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IZA DP No. 15532

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ABSTRACT

Gender, motivation, and self-selection into teaching

This paper investigates the role of intrinsic and extrinsic motivation in choosing a teaching career using data from the Household Income and Labour Dynamics in Australia. We find that the opportunity costs of becoming a teacher vary by gender: women enjoy a small wage premium, whilst males suffer a large wage penalty. We also find that non-monetary aspects and job amenities (such as motivation for the job, job security, and work/family life balance) have a different influence on teaching careers by gender, which can influence the sorting of male and female teachers across government and private schools. Notwithstanding evidence of positive selection into teaching in terms of cognitive ability and motivation for the job, the asymmetries in opportunity costs and non-monetary aspects reveal that introducing differentiated contracts tailored to gender preferences may influence teachers' recruitment by gender. However, we caution that such prospective initiatives need to balance the trade-off between attracting talented and motivated individuals into teaching and promoting gender equality, which arises from the data.

JEL Classification: I21, J16, J24, J31, M52

Keywords: teacher, incentives, Australia, decomposition

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Careers open to men and women have changed. Society's perceptions of women and teachers have evolved. The hierarchy of education and the social status of teaching has affected its feminization.

Elizabeth Boyle, "The Feminization of Teaching in America"

1 Introduction

Recruiting and retaining high-quality teachers is difficult because talented workers can earn better returns in other sectors of the labour market. For male teachers, this has been true for decades. It is also increasingly true for female teachers, who today represent a large majority of the teaching workforce worldwide, as women's jobs and career opportunities outside the teaching sector continue to improve (Corcoran et al., 2004; Bacolod, 2007). However, opportunity costs still differ by gender, with career options outside teaching being relatively more attractive for male versus female workers (Loeb and Page, 2000; Carroll et al., 2021). The OECD notes that the average salary of female teachers is equal to or higher than the average earnings of full-time, tertiary-educated female workers, though in some countries (e.g. Australia), the relative median wages for female teachers (wage for teachers/wage for non-teachers) has declined from 1.3 in 2000 to 1.1 in 2020. In contrast, male teachers only earn 77 percent the average earnings of full time, tertiary-educated male workers (OECD, 2021). Although the positive impact of teachers' gender balance on pupils' performance is receiving increasing attention (Holmlund and Sund, 2008, Schaede and Mankki, 2022), there is a widespread view that issues related to gender imbalances as well as declining quality can be principally addressed by raising wages (Dolton et al., 2011).

This paper contributes to the literature by drawing attention to an important trade-off stemming from the fact that teachers, like other vocations, have a strong intrinsic motivation for their job. When deciding whether to apply for a job, prospective workers do not only respond to standard extrinsic motivations (i.e. wages) but also, likely, to non-pecuniary ones (Deci and Ryan 1985; Frey 1997). Indeed, the three most important reasons to become a teacher reported in OECD countries are: "Teaching allowed me to influence the development of children and young people", "Teaching allowed me to provide a contribution to society" and "Teaching allowed me to benefit the socially disadvantaged" (OECD, 2019). While teachers' quality is multidimensional and depends on ability and motivation, we address the following questions: (1) given the existing gendered labour market opportunities, does teachers' quality differ by gender, and if so how? (2) Are male and female teachers intrinsically motivated for their job? (3) What

is the role of job amenities such as job security and family-work balance in the sorting by gender into this labour market?

These questions are important for recruitment at the school level, as well as for national education policy. If only monetary incentives matter and there are no asymmetries related to gender, recruitment and retention issues could be solved by increasing the education budget. But if non-monetary factors determine the choice of teaching as a career, and there are substantive gender differences in how these influence prospective teachers' choices, an increase in wages may be ineffective in solving existing problems. Worse, higher teachers' wages could further reinforce existing inequalities through unintended (and mis-perceived) trade-offs. For example, a wage increase may be too small to attract high-quality male teachers and, simultaneously, cause the average quality of female teachers to fall. On one hand, as we show in the paper, making teaching an economically attractive option for male workers represents a very costly reform. Indeed, given the existing difference between teachers' and non-teachers' salaries for full-time male workers, this requires a dramatic increase in teachers' hourly wages. On the other hand, empirical evidence on the impact of a wage increase on the characteristics of the incoming workforce, particularly in sectors for which motivation matters, is controversial. For example, Merlo et al. (2010) and Fisman et al. (2015) show that higher wages decreased the quality of members of the Italian and European Parliament, respectively, by lowering their human capital. However, Dal Bó et al. (2013) show that higher salaries attracted workers with higher skills and higher public service motivation in Mexico. To address the effect of higher wages on teachers, one needs detailed information on teachers' characteristics including indicators of ability, intrinsic motivation, and job amenities across schools and relaying on monetary incentives to varying degree. Bau and Das (2020) find that observed teacher characteristics account for less than 5 percent of variation in teachers' value-added. Thus, accounting for ability and motivation, unobserved in most studies to date, is important for the analysis of this labour market.

We investigate these dimensions using the Household, Income and Labour Dynamics in Australia (HILDA) survey. This is a longitudinal survey collecting information on individual personal and psychological characteristics, as well as responses to ad-hoc modules on work conditions on an annual basis since 2001. Our working sample covers almost 300 full-time working teachers. We supplement the insights gained from HILDA with data from the Staff in Australia's School (SiAS) survey — a nationally representative survey of teachers and principals in Australian schools. SiAS enables us to distinguish teachers' sorting across government, catholic and independent schools, across which the capacity to offer higher wages to recruit and retain teachers varies greatly. We present a simple conceptual framework

to guide the interpretation of results from the empirical analysis. We apply this framework to study self-selection into teaching using the Kitagawa-Blinder-Oaxaca decomposition by gender and by sector of the labour market (the market for teachers versus the other labour market sectors).

We show that full-time male workers receive better returns outside teaching and that the gap in the weekly wages of full-time female teachers and non-teachers is small. However, this does not imply that ability among teachers is low. Indeed, we find that the current sorting is drawing a pool of high ability and highly motivated—male and female—workers into teaching. Our interpretation of the workers' participation constraint is based on the effect of motivation for the job on monetary returns and accounts for the concern for job amenities - like preferences for job security and working hours flexibility. In addition to the differences in the opportunity cost of becoming a teacher for males and females, there are gender differences in the preferences for non-monetary job amenities. Our results suggest that few skilled male workers, driven by motivation, enter the teaching profession despite relatively low returns from teaching. Conversely, many skilled and highly-motivated female workers still enter the teaching profession, despite small differences in returns with the non-teaching sector and, more importantly, despite the dissatisfaction with (the lack of) flexibility to balance working hours in teaching.

We also document novel gender differences among teachers. Though the majority of teachers across all sectors are female, private schools attract significantly more male and less female teachers. Male teachers earn slightly more in private schools, while female teachers earn much less in private schools; hence, a small gender wage gap exists among teachers, fully driven by private schools. Notably, teachers—male and female—are more satisfied with salary in the private sector than in government schools. This suggests that contract flexibility improves teachers' satisfaction with pay and work-life balance.

Overall, our results show that increasing gender balance in the teaching sector requires careful understanding prior to introducing reforms. We investigate the implications of these results and highlight the existence of a key — but unsolved and under-researched — trade-off between horizontal segregation and pay equity between male and female teachers. This trade-off, whereby the achievement of a more gender balanced teacher workforce results in more inequality of pay between male and female teachers (and vice-versa) is fundamental for effective (and not counter-productive) policy design in this labour market.

Our analysis makes three contributions to the literature on teachers' labour market. First, it shows how asymmetric opportunity costs lead to an imbalanced gender distribution in this occupation, with a small gender wage gap which is fully driven by teachers' sorting into public and private schools. Second,

we show that those choosing to be teachers have higher than average ability and motivation. Third, we provide evidence of sorting with respect to (the lack of) some job amenities. Specifically, teachers may require some compensation for the dissatisfaction they suffer because of the difficulty of reconciling family and working life, as we document in the case of female teachers.

These findings provide crucial information for designing better incentives - the main objective being to attract and retain high quality— skilled and motivated— teachers. However, given the increasing awareness and importance of gender equity, this objective has to be balanced against the need to decrease, or at least not worsen, vertical and horizontal segregation that already exists within this occupation. We explain the economic forces determining workers' current sorting into teaching and discuss policy options, such as flexible contracts, that can mitigate teacher shortage and turnover.

2 Literature

Several papers describe the labour market for teachers, sharing similar concerns about the constrains within which it operates, setting it apart from competitive labour markets. Our paper intersects four distinct areas of analysis. The first area of research explores the features of the teachers' labour market. This stream of work highlights the positive relationship between teacher quality and student outcomes, and the lesser role played by financial incentives to reward teachers' productivity.

Teachers contribute to society by training the future workforce, enabling it to be more productive and earn higher incomes. The literature concurs that higher teacher quality produces better student outcomes, which in turn translate, among others, in higher incomes over their lifetimes (Hanushek, 2011) and tax revenues for the government. Despite these potentially substantial societal gains, the institutional settings of the teacher labour market do not internalise qualities and behaviours that enable individual teacher to promote such desirable outcomes. Labour demand is dominated by the government sector, which operates in a regime of quasi monopsony where wages and conditions are set centrally and apply to all government schools throughout the nation. As a result, government school teachers earn identical wages if they perform identical duties ('one job one pay') regardless of the local labour market in which they operate, and their salary scale across the few different levels of responsibility is more compressed than what is observed in the private sector. Government school teachers have no or limited incentives to be more productive as they are not rewarded for how well they carry out their tasks — a situation that is common to government schools across OECD member states (Ghinetti and Lucifora, 2008). Because of the quasi monopsony of government in hiring teachers, the 'one job one pay' structure is resilient to

change because there is not enough competition from non-government schools, which, when they exist, employ only a small proportion of the local teaching workforce.

However, like other workers, teachers respond to financial incentives (Britton and Propper, 2016; Stokes, 2005) and their supply is sensitive to the attractiveness of job offers from other sectors of the economy ('outside option') (Loeb and Page, 2000). Teachers' recruitment and retention is therefore, more difficult when the outside option is attractive. This has been noted in urban labour markets and for graduates in science and mathematics, where competition among would-be employers pushes wages up (Chevalier and Dolton, 2004; Chevalier, Dolton and McIntosh, 2007). Bau and Das (2020) show that in Pakistan, the teacher value-added of teachers on lower salary contracts was at least as high as that of permanent teachers on higher wage contracts.They show that outside option plays an important role and the correlation between teacher pay and productivity varies by sector. While compensation is strongly linked to performance in the private sector, the pay is low. In contrast, the public sector wages are 5 times higher and there is no correlation between pay and performance of teachers; so even a 35 percent decline in wages has no negative impact on teacher value-added.

Apart from describing the mechanics and key features of the teachers' labour market, this stream of literature generally agrees that higher relative wages can be a key lever to attract and retain quality teachers, either through higher wages for all teachers (Loeb and Page, 2000; Shin and Moon, 2006; Bacolod, 2007; Chevalier, Dolton and McIntosh, 2007; Dolton and Mercenaro-Gutierrez, 2011), or selective increase in wages by linking them to each teacher's productivity (Stokes and Wright, 2007; Hanushek, Kain and Rivkin, 2004; Podgursky and Springer, 2007; Neal, 2011). Besides wages, this literature highlights that further recognition to teachers' professionalism (through training or certification) may also contribute positively to recruitment and retention of high quality teachers.

The link between more flexible pay and teachers' productivity is at the core of the second line of research this paper draws from. The literature focuses on the causal effect of introducing flexible wages. A significant number of articles discuss quasi-experiments of policy changes aimed at raising flexibility in teachers' pay to estimate the subsequent productivity effect. In general, this literature finds that more wage flexibility leads to more applicants for the positions advertised, better teacher quality, and improved students' achievements – the latter used as a proxy of teachers' productivity. The problem of endogenous explanatory variables is overcome by the use of variables that clearly identify the treatment of interest (e.g. a random assignment to a treated class or school) and apply econometric techniques such a regression discontinuity and difference-in-differences methods to verify the estimated effects as well as

several post-estimation robustness and falsification tests.

Wage flexibility has been analysed in various forms. One of the earliest cases presented by this literature discusses the use of cash bonuses, which are paid in lieu of non-cash incentives (e.g. training) (Lavy, 2009). The case is about 49 Israeli high schools where English, Hebrew, Arabic and Maths teachers were ranked relative to each other in their respective subjects through a rank-order tournament. Teachers' productivity was measured with the students' pass rate and, as an alternative outcome variable, with the average score in an independent national exam. Bonuses were predetermined but schools were not randomly chosen, and this required additional technicalities to reduce the effect of selection into treatment (see Lavy, 2009 for details). The results suggest that the cash bonuses led to better student outcomes and matriculations.

A similar experiment was carried out on a larger sample of government primary schools in Andhra Pradesh, India (Muralidharan and Sundararaman, 2011). Over a period of two years, students of treated schools, whose teachers received the cash bonus, achieved much better scores than students in the control schools. Such improvement was observed even in students whose teachers received no bonus, supporting the hypothesis that the direct effect of the cash bonus on teachers' efforts spilled over to complementary areas of teaching. The possible presence of positive spillovers, however, raises questions about equity among teachers in treated schools and the possible negative effect on collaboration and cooperation among teachers within a school, which are implicitly assumed to be important for student development. Collaborative behaviours among teachers may be reduced or disappear under a differential pay regime.

Besides individual cash bonuses, this stream of research investigates changes in the wage bargaining system. Similar to individual cash bonuses, flexible wages affect wages (increasing them in a US case but reducing them or producing no effect in England and Sweden) and affect student achievements. In the US case, when local school districts in Wisconsin were allowed (but not forced) to switch from collective bargaining to individual wage negotiation, it was observed that switching districts experienced higher levels of student attainments compared with district that maintained collective bargaining (Biasi, 2021). The effect was almost equally attributed to teacher effort (desirable) and teachers' sorting into schools that had or had not enacted the pay shift. In contrast, in England, when schools introduced individual wage negotiation with teachers in 2013/2014, there was a drop in teachers' pay but an increase in students' achievements (Burgess et al, 2019; Anders et al., 2019). In Sweden, where switching to individual pay negotiations was mandated rather than left to school preferences, there was an increase in teachers' wages but no effect on either teacher quality or student attainment (Willen, 2021). These contrasting results

again highlight the role of the outside option (Anders et al, 2019). The relative attractiveness of jobs available in other sectors within the same local labour market, whose influence is consistent with observed differences in teachers' pay by gender (Biasi and Sarsons, 2021) and recruitment into teaching (Dolton and Klaauw, 1995; Smithers and Robinson, 2003; Corcoran, Evans, and Schwab, 2004), is now being considered in analyses.

The third line of related research is the (often) theoretical analysis of workers' selection into teaching and other "vocational" professions. Teachers strongly respond to financial (extrinsic motivation) as well as non-financial rewards (intrinsic motivation). Because of the interplay between workers' ability and intrinsic motivation for the job, monetary incentives may have unintended consequences, like attracting the "wrong" pool of workers. In particular, teachers and workers in other 'caring' sectors make their career choices to also fulfill their sense of purpose in life, and this typically manifests in helping others (Heyes, 2005). Typically, in the education and health care sectors, attracting motivated workers is considered essential for the provision of high-quality services. The existence of multiple pullers into a profession, or 'vocation', invites a careful examination of the complexity arising from the inter-relations between financial and non-monetary incentives in underpinning quality and productivity. It constrains the effectiveness of a 'one–size–fits–all' approach model based on prices to solve problems, such as resolving the teacher or nurse shortage, and/or fostering productivity.

A number of studies have begun to incorporate this complexity to explain how people of varying productivity and motivation sort into different jobs (Barigozzi and Turati, 2012). Monetary incentives play a central role, in that the wage level positively relates to the number of applicants to teaching and other vocational jobs. However, as wages increase the monetary lever pulling applicants (or retaining incumbents) into a vocation leads to a differential response among the various types of applicants, who differ in their monetary/non-monetary preference mix. It also points to the possibility that higher wages attract less intrinsically motivated applicants —an undesirable outcome in the labour market for teachers (Barigozzi, Burani, and Raggi, 2018).

Finally, with reference to the welfare effects of individually-negotiated pay, it has been shown that contracts tying wages to individual teachers' skills and minimum competency requirements can have large positive effects on student outcomes and contribute to lower inequality in the achievements of rich and poor students (Tincani, 2021). These effects are larger than a wage increase in government schools or the introduction of minimum competency, viewed as separate prospective policy actions, and are driven by higher expected recruitment of teachers from the private sector —an 'intra-industry' outside

option. Although the link between public and private sector in education is relatively under-studied, descriptive evidence indicates that most private school teachers were previously working in government schools (Green et al., 2012). Allowing public sector schools to offer flexible wages and conditions would, therefore, enable them to tap into a wider pool of high-quality teachers.

3 Conceptual framework

3.1 Teachers' participation constraint

To study workers' sorting into the market for teachers, we propose a simple participation constraint describing prospective workers' choice between two alternatives.

The labour market consists of two sectors, $j \in \{T, NT\}$, T denotes the teaching sector and NT denotes the opt-out (non-teaching) sector. Organizations (i.e., schools in the market for teachers) in the two sectors use labour as the only input and produce with a sector-specific technology. Workers are heterogeneous with respect to their *ability* (denoted by subscript a) and *motivation*(denoted by subscript im) which affect workers' productivity and workers' wage rate in the two sectors.

Our conceptualisation of workers' ability and motivation is informed by the literature and data (see Section 4 for details). Specifically, workers' ability is their cognitive ability as measured by widely recognized tests in the psychological and educational research. Workers' motivation is the intrinsic motivation for the job and is measured using questions about their interest in their current job, challenges and skills used in their job. We assume that workers' ability is *innate* and affects the worker's remuneration in any of the two sectors, while motivation is an intrinsic motivation *for the job* and, as such, is sector-specific.

The correlation matrix between cognitive ability and motivation in our data, reported in Appendix Table A.1, shows that ability and motivation for the job are positively correlated in the population of workers (the regression of motivation on ability estimates the coefficient to be equal to 0.27 with *t statistic* 5.98).

The worker's wage rate in sector j is:

$$W_j(x_a, x_{imj})$$

where x_a is innate ability and x_{imj} is worker's intrinsic motivation for the job in sector j.

Returns to ability and motivation are measured by the partial derivatives of function $W_j(\cdot)$, W_{j1} and W_{j2}, which are non-negative. Strictly positive partial derivatives are possible if a wage scheme is characterized by some "pay for performance". Conversely, if partial derivatives are zero, then the wage

scheme is flat and no pay for performance exists.

The two sectors are obviously likely to differ in their returns to ability and motivation, W_{j1} and W_{j2}, and returns may also differ by workers' gender. Typically, teachers are employed in the public sector and are offered very standardized contracts, characterized by limited incentive pay and career opportunities (basically no other positions besides regular teachers and principals exist). Hence, we expect function W_{NT} to be steeper than function W_T and, in particular, $W_{NT1} > W_{T1}$. In addition, a gender pay gap is well documented in all countries and all sectors of the labour market. This implies that, ceteris paribus, $W_j^m(x_a, x_{imj}) \geq W_j^f(x_a, x_{imj})$, where the superscripts m and f indicate male workers and female workers, respectively.

Let us now define ρ_j the "premium for job amenities in sector j" accruing the worker. We consider two job amenities, job security and the flexibility to balance work and non-work commitments, detailed in Section 4. Workers have different preferences for job amenities and these amenities differ across jobs. Typically, workers are ready to accept a lower wage for a job with a given amenity they like (i.e., job security) and, conversely, they require compensation for accepting a job without it.

These features enable us to formulate a teacher's participation constraint. A worker with characteristics (x_a, x_{imj}) enters the teaching sector if:

$$W_T(x_a, x_{imT}) + \rho_T \geq W_{NT}(x_a, x_{imNT}) + \rho_{NT}, \tag{1}$$

The previous self-selection constraint can be rewritten as:

$$\rho \geq W_{NT}(x_a, x_{imNT}) - W_T(x_a, x_{imT}) \tag{2}$$

where $\rho = \rho_T - \rho_{NT}$ is the *net* premium accruing the worker for the amenities/disadvantages he/she enjoys/suffers in the teaching sector.

If $\rho = \rho_T - \rho_{NT} > 0$, the worker, overall, prefers amenities in the teaching sector to the ones in the non-teaching sector. In this case he/she may be willing to enter the teaching sector even if $W_{NT}(x_a, x_{imNT}) - W_T(x_a, x_{imT}) > 0$. That is, if a worker prefers the amenities existing in the teaching profession, he/she may self-select into teaching even if remuneration as a teacher is lower than remuneration in the non-teaching sector. Conversely, if $\rho = \rho_T - \rho_{NT} < 0$, the worker prefers amenities in the non-teaching sector and he/she will self-select into teaching only if remuneration as a teacher is higher than remuneration in the non-teaching sector.

This framework guides the empirical analysis, as the participation constraint (2) maps into the decomposition results in Table 2. Specifically, the weekly wage rate of workers (of same gender) employed

in sector T, for whom (2) holds, is contrasted with the weekly wage rate of workers employed in sector NT, for whom the opposite of (2) holds.

3.2 Empirical Approach

The decomposition developed by Kitagawa-Oaxaca-Blinder enables an empirical investigation of selection based on the participation constraint (2). The expected difference between mean wages in the two sectors is:

$$\Delta = E(W_T) - E(W_{NT}). \tag{3}$$

Under the assumption that the conditional expectation of wages, given a set of covariates, is linear; the contribution of each observed covariate is the difference of the Ordinary Least Squares (OLS) estimates of two separate wage equations for two sub-groups (teachers and non-teachers as in equation (3) above). The difference then can be decomposed as follows.

$$\Delta = E(W_T) - E(W_{NT}) = E(X_T) - E(X_N T)'\beta^* + E(X_T)'(\beta_T - \beta^*) + E(X_N T)'(\beta^* - \beta_{NT}) \tag{4}$$

The first component $E(X_T) - E(X_N T)'\beta^*$ is explained by the differences in the predictors in the wage equations. The second component, $E(X_T)'(\beta_T - \beta^*) + E(X_N T)'(\beta^* - \beta_{NT})$ is the unexplained part. It captures the difference in returns (β_j) as well as the potential effects of differences in unobserved variables. We minimise the role of unobserved differences by restricting the sample to individuals with higher education levels (diploma and above) and by comparing narrowly defined groups, teachers and non-teachers, within gender.

4 Data

We employ data from a nationally representative Household, Income and Labor Dynamics in Australia (HILDA) survey. This survey is a longitudinal household-based panel starting in 2001 and administered annually. The first wave consisted of 7,682 households and 19,914 individuals. It collects information on economic and subjective well-being, labour market dynamics and family dynamics of individuals aged 15 and older (see Wooden et al. 2002). The survey non-response or attrition compares favourably with other longitudinal surveys such as the British Household Panel Study, for instance, the response rate from previous wave is 94 percent for Wave 14 in HILDA (see, Summerfield et al., 2015). All individuals aged 15 years and over are included in the analysis and they are followed for the entire period. We use data from wave 16 when in addition to other variables, the survey collected measures of cognitive ability. While

HILDA is a longitudinal survey, ability is measures in only 2 waves and transitions between teachers and non-teachers are rare. Hence, this analysis focuses on the difference between teachers and non-teachers in wave 16 rather than analysing the evolution over time.

In 2012, respondents participated in hands-on tests aimed at determining their cognitive ability (see Wooden et al., 2013). These tests evaluated the degree to which participants were able to:

1. recall and recite backwards progressively longer strings of numbers. (backwards digits score)
2. correctly pronounce 50 irregularly spelled words. (word pronunciation score (short NART))
3. match symbols and numbers based on a printed key against time. (symbol-digit modalities score)

These measures are widely recognized instruments routinely employed in psychological and educational research, and have been shown to be highly correlated with overall intelligence (Wooden et al., 2013).

Job amenity is measured by two dimensions of the job: satisfaction with work-life balance and job security.

1. The flexibility to balance work and non-work commitments satisfaction (satisfaction with work-life balance). The question in the survey asks the respondent how satisfied or dissatisfied you are with different aspects of your job, in this case, the flexibility available to balance work and non-work commitments. The respondent is asked to pick a number between 0 and 10, where 0 represents "totally dissatisfied" and 10 represents"totally satisfied".
2. Secure future in the job (job security). The question in the survey asks the respondent to indicate, on a 7-point scale (1= strongly disagree to 7= strongly agree), how strongly they agree or disagree with the statement "I have a secure future in my job".

As a measure of motivation for the job, we use questions where workers state how much they agree with the following claims about their current job on the same 7-points scale as before (1= strongly disagree to 7= strongly agree):

1. I use many of my skills and abilities in my current job.
2. My job often requires me to learn new skills.
3. My job provides a variety of interesting things to do.
4. My job requires me to take initiative

The above four claims are chosen as an indicator of "motivation for the job" following the inventory on work preference that was proposed by Amabile et al. (1994). The Work Preference Inventory was designed to assess individual differences in intrinsic and extrinsic motivational orientations. The major elements of intrinsic motivation elicited in the inventory are self-determination, competence, task involvement, curiosity, enjoyment, and interest. Specifically, the interest/enjoyment subscale is considered a validated self-report measure of intrinsic motivation for the job. Notably, the four claims from HILDA that we listed above are very similar to the claims that populate the interest/enjoyment subscale of Amabile et al. (1994) which is considered a validated self-report measure of intrinsic motivation for the job.

In addition to these variables, we include age, level and field of education and state as controls. In order to avoid wide heterogeneity among non-teachers and to maintain comparability between teachers and non-teachers, we restrict the sample to individuals holding diploma and higher levels of qualification and working full-time.

Table 1 reports the means and standard deviations for the variables used in the analysis. We focus on full-time workers. Men working in non-teaching occupations have the highest weekly wages. In contrast, women working in non-teaching occupations have a slightly lower weekly wage than female teachers. Female teachers earn less than male teachers. 73 percent of teachers, males and females, are employed in public schools. In contrast, in non-teaching occupations only 26 percent of men and 37 percent of women work in the public sector.

Teachers, both male and female, have higher cognitive scores than non-teachers (except for the symbol digit modalities score, where female non-teachers have a slightly higher score than female teachers). This suggests that teachers are positively selected in terms of cognitive ability. The two dimensions of job amenity move in opposite directions for teachers and non-teachers. Contrary to the public perception about teaching as a family-friendly occupation, teachers report less satisfaction with their ability to balance work and non-work commitments than non-teachers. This is particularly notable for female teachers who report the lowest satisfaction. However, teachers enjoy higher security in their jobs. Teachers report higher levels of intrinsic motivation across all dimensions of the job. In the following Section 5 we investigate the role of these variables on the wage differences between teachers and non-teachers.

Note that HILDA does not provide detailed teacher-specific information such as type of school in which one works (e.g., private/public). These details are captured in the SiAS 2013 data. Overall, most primary teachers are females (81 percent of primary teachers versus 58 percent of secondary teachers). However, women hold only 65 percent of the leadership positions in primary schools and 48 percent of

Table 1: Descriptive statistics

	Females		Males	
Variable	Teachers	Non-teachers	Teachers	Non-teachers
Weekly wages	1596.56	1534.56	1750.84	2112.62
	(596.86)	(838.48)	(656.87)	(1466.36)
Employed in public sector (%)	73.53	37.44	72.94	26.46
Cognitive scores				
Backwards digits score	5.60	5.38	5.73	5.50
	(1.40)	(1.45)	(1.40)	(1.50)
Word pronunciation score	17.19	15.72	17.79	16.43
	(3.59)	(4.44)	(3.77)	(4.73)
Symbol digit modalities score	57.19	58.02	56.53	54.88
	(10.01)	(10.02)	(8.39)	(9.80)
Job amenity				
Satisfaction with work-life balance	6.33	7.18	6.96	7.56
(0 = totally dissatisfied, 10 = totally satisfied)	(2.21)	(2.15)	(2.30)	(1.97)
Job security	5.61	5.11	5.72	5.05
(1 = strongly disagree, 7 = strongly agree)	(1.60)	(1.56)	(1.54)	(1.51)
Intrinsic motivation				
(1 = strongly disagree, 7 =strongly agree)				
Use of skills and abilities	6.26	5.62	6.09	5.61
	(0.86)	(1.31)	(0.91)	(1.20)
New skills	6.01	5.20	5.68	5.19
	(0.98)	(1.51)	(1.01)	(1.43)
Variety of interesting things	5.48	5.21	5.48	5.11
	(1.12)	(1.40)	(1.25)	(1.38)
Initiative	6.15	5.87	6.00	5.83
	(1.02)	(1.18)	(1.14)	(1.16)
Observations	204	965	85	1198

Notes: Standard deviations reported in parentheses. Sample restricted to full-time workers.

the leadership positions in secondary schools.

5 Results

5.1 Decomposition of wage gap between Teachers and Non-teachers

We start by applying decomposition method to understand the wage difference between teachers and non-teachers by gender. From the descriptive statistics in Table 1, we observe lower average weekly wages for male teachers compared to (male) non-teachers. In contrast, female full-time workers earn $62 more as teachers than as non-teachers, showing a small positive gap in returns from teaching for female workers. In terms of job amenities, the average satisfaction for work-life balance is higher for non-teachers than for teachers, irrespective of gender. However, average satisfaction for job security is higher for teachers than for non-teachers, again irrespective of gender. This could be reflecting the fact the 71 percent of teachers work in the public sector compared to 27 percent of female non-teachers and 18 percent of male non-teachers.

With this context, the decomposition results reported in Table 2 are interpreted using the participation constraint (2). Starting with male teachers, net amenities in teaching must be positive for male teachers, ($\rho^m = \rho^m_T - \rho^m_{NT} > 0$), otherwise they would not choose teaching as a profession given the low returns for ability and motivations for the job (here, $W^m_{NT}(x_a, x_{imNT}) - W^m_T(x_a, x_{imT}) > 0$). The model with all controls in column (3) shows that the unexplained part is large, in fact larger than the wage difference, and statistically significant. The unexplained part of the decomposition can be interpreted as higher returns in the non-teaching sector, which could be the result of higher incentives and the existence of "performance pay" contracts in these sectors. This may explain why returns to ability are higher in the non-teaching sector; the wage scheme in teaching is decidedly flatter than the wage scheme in non-teaching sector: $W^m_{NT1} > W^m_{T1}$. In contrast, the overall explained part of the decomposition is negative, small, and not significant. However, the coefficients of ability and motivation have a negative sign, are large and statistically significant. Hence, we observe positive selection into teaching for ability and, especially, for motivation. The gap in weekly wage, in favour of male non-teachers, narrows when accounting for ability and motivation.

Now consider female teachers and the participation constraint (2). Net amenities in teaching can be negative ($\rho^f = \rho^f_T - \rho^f_{NT} \leq 0$), because female teacher gets slightly higher returns for their ability and motivation than non-teachers (now $W^f_{NT}(x_a, x_{imNT}) - W^f_T(x_a, x_{imT}) < 0$). This is reflected in the

Table 2: Decomposition of wage differential between Teachers and Non-Teachers (full-time workers)

	Males			Females		
Weekly wage	(1)	(2)	(3)	(4)	(5)	(6)
Non-teachers	2112.62***	2112.62***	2112.62***	1534.56***	1534.56***	1534.56***
	(42.36)	(42.36)	(42.36)	(26.99)	(26.99)	(26.99)
Teachers	1750.84***	1750.84***	1750.84***	1596.56***	1596.56***	1596.56***
	(70.93)	(70.93)	(70.98)	(41.73)	(41.73)	(41.73)
Difference	361.78***	361.78***	361.78***	-62.01	-62.01	-62.01
	(82.62)	(82.62)	(82.66)	(49.70)	(49.70)	(49.70)
Explained	40.11	16.69	-37.27	-4.22	-28.00	-76.23
	(175.72)	(180.75)	(175.63)	(45.27)	(46.62)	(48.82)
Ability		-68.30***	-59.86***		-38.01***	-31.79***
		(22.87)	(20.94)		(12.83)	(11.83)
Motivation			-83.34***			-43.39***
			(30.43)			(15.49)
Amenity			3.59			-25.55**
			(25.40)			(10.95)
Unexplained	321.67	345.09*	399.05**	-57.79	-34.01	14.22
	(203.36)	(208.59)	(203.00)	(68.44)	(69.35)	(69.94)
Observations						
Non-teachers		1198			965	
Teachers		85			204	

Notes: *** denotes p < 0.01, ** denotes p < 0.05 and * denotes p < 0.10. Robust standard error reported in parenthesis.Age, level and field of education and state included as controls.

descriptive statistics in Table 1, which indicate that female teachers are substantially less satisfied with work-life balance than female non-teachers, and only marginally more satisfied with job security. Neither the explained nor the unexplained part of the decomposition for wage difference between teachers and non-teachers are statistically significant for females. In line with the male workers, the explained part is negative, while the unexplained part is positive. However, the magnitude of the explained part is larger than the unexplained part and, more importantly, the unexplained part is not significant. Contrary to the male workers, the wage difference between female teachers and non-teachers is not driven by differences in

returns in the two sectors. A possible explanation could be that in non-teaching sector, women typically sort into occupations with low incentives and career opportunities: $W^f_{NT1} \sim W^f_{NT1}$.

In the explained part of the decomposition, the contributions of ability, motivation and amenities are negative and statistically significant. Part of the higher wages (around $32) for female teachers is explained by their higher cognitive ability. Further wage gap in favour of teachers is explained by differences in motivation and job amenity between female teachers and female non-teachers. As shown in Table 1, female teachers report higher levels of motivation along every dimension of the measure. These explain a $43 wage advantage in favour of teachers. We observe a positive selection of ability and, especially motivation, into teaching for female workers; the gap in weekly wage in favour of female teachers increases when controlling for female workers' ability and motivation. In contrast, Table 1 shows that female teachers are particularly less satisfied, than non-teachers, with the flexibility in balancing work and non-work commitments. The decomposition in column (6) of Table 2 shows that higher wages for female teachers partly reflect the compensation for lack of this job amenity.

The analysis presented here is in terms of differences in the weekly wages of full-time workers. We re-estimate the specifications reported in columns 3 and 6 of Table 2 including all workers and decompose the wage differential in hourly wages instead of weekly wages. These results are reported in Appendix Table A.2. Even after adjusting for hours worked, female workers receive better wages as teachers. Male teachers continue to suffer a significant wage penalty compared with male non-teachers. While the explained and unexplained components are not statistically significant, the parts explained by ability and motivation are significant. Male and female teachers are positively selected. Thus, the main findings hold even after adjusting for hours worked, and when including part-time and full-time workers.

5.2 Decomposition of gender gap in teaching

After analysing the difference between teachers and non-teachers, we present gender differences within the teaching sector. Indeed, Table 1 indicates that teachers' weekly wages differ by gender and the traditional decomposition for the gender wage gap may help us to understand why. Table 3 presents the results of the Kitagawa-Oaxaca-Blinder decomposition of the wage difference between male teachers and female teachers. A gender wage gap exists within teaching, even though majority (73 percent) of teachers in the sample work in public school system which is characterized by standardized contracts. Male teachers earn $154 more per week. However, there is no observed differences in ability, motivation or amenity between male teachers and female teachers (these components of explained gap are not statistically significant).

Table 3: Decomposition of Teachers' wage by gender

Weekly wage	(1)	(2)	(3)	(4)	(5)	(6)
					Private sector	Public sector
Males	1750.84***	1750.84***	1750.84***	1750.84***	1760.09***	1747.40***
	(71.01)	(71.01)	(71.05)	(71.05)	(111.39)	(88.67)
Females	1596.56***	1596.56***	1596.56***	1596.56***	1389.98***	1670.93***
	(41.77)	(41.77)	(41.77)	(41.77)	(55.07)	(51.99)
Difference	154.27*	154.27*	154.27*	154.27*	330.11***	76.47
	(82.38)	(82.38)	(81.12)	(82.41)	(124.26)	(102.78)
Explained	52.33	45.61	50.13	47.24	130.01	28.93
	(41.92)	(42.97)	(45.57)	(45.86)	(95.28)	(57.38)
Ability		-12.78	-13.51	-13.31	10.94	-9.43
		(14.11)	(13.89)	(13.75)	(25.76)	(18.85)
Motivation			-8.87	-9.12	16.78	-20.71
			(13.14)	(13.46)	(24.56)	(18.55)
Amenity			17.28	16.92	-20.46	14.33
			(14.22)	(14.07)	(22.99)	(21.64)
Unexplained	101.94	108.66	104.14	107.03	240.10**	47.54
	(79.70)	(81.07)	(77.20)	(77.86)	(118.51)	(95.81)
Observations						
Males			85		23	62
Females			204		54	150

Notes: *** denotes p < 0.01, ** denotes p < 0.05 and * denotes p < 0.10. Robust standard error reported in parenthesis. Age, level and field of education and state included as controls. Specification reported in column (4) also controls for sector of employment. Sample restricted to full-time workers.

Higher wages for male teachers compared to female teachers could be the result of better returns for male workers in the teaching sector or unobserved workers' characteristics that differ from our proxy for ability and motivation. Differentiating between public and private schools in the last two columns, we observe that the gender gap is driven by private schools. While the sample size is smaller, male teachers in the private sector earn $330 more per week than their female counterparts. In contrast, gender wage gap amongst teachers in the public sector is small and not statistically significant. Looking at the weekly

wage of male and female workers in public schools, we also observe that male teachers earn slightly more in private schools, while female teachers earn much less in private schools.[1]

Further exploration of gender differences within teaching is hampered by the small sample size for teachers (particularly male teachers) and limited information on types of schools and working conditions in HILDA. We provide further insights by providing supplementary information on these dimensions from the SiAS data from the 2013 round. These results are reported in Table 4. Though the majority of teachers across all sectors are female, private schools attract significantly more male teachers and less female teachers. In line with the earlier evidence, female teachers are less satisfied with work-life balance and more satisfied with their salary compared with male teachers, but there are differences across school sectors. Female teachers in private schools are more satisfied with their work-life balance than their counterparts in public schools. Teachers, male and female, are more satisfied with salary in the private sector than in government schools. Note that private schools have more staff on individual contracts and have an opportunity to offer performance bonuses. Overall, these schools have more ability to vary contracts. This suggests that contract flexibility improves teachers' satisfaction with pay and work-life balance.

This information from Table 4 helps us to interpret the results from Table 3. Private schools attract relatively more male and relatively less female teachers than public schools. Male teachers earn more, while female teachers earn less in private than in public schools. Both male and female teachers take advantage of the larger contract flexibility offered by private schools in such a way that their satisfaction with working-hours, and especially with salary, increases overall. This suggests that, in private schools, a better match between teachers' preferences and working conditions is possible, and women use such flexibility to balance their workload.

6 Concluding comments and policy implications

Our results provide key insights on sorting into the labour market for teachers. Previous literature expresses concerns about the decreasing quality of teachers. Corcoran et al., (2004) and Bacolod (2007) use standardized tests measuring prospective teachers' verbal and mathematical aptitude as a proxy for quality. Bacolod (2007) also uses the fraction of first-year college students in the US from highly selective institutions entering the teaching profession. However, Schaede and Mankki (2022) recently showed that

[1]For context, the gender wage gap in non-teaching occupations is higher and mainly driven by unexplained (though, both explained and unexplained are statistically significant).These results are available from the authors.

Table 4: Descriptive statistics by school sector and gender

	Females			Males		
School sector	Govt	Catholic	Independent	Govt	Catholic	Independent
Observations	7077	1951	1883	2662	823	1128
Proportion of teachers in the sector(%)	72.67	70.33	62.54	27.33	29.67	37.46
% satisfied with work-life balance	50.16	47.90	53.45	58.75	58.57	58.67
% satisfied with salary	65.24	66.12	77.27	59.30	59.51	77.13

Notes: % satisfied is calculated as a sum of those who answered 'satisfied' and 'very satisfied'.

prospective teachers' academic performance alone does not predict teachers' quality and Bau and Das (2020) observed teacher characteristics do not explain most of the variation in teacher value-added. Our paper extends this literature. In our analysis, teacher quality is multidimensional and measured using a standardized measure of cognitive ability and motivation for the job. The two characteristics are positively correlated in our sample of workers.

We find that ability and intrinsic motivation for the job are positively correlated in the workers' population. Notably, teachers are positively self-selected with respect to ability and intrinsic motivation for the job regardless of gender. However, there are significant gender differences with respect to how the prevailing incentives work. In particular, male teachers suffer from a penalty for becoming teachers but the opposite occurs for women, even if the size of the wage penalty for men is much higher than the size of the wage gain for women. Interestingly, the gap in returns is closing for female workers and is no more significant for full-time workers. The male wage penalty and the (decreasing) female wage premium largely explain the horizontal segregation characterizing the labour market for teachers. Surprisingly, we also find that satisfaction with work-life balance is lower for female workers in teaching compared to female workers outside teaching. In contrast, male and female teachers consider job security as a job amenity.

What are the policy implications of these findings from the present analysis? Higher wages and performance-based remuneration are typically advocated as effective policies to address problems in the supply of teachers (see, among others, Dolton et al., 2011). However, government budgets are limited and under pressure and well-known difficulties in assessing teachers' performance possess a challenge for performance–based–pay. We suggest reforms based on (self)selection mechanisms for teachers as a alternative way to attract and retain high-quality teachers. Our suggestion is inspired by the differences

we currently observe in the workforce of public and private school systems in Australia. In private schools, where contract flexibility is higher, teachers' dissatisfaction with pay and lack of flexibility to balance work and life is lower compared to public schools. In addition, the share of male teachers is higher in private schools. This suggests that introducing some contract flexibility in government schools would attract more male teachers. Given the recent evidence on the positive effects of a more gender-balanced teaching workforce on pupils' academic and early job market performance (Schaede and Mankki, 2022), this represents a desirable outcome. Specifically, contracts might be tailored to women's stronger preference for flexible working hours and men's stronger preference for salary. Prospective teachers would have a choice between differentiated contracts; longer working hours and additional responsibilities required for higher pay, while the flexibility around working hours is traded-off with the lack of (or a lower) wage increase. This would increase prospective teachers' choice, attract more men to the teaching profession and improve male and female teachers' job satisfaction without creating additional pressure on the school budget.

As a drawback, contract flexibility can potentially increase the gender gap within the teaching sector.[2] Indeed, a trade-off seems to exist between the goal of decreasing horizontal segregation (attracting more men in teaching) and reducing gender gaps. As we documented in our analysis, a small gender wage gap exists among teachers, entirely driven by private schools. Consider again the flexible contracts proposed above. Under current settings, men are likely to self-select into high-responsibility/longer hours contracts. At the same time, women are more likely to accept contracts with greater working-hours-flexibility. This would tend to increase the gender wage gap in the teaching sector. To prevent the possible drawback of contract flexibility in terms of (lower) gender equity, contract flexibility may be combined with corrective policies like pay transparency rules and gender-based quotas for principals and other roles with increased responsibility. In addition, women self-selecting into the greater working-hour-flexibility contract should be incentivized to switch to the high-responsibility contract at suitable stages of their life.

As a final remark, it is important to note that contract flexibility can be an entirely gender-neutral reform only with greater gender equality; when family duties are equally shared between partners and the existing gender gap in career opportunities outside teaching is closed. Attracting and retaining a high-quality and gender-balanced workforce in the teaching profession ultimately requires a broader, societal

[2]The relationship between contract flexibility and gender inequalities in the labour market has been documented by some recent papers. Fernández-Kranz and Rodríguez-Planas (2021) show that increasing part-time availability aggravates labour market inequalities between men and women. In Biasi and Sarsons (2022), flexible pay lowered women's salaries compared to men's with the same credentials.

change in cultural values and social norms.

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A Appendix

Table A.1: Correlation between ability and motivation

	Ability		
Motivation	Backwards digits score	Word pronunciation score	Symbol digit modalities score
Use of skills and abilities	0.006	0.078	0.015
New skills	0.033	0.057	0.068
Variety of interesting things	0.047	0.149	0.043
Initiative	0.053	0.137	0.035

The table reports correlation between ability and motivation for individuals with education level diploma and above.

Table A.2: Decomposition of wage differential between Teachers and Non-Teachers (All workers)

Hourly wage	Females	Males
Non-teachers	38.343***	47.092***
	(0.968)	(0.887)
Teachers	39.695***	41.646***
	(0.945)	(2.223)
Difference	-1.352	5.446**
	(1.353)	(2.394)
Explained	-0.078	1.039
	(1.180)	(3.468)
Ability	-0.559**	-1.076***
	(0.253)	(0.378)
Motivation	-0.978***	-1.383***
	(0.373)	(0.491)
Amenity	0.643	0.270
	(0.452)	(0.317)
Unexplained	-1.275	4.407
	(1.375)	(4.704)
Observations		
Non-teachers	1578	1490
Teachers	311	112

Notes: *** denotes p < 0.01, ** denotes p < 0.05 and * denotes p < 0.10. Robust standard error reported in parenthesis.Age, level and field of education and state included as controls. Sample includes all, part-time and full-time, workers.