacy in adulthood through a more detailed analysis of gender gaps in financial literacy when young.

A particular strength of our study lies in being able to directly compare gender gaps in financial literacy across three groups of young people at various stages in the life-course using nationally representative data. In so doing we extend insight gained from studies based on high school students and studies based on a particular age group (e.g., 15 year-olds in the case of PISA based studies). The inclusion of young people from a diversity of backgrounds also overcomes a particular limitation of studies centred around college students (e.g., Gerrans and Heaney, 2019), where the sample members all highly educated individuals pursuing post-compulsory schooling. A related advantage of our focus on 15-29 year-olds is that, when compared to older people, the financial literacy acquisition gradient is relatively steep in this age range (see Figures 3 and 4). This suggests that much of the mastery of financial literacy may occur during these critical years and that the source of the gender gap in financial literacy may be more readily identifiable within this age range.

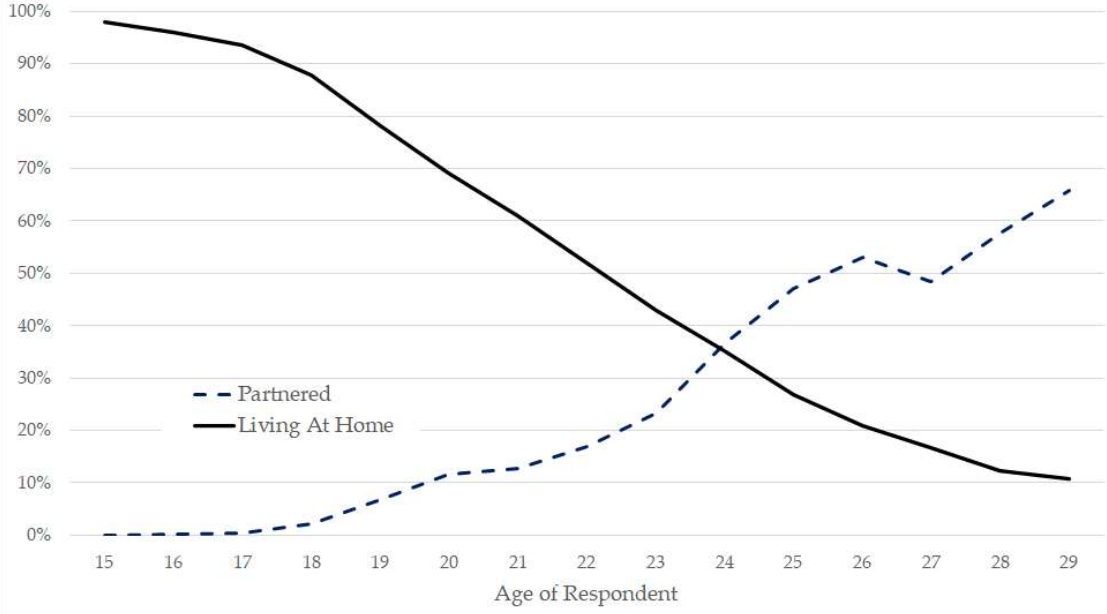
We contribute to the literature in several ways. The first, as noted, is through extending previous studies of adolescents beyond high-school students using a nationally representative group of teenagers that includes those who are no longer in school. The second is through an examination of the gender gaps using an approach that allows comparisons across three important stages of the life-course of young people. Our third contribution is through the use of a rich and, as yet, unexploited dataset, which enables us to control for a detailed set of factors that have been shown to correlate with financial literacy, including parental characteristics and

family background and cognitive and non-cognitive traits such as personality. A particular strength of the HILDA data and, therefore, our study, lies in the fact that the set of questions testing financial knowledge are the same for all individuals. In other words, the question set is not tailored for age or stage in life. To the best of our knowledge no other study of the gender gap in financial literacy offers such a detailed comparison by age.

The remainder of the paper is organised as follows. Section 2 provides a review of the literature focusing, in particular, on prior research examining why males are, on average, more financially literate than females. Section 3 presents the data and summary statistics. Section 4 discusses the empirical approach. The results are presented in Section 5 along with extensions and robustness checks. Section 6 concludes the paper.

Figure 1

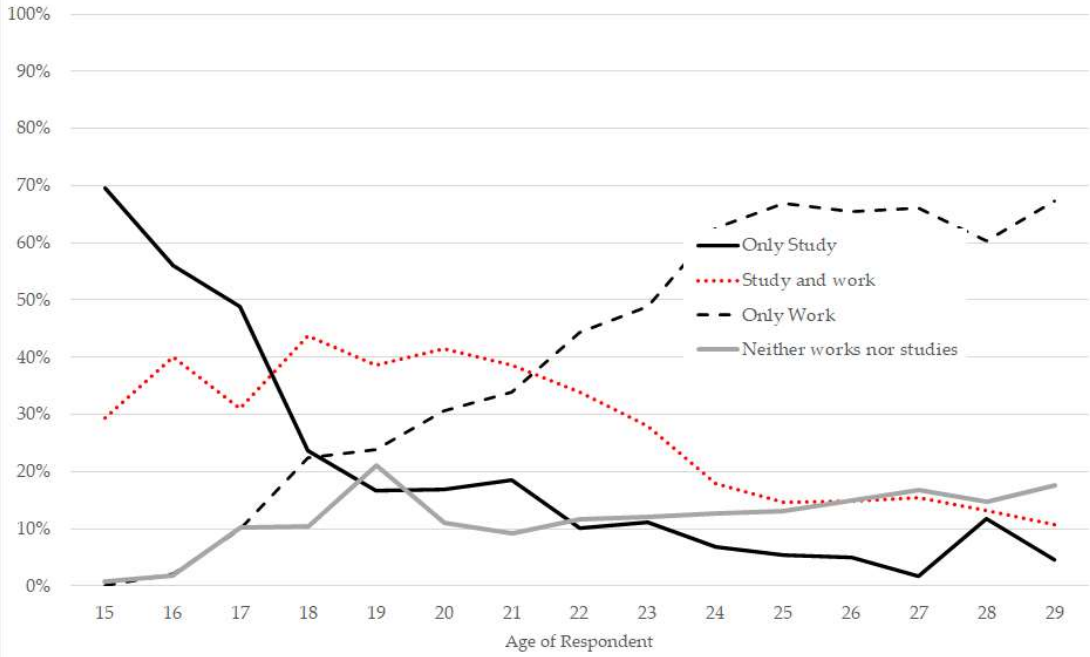
Incidence of Living at Home and Incidence of Being Married or Living as De-facto by Age, Australians, 15-29, 2016



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

Figure 2

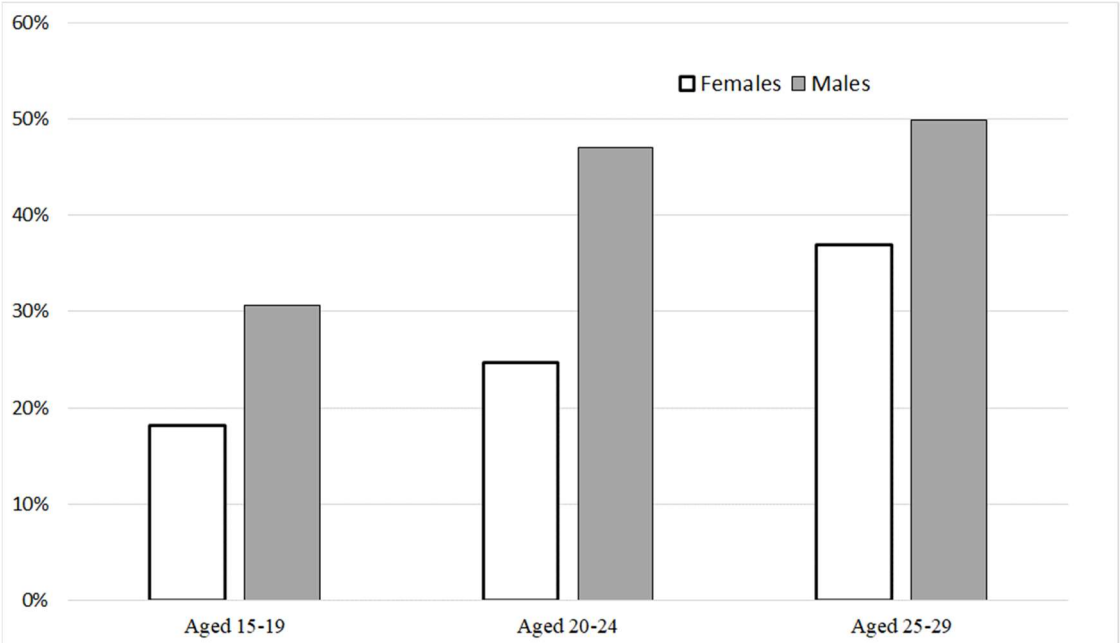
Study and Work Activities by Age, Australians, Age 15-29, 2016



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

Figure 3

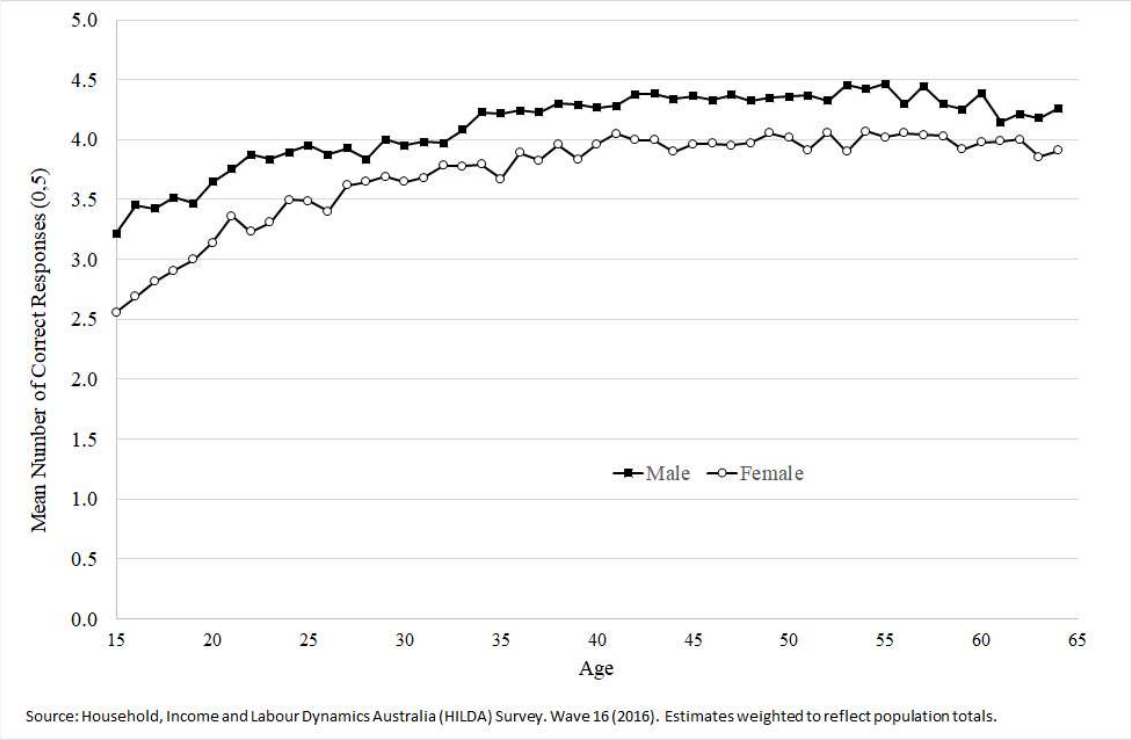
Financial Literacy Share (%) by Age and Sex, Australians, 2016
(Share Correctly Answering all of the 'Big-3' questions correctly)



Source: Household, Income and Labour Dynamics Australia (HILDA) Survey. Wave 16 (2016). Estimates weighted to reflect population totals.
The 'Big-3' questions examined comprise: numeracy, inflation and diversification

Figure 4

Mean Number of Correct Financial Literacy Responses by Age and Sex
Australians, Age 15-64, 2016



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

2. PREVIOUS STUDIES

An increasingly favoured approach when examining the source of the gender gap in financial literacy is to follow the approach widely used in economics when studying the gender gap in earnings (see Blau and Kahn, 2017), and that is to use the Oaxaca (1973) and Blinder (1973) decomposition technique. Fonseca et al. (2012) were amongst the first to employ this approach when studying the gender gap in financial literacy. The technique is described in more detail in section four of this paper. In brief it involves decomposing the male-female difference in financial literacy into a component that arises from gender differences in characteristics (e.g., schooling) and a component that reflects gender differences in the 'yield' (i.e., financial literacy ability) associated with these characteristics (i.e., arising from the coefficients).

In the few studies employing the Oaxaca-Blinder (or O-B) technique a common finding is that gender differences in observable characteristics such as marital status, age, education and work generally account for very little (less than a quarter) of the observed or raw gender gap in financial literacy (e.g., Bucher-Koenen et al., 2017; Cupak et al., 2018; Preston and Wright, 2019). This suggests that gender differences in financial literacy largely arise from gender differences in the coefficients, leading to the conclusion that males and females produce or acquire financial literacy differently. Fonseca et al. (2012), for example, shows that within couples, greater responsibility for financial decision-making correlates with higher financial literacy for males but not females.

In some studies a sizeable share of the gender gap may be explained by gender differences in psychological attributes. Robson and Peetz (2020) for example find that 54% of the gender gap in adult financial literacy in Canada may be explained once gender differences in psychological attributes are controlled for. Grohmann and Schoofs (2021) similarly explain 46% of the adult gender gap in financial literacy in Rwanda with a specification controlling for psychological characteristics. In Australia the situation is different. While personality (specifically 'openness to new experiences') is a significant predictor of financial literacy of males and females, gender differences in personality traits appear not to matter when it comes to explaining the gender gap in financial literacy (Preston and Wright, 2019).

Family background characteristics, including parental schooling and work characteristics as well as peer groups have been shown to be particularly important factors affecting the financial literacy and financial behaviours of individuals and in explaining gender gaps in financial literacy (Mandell, 2008; Shim et al., 2010; Shim et al., 2015; Lusardi, Mitchell and Curto, 2010; Gutter, Garrison and Copur, 2010; Jorgensen and Savla, 2010; Agarwalla et al., 2015; Jorgensen et al. 2019; Bottazzi and Lusardi, 2021; Davoli and Rodriguez-Planas, 2022). Broadly they capture financial socialisation effects and may be linked to culture and to

messages shaping gender roles and gender stereotypes. In the field of mathematics, for example, the gender gap in mathematics has been linked to gender stereotype messages that suggest boys/males are more suited to mathematics (Cvencek et al., 2011; Rodríguez-Planas and Nollenberger, 2018). Gender is a social construct and relates to how individuals behave (e.g., masculine and feminine traits) and how they 'do gender'; i.e., respond to and internalise the expectations of others including cultural expectations and expectations regarding gender roles (Risman, 2004).

Studies investigating culture and socialisation effects with respect to financial literacy vary in approach and, therefore, variables studied. Davoli and Rodriguez-Planas (2022), for example, exploit information on country-of-ancestry in their study of gender gaps in financial literacy of adults in the USA. They show that males with ancestral backgrounds that value patience and risk aversion, and have a long-term orientation, have significantly higher financial literacy. They also show that greater gender convergence in the gender gap in financial literacy in the country of ancestry is an important (and large) predictor of the gender gap in financial literacy in the US, leading the authors to conclude that gender differences in financial knowledge in the US are socially constructed. Rink, Walle and Klasen (2021) investigate the role of culture in explaining the gender gap in financial literacy in India. In their study they exploit variation in gender gaps within and across matrilineal and patriarchal states. Within patriarchal states they observe a 12% gender gap in financial literacy, of which 51% may be explained by gender differences in characteristics such as education as well as the use of different information sources such as newspapers. In matrilineal states the financial literacy of women is higher than that of women in patriarchal states and the gender gap is essentially non observable (at only 2%). In China the gender gap in financial literacy (after adjusting for gender differences in characteristics such as schooling) is shown to be higher in rural settings (equal to 20%) than in urban settings (equal to 8%), consistent with differing gender structures and

greater observance of traditional values and norms in rural settings (Preston, Qiu and Wright, 2022).

The effect of gender stereotypes and the role of parents in affecting gender gaps in financial literacy has received particular attention in recent years. A key finding from research conducted in New Zealand is that an important predictor of financial literacy is later years is the age an individual was when they had their first financial discussion in the home (Agnew and Cameron-Agnew, 2015). The authors also found that boys had their first financial discussion at an earlier age than female.

Bottazzi and Lusardi (2021) show that, in Italy, girls growing up in a more gender equality cultures (captured by a stereotype index) had financial literacy levels slightly higher than that of their male counterparts. They also show that the background of mothers matters for the financial literacy of girls and that having a mother who was not in paid employment (i.e., was a housewife) was negatively associated with financial literacy. Gender stereotype effects also show up in Driva et al.'s (2016) study of Germany teenagers aged 13-15. In their study female financial literacy deteriorated with stereotype intensity while male financial literacy increased.

Stereotype messages also feed into other outcomes, including confidence. Lührmann, Serra-Garcia and Winter's (2015) study of German teenagers shows that there is a significant gender gap in self-assessed financial knowledge and that one-third of students who correctly answered all financial literacy knowledge questions rated their self-assessed knowledge of financial literacy low, consistent with having low confidence After training (on financial literacy) the share answering questions increase, as did the match with confidence ratings. Given this confidence effect it is also important to consider how financial literacy is measured. Studies consistently show that when presented with a 'do not know' option when testing financial literacy, females are more likely than males to select this option, thus potentially

understating their financial literacy (Ooi 2020; Bucher-Koenen et al., 2017). Recent work by Bucher-Koenen et al. (2021) explores this matter further by comparing financial literacy scores from surveys with and without a 'do not know' option. They note that when the 'do not know' option is removed the gender gap in financial literacy narrows. Their analysis leads them to conclude that two-thirds of the financial literacy gender gap is driven by gender differences in knowledge and one-third is driven by gender differences in confidence.

We end this section by noting that mathematics ability strongly correlates with financial literacy (Almenberg and Dreber, 2015; Skagerlund et al., 2018; Lührmann, Serra-Garcia and Winter, 2015). This is not particularly surprising as financial literacy does require some numeracy skills. However, although the gender gap in numeracy or mathematics is an important predictor of the gender gap in financial literacy, sizeable gender gaps in financial literacy remain even in the presence of controls for mathematics ability (Preston and Wright, 2019; Bottazzi and Lusardi, 2021). Moreover, it is debatable as to whether numeracy should be controlled for in studies of the gender gap in financial literacy. Arguably, all it does is shifts the focus to one of understanding why there is a gender gap in numeracy.

III DATA, SAMPLE AND SUMMARY STATISTICS

A. Data and Sample

The data employed in this paper are nationally representative and draw on the Household, Income and Labour Dynamics in Australia (HILDA) Survey. The HILDA Survey is undertaken annually and is a household panel survey. Our approach, however, is cross-sectional and draws on data from five financial literacy questions which were asked in 2016 (wave 16). 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 (e.g. the OECD's Programme for International Student Assessment (PISA)). It is the administration of the same set of survey questions to all respondents which allows us to directly compare the outcomes of teenagers with young adults and shed additional light on the male-female gap in financial literacy.

In terms of sample size, in wave 16 there were 4,794 observations aged 15-29 years of age. Four observations had missing information on a variable capturing mathematics ability and were, therefore, removed from the sample. This rendered a sample of N=4,790, comprised of 2,451 (51%) females and 2,339 (49%) males. By sub-group: N=1,384 for 15-19 year-olds; N=1,570 for 20-24 year-olds; and N=1,734 for 25-29 year-olds.

B. *Measuring Financial Literacy*

The five questions testing 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 follow those originally developed by Lusardi and Mitchell and now commonly used in numerous studies of financial literacy globally (Bucher-Koenen et al., 2021).

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 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?"*

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?"*

At the mean, and for those aged 15-19, males answered 3.4 of the five questions correctly. The corresponding mean for females was 2.8, with the raw or unadjusted gender gap equal to 21.9%. (The means for males and females in other age groups are reported in Table 1).

In our primary analysis we employ on a dependent variable measuring the number of questions correctly answered. In the robustness section we consider several other dependent variables including a measure that adjusts for degree of question difficulty and measures that explore the effects when each question is examined separately. We express the dependent variable in natural logarithms. As it is not possible to take the natural logarithm of zero, the small share scoring zero (2.9% 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 and Wright, 2019). Robustness checks involving the use of a non-transformed measure and for a sample that excludes those scoring zero shows that this transformation has no effects on the results.

C. Independent Variables

Table 1 also describes the explanatory variables (definition and summary statistics) in the baseline specification. Table A1 in the appendix contains the description and summary statistics for covariates that we include in the extended specifications and in the robustness tests. As financial literacy is a form of human capital (a skill that one invests in) education is

an important predictor. In the empirical analysis the latter is entered as continuous (quantity) measure in the form of years of schooling ('Yos'). 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 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 etc.) 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 and Lusardi, 2021). In this study we control for school type via an indicator variable set equal to 1 if the respondent attended a fee-paying school and 0 if attended a government school.

Previous studies have shown that labour market activity impacts on 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). In this study we control for labour market activity using three dummies: a dummy if studying only; a dummy if studying and working; and a dummy if neither studying nor working. The reference group consists of those who are only working. Figure 2 shows the shares of young people in these various categories.

To capture the effect of parents on the financial literacy of children we control for their labour market status when the respondent was aged 14 and we control for their years of schooling. The employment variable is a dummy variable, equal to 1 (if employed) and 0 if not

employed. Those whose mother was deceased or who answered do not know were also allocated to the base category. Other family background characteristics controlled for include number of siblings and sibling rank (e.g., it may be that the eldest sibling is assigned more 'responsibility' for caring for others and which may correlate with higher financial literacy). We also control for household type (e.g., mortgaged or not) and whether or not the respondent still lives at home. Information on household type (mortgaged or not) serves as a proxy for wealth and involvement in financial decision making which may, in turn, correlate with financial literacy. Additionally, we use information from a general socio-economic index to control for relative disadvantage in the area that the individual resides in as a proxy for neighbourhood socialisation effects that may correlate with financial literacy outcomes.

Marital status is a particular characteristic that has been shown to affect financial literacy, however, we do not control for it in this study. Only 2% of the teenage sample is partnered (either married or co-habiting) (see Figure 1). Such a small sample size means that, for the teenager group, sampling errors will be large and inference difficult if a marital status control is included. While the share of respondents partnered increases to 20% amongst those aged 20-24 years and to 54% amongst those aged 25-29 years, an indicator variable (equal to 1 if partnered) is insignificant when added to young adult (20-29) baseline regressions and insignificant in female specific age-grouped regressions (results are available on request). In other words, marital status is not an important predictor of financial literacy for young adults. Given this finding and given that it is not a relevant consideration when studying teenagers, marital status is, therefore, not included as a covariate in the regressions.

A self-assessed mathematics ability score is available for our full sample; however, we do not incorporate this in our baseline analysis. We do include it in an extended analysis. The survey question does not test numeracy ability per se, but, rather, asks respondents to rate their mathematic skills relative to a typical Australian (on a scale from 0 (very poor) to 10 (very

good)). Females consistently under-rate their perceived mathematic skills when compared to their male counterparts, with t-tests showing highly significant differences for all age groups (15-19 years, 20-24 years, and 25-29 years). Rather than picking up actual mathematics ability per se, it is possible that this variable is capturing the math-gender stereotype effect (i.e., confidence effect) alluded to earlier (see also Lührmann, Serra-Garcia and Winter (2015) for a discussion of confidence and self-assessed financial literacy).

Our extended analysis reports findings when personality and cognition controls are added to the baseline specification. It is important to note, however, that the estimates in these sets of regressions are likely not representative of the population in the various age groups on account of the fact that we are missing cognitive and personality information for a large number of observations. For example, around 11% of the total sample in this paper completed the HILDA survey via telephone and were unable to answer cognition tests that involved visuals. Additionally, personality data was captured in wave 17 (in the 2017 survey) and although it could be backwardly merged to wave 16, it could only be observed for 79% of our total sample. The descriptive information associated with the cognition and personality controls is provided in Table A1 in the appendix.

Table 1

Means (and Standard Deviations) and Definitions of Financial Literacy Regression Variables

Australians, Age 15-19, 20-24, 2-29, 2016

		Age 15-19			Age 20-24			Age 25-29		
Mnemonic	Definition	Persons	Male	Female	Persons	Male	Female	Persons	Male	Female
FL	Number of correct financial literacy responses (0,5)	3.10	3.40	2.79	3.58	3.84	3.32	3.74	3.91	3.56
		(1.41)	(1.33)	(1.43)	(1.40)	(1.29)	(1.45)	(1.31)	(1.25)	(1.36)
ln(FL)	Natural logarithm of FL (if FL=0, ln(FL)=ln(0.35), N=141 or 2.9%)	0.99	1.10	0.86	1.17	1.26	1.08	1.23	1.29	1.18
		(0.65)	(0.58)	(0.69)	(0.59)	(0.54)	(0.64)	(0.52)	(0.50)	(0.54)
Male	=1 if respondent is male; =0 if female	51.4%	100.0%	-	50.4%	100.0%	-	50.7%	100.0%	-
Yos	Years of schooling (based on information on highest qualification level attained and qualification level currently enrolled in)	11.71	11.63	11.80	13.73	13.60	13.85	13.94	13.60	14.28
		(1.27)	(1.24)	(1.31)	(1.87)	(1.88)	(1.85)	(2.37)	(2.28)	(2.41)
PrivateSchool	=1 if respondent attended/attending a Catholic or other non-government high school; =0 if attended/attending government high school or other school classification (1.2% of sample). [NB. the base also includes 0.3% of observations with missing information on type of school attended/ing.]	36.8%	34.8%	39.0%	34.9%	34.6%	35.2%	33.4%	31.8%	35.0%
Work.Only	=1 if employed and not a student; =0 otherwise (base group)	11.7%	11.1%	12.4%	44.0%	47.8%	40.2%	65.2%	71.9%	58.4%
Study.Only	=1 if studying and not working; =0 otherwise	42.7%	45.7%	39.5%	12.8%	8.8%	16.8%	5.6%	3.4%	7.9%
StudyandWork	=1 if studying and working' = 0 otherwise	36.7%	33.2%	40.4%	31.9%	33.0%	30.9%	13.9%	11.4%	16.5%
No.StudyWork	=1 if neither studying or working; =0 otherwise	8.9%	10.0%	7.8%	11.3%	10.4%	12.1%	15.3%	13.3%	17.3%
Mother.Emp	=1 if mother was in paid employment when respondent was age 14; 0 = mother not employed, don't know, missing or mother deceased	72.5%	72.3%	72.8%	69.2%	66.3%	72.1%	66.6%	66.3%	66.8%
Father.Emp	=1 if father was in paid employment when respondent was age 14; 0 = father not employed, don't know, missing or father deceased	85.4%	84.9%	86.0%	86.3%	85.5%	87.0%	86.6%	86.0%	87.2%

Mother_yos	Mother's years of schooling	13.30	13.28	13.31	13.06	12.97	13.14	12.84	13.01	12.67
		(1.80)	(1.78)	(1.82)	(1.98)	(1.93)	(2.01)	(2.02)	(1.91)	(2.11)
Father_yos	Father's years of schooling	13.17	13.31	13.01	13.22	13.28	13.15	13.14	13.24	13.05
		(1.81)	(1.71)	(1.90)	(1.91)	(1.82)	(2.00)	(1.89)	(1.81)	(1.97)
N.Sibs	Number of siblings	2.13	2.10	2.16	2.05	2.07	2.03	2.19	2.15	2.23
		(1.60)	(1.64)	(1.55)	(1.58)	(1.50)	(1.65)	(1.66)	(1.53)	(1.78)
Eldest	=1 if has siblings and respondent is the eldest	39.4%	40.8%	37.8%	37.8%	36.1%	39.5%	41.7%	42.8%	40.6%
AtHome	=1 if still living at home	91.1%	91.8%	90.5%	56.3%	58.7%	53.8%	18.6%	22.0%	15.2%
SingleParentHH	=1 if resides in a single parent household	22.2%	21.3%	23.1%	16.0%	17.2%	14.9%	13.7%	13.1%	14.3%
Separated	=1 if parents separated prior to the respondent turning 15.	27.9%	27.3%	28.6%	26.1%	28.1%	24.1%	25.3%	25.5%	25.1%
Renting	=1 if living in rented accommodation (base category)	38.1%	36.1%	40.2%	54.5%	56.2%	52.7%	59.1%	60.1%	58.1%
No.Mortgage	=1 if living in a house that is paid	12.5%	11.8%	13.3%	12.6%	12.5%	12.7%	6.3%	8.3%	4.3%
Mortgaged	=1 if living in a house that is mortgaged	49.3%	52.1%	46.3%	32.9%	31.3%	34.5%	34.4%	31.5%	37.4%
PoorNeigh	=1 if neighbourhood is low socio-economic area (bottom 20 percentile)	18.5%	20.2%	16.7%	17.2%	15.5%	18.9%	19.5%	18.3%	20.7%
MiddleNeigh	=1 if neighbourhood is middle socio-economic area (middle 60 percentile) (base category)	60.4%	57.4%	63.6%	60.3%	63.9%	56.6%	63.5%	64.2%	62.8%
RichNeigh	=1 if neighbourhood is high socio-economic area (top 20 percentile)	21.1%	22.4%	19.7%	22.5%	20.5%	24.5%	17.0%	17.5%	16.5%
M_urban	=1 if resides in main urban area (base category)	63.6%	64.0%	63.2%	71.8%	71.1%	72.4%	68.9%	68.1%	69.7%
OtherUrban	=1 if resides in an other urban area	20.5%	21.1%	19.8%	16.6%	16.5%	16.6%	18.9%	19.4%	18.4%
Rural	=1 if resides in a rural area	15.9%	14.9%	17.0%	11.7%	12.4%	11.0%	12.2%	12.5%	11.9%
N.Obs		1,405	6,96	709	1,609	777	832	1,776	866	910

Notes:

(1) Source: Household, Income and Labour Dynamics in Australia (HILDA) Survey, Wave 16.

(2) Estimates weighted to reflect population totals.

(3) Standard deviation in parentheses for continuous variables only.

(4) Yos derived from information on respondent's highest completed qualification and information on qualification level currently enrolled in if studying.

(5) Information on mother's years of schooling and father's years of schooling was missing for 2.5% and 4.6% observations (total), respectively. For these cases their 'yos' was imputed with the missing cases assigned the mean for each parental group.

IV RESEARCH APPROACH

The empirical approach begins with a baseline specification estimated using ordinary least squares (OLS). In the initial set of regressions the gender gap in financial literacy is captured using a dummy variable approach. The limitation of this approach, however, is that it constrains the effects of other covariates to be the same for males and females. Another limitation of the dummy variable approach is that it does not shed light on the source of the gap. A more useful approach is to employ the Oaxaca-Blinder (Oaxaca 1973; Blinder 1973) decomposition technique and to separate the gap into a component that may be explained by gender differences in characteristics and a component due to coefficients. The method requires the estimation of sex-specific financial literacy regressions as follows.

$$(1)\ ln(FL_M) = \boldsymbol{\beta}_M \boldsymbol{X}_M + e_M$$

$$(2)\ ln(FL_F) = \boldsymbol{\beta}_F \boldsymbol{X}_F + e_F$$

The ln(Gap), measuring the log difference in the financial literacy (FL) of males (M) and females (F), may then be decomposed as follows:

$$(3)\ \ln(Gap) = \overline{\ln(FL_M)} - \overline{\ln(FL_F)} = \ln[\overline{(FL_M)} / \overline{(FL_F)}] = \hat{\boldsymbol{\beta}}_M \overline{\mathbf{X}}_M - \hat{\boldsymbol{\beta}}_F \overline{\mathbf{X}}_F$$

$$= \hat{\boldsymbol{\beta}}_M (\overline{\mathbf{X}}_M - \overline{\mathbf{X}}_F) + (\hat{\boldsymbol{\beta}}_M - \hat{\boldsymbol{\beta}}_F)\overline{\mathbf{X}}_F$$

The first term on the right-side, $\hat{\boldsymbol{\beta}}_M (\overline{\mathbf{X}}_M - \overline{\mathbf{X}}_F)$, is the component of the gap "explained" by gender differences in characteristics (**Xs**). The second term, $(\hat{\boldsymbol{\beta}}_M - \hat{\boldsymbol{\beta}}_F)\overline{\mathbf{X}}_F$, is the component of the gap "unexplained" by gender differences in coefficients including the constant terms (**ßs**).

V RESULTS

The financial literacy regression estimates are summarised in Table 2. In columns (1) to (3) the male and female data are pooled and a dummy variable employed to capture any gender-based differences in financial literacy. Estimates show that the sign on the male dummy variable is positive and highly significant in all regressions. For example, the coefficient in column (1) for teenagers shows that male financial literacy is about 30% higher than female financial literacy (calculated as follows: (exp(coef)-1)*100). The gender gap in financial literacy amongst 20-24 year-olds is around 23% and amongst 25-29 year-olds it is around 16%.

The estimates show that schooling is a highly significant determinant of financial literacy across all age groups. Each additional year of schooling increases the financial literacy of teenagers by 7.2% and the financial literacy of emerging adults (20-24 year olds) and young adults (25-29 year-olds) by 6.8% and 4.2%, respectively. The separate male-female estimates show that, within all age groups, the pay-off to schooling is higher for females than for males.

The type of high school attended is also an important predictor – but only for teenagers. The coefficients suggest that those teenagers who either attended or were attending a private high school had financial literacy rates which were 8.9% higher (if male) and 13.2% higher (if female) than their counterparts attending government high schools. No causation is implied. Further analysis is required to unpack this effect and identify whether or not it relates to curriculum content, teacher quality, network effects or other considerations. (This is beyond the scope of this study).

Consistent with other studies (e.g. Preston and Wright, 2019; Davoli and Rodriguez-Planas, 2020), the coefficients on the work-study variables show that, relative to those who are employed (and not a student), those who are neither studying or working ('No.StudyWork') have significantly poorer financial literacy outcomes. Gender differences are apparent. Teenage males, for example, exhibit significantly poorer financial literacy if they are neither

working or studying ("*NoStudyWork*"), while teenage females holding a similar study/work status have financial literacy levels that are no different from those in employment. Interestingly this variable is also a strong predictor of financial literacy amongst males aged 25-29 year-old males (males not in employment or study have a financial literacy which is 14.6% lower than their counterparts in study). While being out of employment or study matters for 25-29 year-old males, it does not seem to be a factor affecting the financial literacy of 25-29 year-old females.

Family background and parental characteristics also emerge as important predictors, although the associations differ by gender. Having a mother who was employed when the respondent was aged 14 is an important factor affecting the financial literacy of teenage daughters and emerging adults. The coefficient estimates show a 21% different in the financial literacy of teenage females who had a mother in employment when they were aged 14 and those whose mother was either not in employment or deceased. Father's employment is a significant predictor of teenage male financial literacy; with the coefficient estimates showing a 30% gap in the financial literacy of teenage males with and without a father in employment when they were aged 14. While maternal education is not an important predictor of financial literacy (which is in contrast with studies elsewhere, e.g., Bottazzi and Lusardi, 2021) we find that father's schooling is important. Each additional year of father's schooling is associated with 3.9% higher financial literacy rates amongst teenage daughters, 3.2% higher rates amongst daughters aged 20-24 and 3.3% higher rates amongst daughters aged 25-29 years. This contrasts with the situation for males where father's schooling only seems to matter for teenage males. These parental effects may be picking up gender stereotype effects and socialisation effects. The link between mother employment and female financial literacy suggests interventions to raise female financial literacy might fruitfully focus on mothers in employment.

Living at home is a significant predictor of both male and female financial literacy rates. Relative to those who have left the family home, those still at home at older ages (25-29 years) have financial literacy rates which are 10.0% lower if male and 17% lower if female. This presumably reflects differences in levels of financial independence and the associated need to acquire financial literacy skills. We also observe a positive association between financial literacy and being the eldest child (if female). This may reflect additional responsibilities and expectations placed on elder daughters, with spill-over effects in terms of financial literacy acquisition. Similarly, the significant association between parents separating and young male financial literacy rates may reflect additional expectations placed on young males (e.g. to contribute to more household decision making). It is noteworthy that by age 25-29 there is no longer a correlation between financial literacy and being the eldest child in the family.

In summary the findings in Tables 2 provide some evidence of important correlates with financial literacy, with schooling, work and living at home emerging as particularly important correlates. Familial characteristics have mixed effects. Maternal schooling, for example, is not an important correlate but mother's employment status is (for daughters). These patterns differ from findings elsewhere. Davoli and Rodriguez-Planas (2020), for example, study second-generation immigrant adults in the US and find that having a mother with a college degree positively correlates with off-spring financial literacy while maternal employment is negatively associated (weakly).

Table 2

Regression Estimates for Persons, Males and Females, Financial Literacy Equations. Australians by Age (15-19; 20-24; 25-29), 2016.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	All	All	All	Male	Male	Male	Female	Female	Female
Variables	15-19	20-24	25-29	15-19	20-24	25-29	15-19	20-24	25-29
Male	0.266***	0.205***	0.146***	-	-	-	-	-	-
	(0.041)	(0.035)	(0.036)						
Yos	0.072***	0.068***	0.042***	0.060***	0.058***	0.033**	0.083***	0.075***	0.052***
	(0.016)	(0.014)	(0.008)	(0.016)	(0.017)	(0.013)	(0.028)	(0.019)	(0.010)
Study.Only	0.035	0.045	0.025	-0.022	0.057	0.146**	0.106	0.013	-0.012
	(0.065)	(0.065)	(0.057)	(0.076)	(0.062)	(0.070)	(0.104)	(0.094)	(0.088)
StudyandWork	0.093	-0.002	0.071*	0.038	0.018	0.049	0.130	-0.040	0.083*
	(0.063)	(0.039)	(0.037)	(0.071)	(0.047)	(0.052)	(0.098)	(0.062)	(0.050)
No.StudyWork	-0.303**	-0.208***	-0.104**	-0.466***	-0.154	-0.158**	-0.104	-0.263***	-0.060
	(0.136)	(0.072)	(0.043)	(0.166)	(0.108)	(0.065)	(0.149)	(0.093)	(0.060)
PrivateSchool	0.122***	0.055	0.049	0.085*	0.094*	0.086*	0.124*	-0.008	-0.006
	(0.043)	(0.038)	(0.040)	(0.049)	(0.057)	(0.046)	(0.064)	(0.050)	(0.067)
Mother.Emp	0.065	0.108**	-0.009	-0.050	0.099	-0.014	0.192**	0.128**	-0.008
	(0.057)	(0.046)	(0.033)	(0.062)	(0.067)	(0.047)	(0.087)	(0.064)	(0.047)
Father.Emp	0.134**	0.115*	0.044	0.263***	0.079	0.078	-0.005	0.154*	0.016
	(0.064)	(0.062)	(0.049)	(0.088)	(0.081)	(0.072)	(0.091)	(0.092)	(0.054)
Mother_yos	-0.006	-0.005	-0.007	0.002	-0.010	0.003	-0.016	0.001	-0.017
	(0.012)	(0.011)	(0.009)	(0.013)	(0.015)	(0.013)	(0.020)	(0.015)	(0.013)
Father_yos	0.025*	0.018	0.020*	0.032**	0.006	0.007	0.039**	0.032**	0.033*
	(0.013)	(0.011)	(0.010)	(0.015)	(0.015)	(0.010)	(0.019)	(0.016)	(0.018)
N.Sibs	0.014	-0.017	0.006	0.003	-0.025	0.002	0.020	-0.010	0.014
	(0.014)	(0.013)	(0.010)	(0.016)	(0.022)	(0.012)	(0.023)	(0.015)	(0.015)
Eldest	0.060	0.083**	0.013	-0.004	0.040	0.005	0.134**	0.138***	0.026
	(0.043)	(0.039)	(0.034)	(0.052)	(0.051)	(0.044)	(0.064)	(0.053)	(0.055)
AtHome	0.051	-0.005	-0.125***	-0.104	-0.018	-0.096*	0.174	0.020	-0.156*
	(0.074)	(0.045)	(0.047)	(0.088)	(0.061)	(0.054)	(0.112)	(0.065)	(0.080)
SingleParentHH	-0.041	-0.087	-0.055	-0.072	-0.199**	-0.090	-0.005	0.003	-0.015
	(0.056)	(0.063)	(0.052)	(0.067)	(0.099)	(0.079)	(0.085)	(0.068)	(0.072)
Separated	0.140***	0.109***	-0.000	0.148**	0.120**	0.010	0.116	0.101*	-0.031
	(0.048)	(0.042)	(0.034)	(0.059)	(0.059)	(0.048)	(0.076)	(0.054)	(0.054)

No.Mortgage	0.079	-0.048	0.076	0.081	0.027	0.048	0.044	-0.107	0.132
	(0.071)	(0.080)	(0.073)	(0.062)	(0.115)	(0.097)	(0.115)	(0.094)	(0.106)
Mortgaged	0.027	0.014	0.070*	-0.055	0.088	0.051	0.107	-0.070	0.086
	(0.054)	(0.044)	(0.040)	(0.054)	(0.061)	(0.055)	(0.083)	(0.061)	(0.054)
PoorNeigh	-0.102	-0.004	-0.028	-0.148*	0.006	-0.039	-0.005	-0.003	-0.029
	(0.074)	(0.054)	(0.041)	(0.089)	(0.060)	(0.061)	(0.081)	(0.087)	(0.056)
RichNeigh	0.001	-0.013	0.017	0.114**	-0.068	-0.022	-0.110	0.032	0.043
	(0.052)	(0.051)	(0.048)	(0.053)	(0.070)	(0.077)	(0.086)	(0.062)	(0.056)
OtherUrban	-0.045	0.067	-0.032	-0.066	0.042	-0.034	-0.043	0.085	-0.033
	(0.050)	(0.044)	(0.061)	(0.062)	(0.062)	(0.065)	(0.077)	(0.060)	(0.100)
Rural	-0.062	0.021	0.028	0.012	-0.071	0.014	-0.120	0.097	0.039
	(0.054)	(0.051)	(0.039)	(0.060)	(0.079)	(0.054)	(0.087)	(0.064)	(0.059)
Constant	-0.582*	-0.245	0.348	-0.129	0.386	0.663***	-0.979*	-0.628**	0.163
	(0.330)	(0.233)	(0.217)	(0.359)	(0.316)	(0.230)	(0.511)	(0.309)	(0.365)
Observations	1,384	1,570	1,738	681	756	844	703	814	894
R-squared (%)	13.9%	16.4%	11.2%	17.6%	16.5%	10.4%	9.6%	15.1%	11.5%

Notes:

(1) Source: Household, Income and Labour Dynamics in Australia (HILDA) Survey, Wave 16.
(2) Estimates weighted to reflect population values.
(3) Standard errors in parentheses.
(4) Statistical significance levels: *** p<0.01; ** p<0.05; and * p<0.1.

Oaxaca-Blinder Decomposition Results (Baseline)

The Oaxaca-Blinder (OB) decomposition results are summarised in Table 3. The key finding is that the adjusted gender gaps in financial literacy are larger than the raw gender gaps in financial literacy. In other words, once gender differences in characteristics are taken into account the estimated or unexplained gender gaps increase. For example, based on the transformed measure of financial literacy, the gender gap in financial literacy amongst teenage males and females is 28.1% (row 4). After 'adjusting' for (i.e., taking into account) gender differences in characteristics this gap increases to 31.6% (row 11). We use the label "%Df" to refer to this adjusted gap. It is of policy relevance as it shows how much female financial literacy needs to increase to equate to that of males (after taking into account gender differences in factors controlled for).

The OB decomposition is a counterfactual decomposition. It allows us to ask what the gap might be if females were to look like males in terms of average characteristics. To repeat the point made above, the negative sign on the explained component (row (5)) shows that, in this study, if females looked like males in terms of their average characteristics, the gender gap in financial literacy would actually be wider.

Row (11) (%Df) shows the adjusted gaps after taking into consideration gender differences in characteristics. As shown the adjusted gender gap is 31.6% for teenagers, 19.3% for 20-24 year-olds and 11.9% for 25-29 year-olds. Of perhaps some comfort is the finding that the gender gaps decline with age. Overall, the total explained share is small and is predominantly driven by schooling effects. This is especially the case amongst 25-29 year-olds where years of schooling accounts for two thirds (20.6% of 30.1%) of the explained component. Amongst 20-24 year-olds it accounts for just over one half (7.9% of 14.1%) of the explained component and amongst teenagers it accounts for around one-third. A key point to note is that the overall explained component (row 5) is insignificant amongst teenagers and 20-

24 year-olds. Technically this implies that the explained effect is zero. In other words, the gaps are not as a result of gender differences in observed characteristics such as schooling, labour market activity, socio-economic background and familial characteristics.

Table 3
Results of Oaxaca-Blinder Decomposition of the Male-Female Financial Literacy Gap
Australians, Age 15-29, 2016

	(i)	(ii)	(iii)
FL Measure: ln(FL)	Age 15-19	Age 20-24	Age 25-29
N	1,405	1,609	1,776
(1) Mean value males (ln(FL))	1.10	1.26	1.29
(2) Mean value females (ln(FL))	0.86	1.08	1.18
(3) Raw ln(Gap) (1-2)	0.242***	0.182***	0.108***
(4) %Raw Gap (3/2•100)	28.1%	16.9%	9.1%
(5)Explained Component	-0.031	-0.014	-0.032**
	(0.027)	(0.010)	(0.016)
(6)Unexplained Component	0.272***	0.207***	0.140***
	(0.040)	(0.035)	(0.034)
(7) ln(Gap) (5+6)	24.2%	18.2%	10.8%
(8) % of raw gap explained	-12.6%	-14.1%	-30.1%
(9) % of raw gap unexplained	112.6%	114.1%	130.1%
(10) Total (8+9)	100.00%	100.00%	100.00%
(11) %Df (%Adjusted gap)) (6/2•100)	**31.6%**	**19.3%**	**11.9%**
Explained Components (in detail) (% of Raw Gap))			
Years of Schooling	-4.0%	-7.9%	-20.6%
Work/Study Status	-6.0%	-0.8%	-2.6%
Private School	-1.5%	-0.3%	-2.5%
Living away from home	-0.6%	-0.5%	-6.1%
Socio-economic characteristics	-3.5%	-2.1%	0.4%
Familial (paternal schooling and employment)	2.9%	-2.5%	1.3%
Total explained component (as % Raw Gap))	-12.6%	-14.1%	-30.1%

Notes:
(1) Source: Household, Income and Labour Dynamics in Australia (HILDA) Survey, Wave 16.
(2) Estimates weighted to reflect population values.
(3) Standard errors in parentheses.
(4) Statistical significance levels: *** p<0.01; ** p<0.05; and * p<0.1.

Extension – Self-Assessed Mathematics Ability

In this section we extend the baseline specification by incorporating a control for self-assessed mathematics ability. It is a continuous measure based on a scale from 0 to 10 (see Appendix Table A1 for descriptive statistics). Table 4 summarises the coefficients from a baseline specification with this addition. We only report the coefficients of interest. As shown there is a positive correlation between self-assessed mathematics ability and financial literacy, with the effect greater and more significant amongst teenagers. Indeed, column (6) shows that there is no significant association between self-assessed mathematics ability and financial literacy amongst females aged 25-29. As previously indicated, it may be that this self-assessed variable is capturing confidence effects rather than numeracy per se, and that by age 25-29 gaps in confidence that correlate with financial literacy have dissipated.

Table 4

Association Between Self-Assessed Mathematics Skills and Financial Literacy, Males and Females by Age, Australia, 2016

	(1)	(2)	(3)	(4)	(5)	(6)
	Male	Female	Male	Female	Male	Female
Variables	15-19	15-19	20-24	20-24	25-29	25-29
Self-Assessed Maths	0.071***	0.074***	0.045***	0.061***	0.033***	0.030
	(0.014)	(0.016)	(0.016)	(0.014)	(0.011)	(0.018)

Notes:

(1) Source: Household, Income and Labour Dynamics in Australia (HILDA) Survey, Wave 16.
(2) See Table 2 for information on other variables in the regression specification
(3) Estimates weighted to reflect population values.
(4) Standard errors in parentheses.
(5) Statistical significance levels: *** p<0.01; ** p<0.05; and * p<0.1.

When we decompose the gender gap in financial literacy across regressions that control for variables in the baseline plus a control for self-assessed mathematics ability, we find that gender differences in self-assessed mathematics ability accounts for 16.9% of the raw gender

gap in financial literacy amongst teenagers. Amongst 20-24 year-olds and 25-29 year-olds the corresponding shares are 14.6% and 10.3%, respectively. However, although self-assessed mathematics ability accounts for a sizeable share of the raw gender gap, after adjusting for gender differences in all characteristics controlled for, the adjusted gender gaps as a share of mean levels of female financial literacy in each age group (i.e., the %Df) are large. In other words, even in the presence of a control for self-assessed mathematics ability, sizeable unexplained gender gaps in financial literacy remain. These gaps are equal to: 26.9%, 16.4% and 10.7% for 15-19 year-olds, 20-24 year-olds and 25-29 year-olds, respectively. The comparable gaps from regressions without a control for mathematics ability are: 31.6%, 19.3% and 11.9%, respectively (see row 11, Table 3).

Extension – Cognition and Personality

Table 5 provides a summary of the results from a restricted sample where cognition and personality characteristics are added to the baseline specification (without a control for mathematics). As the sample in this analysis is restricted (i.e., reduced on account of missing information) and is likely not representative, we re-estimate the baseline specification for comparative purposes. The first row in Table 5 reports the baseline results from Table 3 (for the full-sample) for ease of comparison. The second row shows the results associated with the estimation of the baseline regression on the reduced samples. The main comparison, however, is with respect to the second and third rows. When cognition and personality controls are included in the regression the magnitude of the adjusted gender gap remains virtually unchanged amongst teenagers (falling from 29.8% to 29.5%). It falls slightly amongst 20-24 year-olds (from 20.8% to 17.9%) and increases slightly amongst 25-29 year-olds (from 12.6% to 14.9%). The main conclusion is that the inclusion of cognition and personality controls has no discernible effect on the size of the adjusted gap.

Table 5
Oaxaca-Blinder Decomposition of the Male-Female Financial Literacy Gap
With Controls for Personality & Cognition; Australians, 2016:
Age 15-19, 20-24, 25-29

		15-19		20-24		25-29	
		Gap%	**%Df (adjusted gap)**	Gap%	**%Df (adjusted gap)**	Gap%	**%Df (adjusted gap)**
1.	*Baseline results from Table 3 (full-sample)*	*28.1%*	***31.6%***	*16.9%*	***19.3%***	*9.1%*	***11.9%***
2.	Baseline with restricted sample	30.4%	**29.8%**	19.5%	**20.8%**	11.9%	**12.6%**
3.	(2) + personality and cognition (restricted sample)	30.4%	**29.5%**	19.5%	**17.8%**	11.9%	**14.9%**

Notes:
(1) Source: Household, Income and Labour Dynamics in Australia (HILDA) Survey, Wave 16.
(2) Estimates weighted to reflect population values.
(3) "Df" is the unexplained coefficient as a share of the female mean multiplied by 100.

Robustness Checks

Table 6 provides a summary of robustness checks. These checks are carried out with the %Df being the main robustness criteria. The checks address issues relating to the transformation of the dependent variable, the fact that some test questions are harder than others, and the effects related to the individual test questions. With the exception of the money illusion question, the estimates show that for all other dependent variables, and across all age groups, the adjusted gender gaps (%Df) are larger than the raw gender gaps. In other words, after adjusting for gender differences in characteristics the gender gaps are wider, not narrower. This attests to the robustness of the results and reinforces the baseline findings.

Table 6

Robustness Checks for Oaxaca-Blinder Decomposition of the
Male-Female Financial Literacy Gap Australians 2016:
Age 15-19, 20-24, 25-29

			15-19		20-24		25-29	
	Dependent variable:	Estimator	Gap%	**%Df (adjusted gap)**	Gap%	**%Df (adjusted gap)**	Gap%	**%Df (adjusted gap)**
1	Baseline	OLS	28.1%	**31.6%**	16.9%	**19.3%**	9.1%	**11.9%**
2	FL not transformed into natural logarithms	OLS	21.9%	**24.1%**	15.7%	**20.2%**	9.7%	**18.8%**
3	ln(FL) adjusted for degree of difficulty	OLS	31.0%	**33.8%**	20.2%	**22.9%**	11.0%	**14.0%**
4	ln(FL), excluding those who answered all incorrectly	OLS	22.0%	**24.2%**	15.7%	**17.1%**	10.3%	**11.7%**
5	Interest Rate Question Correct	Probit	29.9%	**33.1%**	17.8%	**19.4%**	17.8%	**19.4%**
6	Inflation Question Correct	Probit	14.2%	**16.0%**	62.1%	**67.8%**	32.4%	**38.0%**
7	Diversification Question Correct	Probit	36.2%	**38.3%**	11.9%	**12.7%**	0.5%	**4.3%**
8	Risk Question Correct	Probit	31.0%	**33.8%**	16.1%	**17.7%**	18.9%	**21.4%**
9	Money Illusion Question Correct	Probit	2.7%	**5.4%**	-4.2%	**-0.9%**	-3.7%	**-2.7%**

Notes:

(1) Source: Household, Income and Labour Dynamics in Australia (HILDA) Survey, Wave 16.

(2) Estimates weighted to reflect population values.

(3) "Df" is the unexplained coefficient as a share of the female mean multiplied by 100.

VI CONCLUSION

This paper is an attempt to shed further insight into gender gaps in financial literacy. Using rich data from wave 16 (2016) of the Household, Income and Labour Dynamics in Australia (HILDA) Survey and an empirical approach that focuses on adolescents (aged 15-19), emerging adults (aged 20-24) and young adults (25-29) our aims are: (a) to describe the correlates of financial literacy of males and females at key stages in the life-course; and (b) to examine the source of the gender gap within each age group.

Consistent with other studies we find a positive and significant association between maternal employment and the financial literacy of daughters, with this effect dissipating at age 25-29 years. Father's schooling is also an important predictor of female financial literacy (all age groups). These effects imply that the environment in which individuals grow up in matters, with the effects possibly picking up social norms and attitudes regarding gender roles and gender stereotypes. We also find that having a father in employment when growing up is an important predictor of financial literacy of teenage males (but not females). Other findings of interest include the importance of school type for adolescent financial literacy. Teenagers who attended (or were attending) a private school had financial literacy scores around 13% higher than their counterparts not attending a private school. No causation, however, is implied and further work is required to unpack this effect further. Importantly, we note that the school type effect remains weakly significant for males across all age groups but is not a significant predictor of female financial literacy beyond the teenage years.

While there are male-female differences in several characteristics that predict financial literacy (e.g., years of schooling, work and, importantly, family background and parental characteristics) the Oaxaca-Blinder decomposition analysis shows that very little of the observed (raw) gender gaps in financial literacy may be explained by gender differences in

these characteristics. The main factor driving the explained share of the gap is schooling (it accounts for 2/3^{rds} of the explained gender gap amongst 25-29 year-olds). However, because schooling is the main determinant of the explained share and because females, on average, have had more schooling that males, the adjusted gender gaps are actually wider for all age groups studied. The reported adjusted gaps are equal to 31.6%, 19.3% and 11.9% for teenagers, 20-24 year-olds and 25-28 year-olds, respectively.

To conclude, our aim in undertaking this study was to examine the source of the gender gaps amongst teenagers, emerging adults and young adults with a view to shedding light on the gender gap in financial literacy at older ages. We show that schooling and work-study status are key factors associated with financial literacy, as are parental characteristics, although the effects of the latter vary depending on the sex of the child. For each age group we are able to explain only a small share of the observed gender gaps in financial literacy.

Our key take-away is that the gender gap in financial literacy starts young and likely before becoming a teenager. 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 males had their first financial discussion at an earlier age than females. These effects all relate to socialisation effects and if it is the case that what happens when young does significantly affect financial literacy when older, then it is perhaps not surprising that we are unable to explain much of the gender gap at age 15 and beyond as the drivers are rooted in experiences when young. This also helps explain why most adult based studies of the gender gap in financial literacy are only able to explain a relatively small fraction (around 25%) of the raw gender gap in financial literacy. Further research is clearly warranted to better understand the factors that give rise to gender gaps in financial literacy amongst children in their pre-teen years. Of particular interest is the identification of when, in

the life-cycle, gender gaps in financial literacy set in and, as noted, of the role played by gender stereotype beliefs.

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Table A1

Means (and Standard Deviations) and Definitions of Financial Literacy Regression Variables in Extended Specifications and in Robustness Tests, Australians, Age 15-19, 20-24, 2-29, 2016

		Age 15-19			Age 20-24			Age 25-29		
Mnemonic	Definition	Persons	Male	Female	Persons	Male	Female	Persons	Male	Female
Math	Self assessed math skills (0=very poor; 10=very good)	6.8	7.1	6.5	7.0	7.2	6.7	6.8	7.0	6.5
		(2.0)	(1.8)	(2.1)	(2.0)	(1.8)	(2.1)	(2.1)	(2.1)	(2.2)
Ctbds	Backwards digit score (max. number of digits successfully repeated in a backwards order	-0.15	-0.11	-0.19	0.16	0.17	0.14	0.14	0.10	0.17
		(0.96)	(0.97)	(0.94)	(1.1)	(1.1)	(1.1)	(1.1)	(1.1)	(1.1)
Ctsds	Symbol digit modalities score (number of correct responses)	-0.09	-0.16	-0.01	0.15	0.06	0.24	-0.00	-0.17	0.16
		(1.0)	(1.0)	(1.0)	(1.1)	(1.2)	(1.0)	(1.1)	(1.0)	(1.2)
ctwps	Pronunciation (short NART) score	-0.27	-0.28	-0.26	0.16	0.21	0.11	0.12	0.08	0.15
		(0.99)	(1.02)	(0.95)	(1.0)	(1.1)	(0.96)	(1.1)	(1.1)	(1.1)
Extrv	Extroversion score	0.04	-0.03	0.11	-0.02	-0.02	-0.02	-0.04	-0.11	0.02
		(1.1)	(0.98)	(1.1)	(1.0)	(0.98)	(0.06)	(1.0)	(0.95)	(1.1)
Agree	Agreeableness score	-0.10	-0.30	1.11	0.07	-0.16	0.29	0.04	-0.10	0.18
		(1.1)	(1.1)	(1.0)	(0.96)	(0.95)	(0.05)	(1.1)	(0.99)	(1.1)
Consc	Conscientiousness score	-0.20	-0.21	-0.20	0.06	-0.01	0.12	0.14	0.07	0.21
		(1.0)	(0.95)	(1.1)	(1.0)	(0.98)	(0.06)	(1.1)	(1.1)	(1.1)
Emote	Emotional stability score	0.07	0.20	-0.06	-0.04	0.12	-0.18	0.01	0.04	-0.02
		(1.0)	(0.99)	(1.1)	(1.0)	(0.97)	(0.06)	(1.0)	(0.97)	(1.1)
Opene	Openness to experience score	-0.05	-0.04	-0.06	0.10	0.15	0.06	0.03	0.12	-0.05
		(1.0)	(1.03)	(1.1)	1.0)	(0.99)	(0.05)	(1.1)	(1.0)	(1.1)
N.Obs		1,055	509	546	1,092	509	583	1,231	572	569

Notes:

(1) Source: Household, Income and Labour Dynamics in Australia (HILDA) Survey, Wave 16.

(2) Estimates weighted to reflect population totals.

(3) Standard deviation in parentheses for continuous variables only.

(4) All variables (other than the mathematics variable) are entered as z-scores