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Does a Motherhood Penalty Exist in the Post-apartheid South African Labour Market?

Sibahle Siphokazi Magadla, Murray Leibbrandt, and Cecil Mlatsheni

N.i.D.S.
NATIONAL INCOME DYNAMICS STUDY

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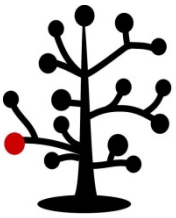

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Abstract

Do working mothers earn less than non-mothers in the South African labour market? This study examines whether there exists a motherhood (or child) penalty for Black African female employees in post-apartheid South Africa using data from wave 5 of the National Income Dynamics Study (NIDS), from 2017. NIDS is the first nationally representative survey in South African to include comprehensive child birth history. Restricting analysis to women aged 20 to 49, the Mincerian regression model results from the analysis indicate that a motherhood penalty does exist, ceteris paribus. Moreover, the study uses unconditional quantile regressions (RIF-OLS) to examine the wage returns of mothers versus non-mothers along the wage distribution. The study finds that, when controlling for relevant observable characteristics, there exists a motherhood wage penalty at lower wage levels, but this effect wanes in prominence at higher wage quantiles. At higher wage levels, mothers earn higher hourly wages than their child-free counterparts, especially if they are married and work part-time. This result indicates the effect of a part-time hourly wage premium. The study then applies Oaxaca-Blinder type decompositions within the RIF framework to decompose changes in the motherhood wage gap along the distribution into explained and unexplained contributions related to a range of factors. The decomposition results indicate that only at the hourly wages of mothers minus wages of non-mothers are negative only at the 10^{th} quantile, but positive everywhere else. Moreover, even though most of the wage differential between mothers and non-mothers is due to explained characteristics, at the lower levels unobservable traits have an impact on the wage gap. This implies that there are additional relevant factors such as societal norms, selection effects into employment and behavioural characteristics which should be considered when analysing women's wage outcomes. Labour market policy needs to accommodate women with children, particularly if they are the main breadwinners at lower wage levels. Workplaces should consider embracing flexible work hours and provide the option for staff to work remotely.

Keywords: Motherhood wage gap; child penalty; part-time work; wage differential; Mincerian regression; recentered influence function (RIF); decomposition; South Africa

1. Introduction

Currently, women in South Africa represent 45.1% of the employed[1] population (QLFS, 2017). While women have come a long way in terms of gains in the labour market, they are still less likely to have successful careers than men (Bhorat & Goga, 2013), more so if they have children. Globally, women who participate in the labour market are susceptible to social norms and prejudices both inside and outside the workplace. As more women enter the labour force, concerns around and how the workplace adjusts to childbearing and child-caring matter.

Although many studies have investigated the gender wage gap in South Africa (Bhorat & Gogga, 2013; Bosch, 2015), none have analysed the motherhood wage gap, or motherhood penalty. There seems to exist a gap between the earnings of women with children and the earnings of women without children. It is postulated that women with children tend to earn less than women without children. The motherhood pay gap is also known as the family or child wage gap, reflecting the fact that sometimes it measures the pay gap between mothers and non-mothers but, in most econometric studies, it measures this gap for women without dependent children (Grimshaw & Rubery, 2015). The incidence of mothers earning less than non-mothers pulls the average earnings of women relative to men down, meaning that, as long as working women bear children, one cannot expect the gender gap to narrow. Consequently, there is a growing tendency globally for career-minded and highly skilled women to postpone or even forgo child-bearing for the sake of career progression.

The presence of children can affect the household dynamic for all members, but women tend to change their labour-market behaviour more drastically than men in response to a change in family size (Angrist & Evans, 1998). The case of South Africa is unique due to the high labour migration rates across provinces. Posel and Van der Stoep (2008) posit that motherhood affects women whether they co-reside with the children or not. Women who are migrant workers may respond to childbirth in a range of ways. For example, they might leave children in the care of relatives. Thus, the outcomes of motherhood for Black South African women in particular tend to be nuanced.

Using the 2017 (wave 5) National Income Dynamics Study (NIDS) data, this study combines detailed wage decompositions with quantile regressions to analyse differences in wage outcomes for employed mothers and non-mothers (child-free women). This study is henceforth structured in the following manner: Section 2 provides a review of pertinent international and South African literature on women's labour market outcomes. Section 3 discusses the data and presents the methodology. Section 4 presents trends in women's labour market characteristics with graphical illustrations of key

[1] Narrow or strict definition of employment.

variables of interest. Section 5 provides the model estimation results: Firstly, the Mincerian (Mincer, 1974) regression is applied to understand the average magnitude of the motherhood wage penalty. Secondly, the linear Recentered Influence Function (RIF-OLS) regressions models wage returns for mothers and child-free women along the wage distribution. Thirdly, using the Blinder-Oaxaca method on the RIF regressions, the section decomposes the wage gap between mothers and non-mothers into explained and unexplained parts along the distribution. Section 6 discusses key findings of the study, flagging some important limitations. Section 7 concludes.

2. Literature Review

According to a United Nations report on gender and work (2015), on average, women spend three hours more per day than men on unpaid work such as childcare in developing countries and two hours more per day than men in developed countries. It is widely documented internationally that female employees without children earn higher wages than female employees with children, even after controlling for measurable characteristics related to their productivity. There are various possible explanations for why mothers are more likely to earn lower wages than other women. According to the rationalist economics (human capital) approach, time spent at home for childcare interrupts work experience, and mother-friendly jobs offer lower wages (Budig & England, 2001). The sociological approach posits that employers may hold stereotypes that mothers are distracted or less productive at work due to exhaustion from childcare during leisure hours; so employers may just blatantly discriminate against mothers (ibid.). The third framework is a comparative institutionalist approach which aims to identify the societal specific causes of inter-country patterns in motherhood pay gaps, paying attention to gender relations and intersections with welfare, education and employment institutions (Grimshaw & Rubery, 2015). Most studies regarding the motherhood penalty focus on a combination of the rationalist economist and sociological approaches.

The motherhood pay gap may be related to a productivity differential, or statistical discrimination. In the context of the former, Becker's worker effort hypothesis claims that firms aim to maximize worker effort per hour, given earnings subject to their production functions (Becker, 1977). On the other hand, workers maximize utility by allocating time and effort to different activities, subject to their household production functions. Women with children will either choose to pay for childcare or take care of children themselves during leisure hours at home. The preference may be contingent on the wages they earn. Because of this energy split between parenting and work, motherhood might be expected to reduce women's productivity on the job, thus affecting their pay. In the latter case of discrimination, employers might deem mothers less productive, assuming the generic parenting arrangement where women have more childcare responsibilities than men. Women with children may

therefore incur a penalty in terms of employment and/or wages. The motherhood pay gap may be due to other reasons. Many mothers respond to the competing demands of employment and childrearing by relaxing their attachment to paid work (Gornick, et al., 1998). For example, they may engage in part-time employment, reduce working hours, or even change occupations completely.

The estimates in most studies refer to an adjusted wage gap, i.e. the size of the motherhood wage gap controlling for differences in characteristics important for productivity (such as age, education, industry, occupation, firm characteristics) (Staff & Mortimer, 2012). Staff and Mortimer (2012) shed some light on the motherhood wage penalty early in women's occupational careers using fixed effects analysis on longitudinal data for 486 women followed from ages 19 to 31 in the Minnesota Youth Development Study. They observe that accumulated months out of the labour force and also not enrolled in school explain to some extent the residual pay gap of approximately 5% between mothers and non-mothers (ibid.). Nicodemo (2009) estimates family gaps along the wage distribution in the case of European households. The study finds that the reason for the family wage gap is that, when married, wives and husbands have the same characteristics but wives suffer from two types of discrimination: a lower wage for the same work and also primary responsibility for children. Likewise, Budig and England (2001) use longitudinal data with a fixed effects model over the 1982 to 1993 period in the United States and find a motherhood wage penalty of 7% per child. They also discover in their analysis that penalties are larger for married women than for unmarried women.

The fact that a woman has a child implies that she may have taken some time off work, meaning that she may be negatively affected in the long run due to work experience foregone to take care of children. Using random effects and fixed effects regressions, Jia and Dong (2013) use panel data for the period 1990–2005 to investigate how the economic transition has affected the wage gap between mothers and childless women in urban China. The results reveal that, on average, mothers earned considerably less than childless women during that period. More precisely, motherhood decreased women's hourly wages by 45.1% (statistically significant at the 5% level) over the Chinese market-oriented economic reform period.

Vinkenburg, et al. (2012) study the motherhood bias, which is the phenomenon where those making hiring and promotion decisions in organisational settings have lower expectations of the professional commitment and competence of mothers. The authors conduct an experiment and discover that, although women face a penalty for having children, their results uncover a wage premium for fathers (Grimshaw & Rubery, 2015) as they tend to be expected to work even harder than before to provide for their growing family. This fatherhood premium is more significant when the father is married (Glauber, 2018). Moreover, applying the quantile regression and decomposition approach along the

wage distribution on the National Longitudinal Survey of Youth (NLSY), Waldfogel (1998) finds that in the United States between 1980 and 1991, having children had positive or no effects for men, but very strong negative effects for women. The author shows that the family penalty disadvantages women more than men. To some extent, this explains why women with children tend to earn less than women without children.

Motherhood has a varying impact on women throughout their career lifecycle (Kahn, et al., 2014). Analysing longitudinal survey data, Kahn, et al. (2014) find that motherhood has the strongest negative labour market outcomes for women when they are younger, and then attenuates when they are older (around age 50). However, for women with 3 or more children, the negative impacts persist across their life course. It should be kept in mind, though, when considering these results, that women who are married and have access to a husband's sizable income may face different incentives for labour force participation and career advancement than women who are unmarried or have husbands who earn very little (ibid.).

The penalty is usually heavier the younger the child. Using country fixed effects on data for women from 21 developing countries, Aguero, et al. (2012) discover that, for low-skilled mothers, the motherhood penalty diminishes as children age. The authors stress the fact that among these less educated mothers, effort and selection into different types of occupations and work intensity fully explain the family gap.

Applying the Oaxaca-Blinder wage decomposition on explained and unexplained components on two British cohort studies, Joshi, et al. (1999) discover that, among full-time employees, women who put their employment on hold for childbirth are subsequently paid less than childless women. In contrast, mothers who maintained employment continuity are as well paid as childless women, but neither are as well remunerated as men. Likewise, Gamboa and Zuluaga (2013) use the Nopo approach (an alternative to Oaxaca-Blinder) to decompose the wage gap between mothers and non-mothers in Colombia into four components – three observable and one unexplained element of the gap. Their results show that, once schooling is included as a matching variable, the unexplained components of the gap narrow and become insignificant. This effect could speak to childbearing limiting further educational attainment for women and thus leading to lower wages.

The motherhood bias may have a negative impact on women at various wage and skills levels. In other words, the size of the penalty may vary depending on the competency and commitment of the particular mother. A penalty may exist even for highly skilled (high-wage) and career-oriented mothers. Using unconditional quantile regression models with person-fixed effects, England, et al. (2016) find that highly-skilled women who earn well experience the highest total penalties for

motherhood. The authors suggest that wage penalties can prevail just as much at low skill, low wage levels as at high wage levels.

The sociological approach to understanding the motherhood pay gap argues that some employers may build into their hiring and promotion decisions traditional stereotypical expectations of the burdens imposed by families on mothers' time and energy. This consequent undervaluation of women's work means that skills and experience in female-dominated occupations and workplaces tend to be rewarded less (Grimshaw & Rubery, 2015). To demystify the question regarding whether motherhood actually affects workplace productivity and performance, Kalist (2008) investigates the motherhood penalty using panel data for a natural experiment on professional female golfers. He finds that productivity levels of women who eventually become mothers tend to increase in the years before giving birth and then decline thereafter. These results support the human-capital explanation and Becker's effort hypothesis concerning the family wage gap.

In spite of the productivity motivation for paying mothers less, a portion of the motherhood penalty still remains unexplained. A number of behavioural studies have tried to explain workplace discrimination against mothers. Normative discrimination in particular is a form of bias which occurs when employers discriminate against mothers because they believe, unconsciously, that paid labour market success signals stereotypically masculine qualities such as assertiveness or dominance (Benard & Correll, 2010). This status-based discrimination occurs when individuals violate gendered expectations that mothers should prioritise family over paid work. Bernard and Correll (2010) determine whether mothers face normative discrimination by conducting a laboratory study where job applications for a high-status, highly paid professional position are evaluated by participants. Their findings show that, given identical résumés, mothers were significantly less likely to be recommended for hiring or promotion, offered marginally significantly lower starting salaries, and held to higher performance and punctuality standards (ibid.). Such biases influence the econometric analyses of women's wage outcomes.

Using population surveys from affluent countries and also conducting a survey experiment similar to that conducted by Benard and Correll (2010), Oesch, et al. (2017) also find an unexplained wage penalty of 4% to 8% per child. This penalty is worse for younger mothers below the age of 40 and disappears for older mothers with older children or mothers in low income or low status jobs. This experiment corroborates the findings of Benard and Correll (2010). Likewise, using data from the 1968-1988 National Longitudinal Survey of Young Women, Anderson, et al. (2003) observe that human capital inputs and unobserved heterogeneity explain 55-57% of the wage gap between mothers and women without children.

Statistical discrimination starts from the idea that employers think membership of a given group sends a signal about the individual's productivity (Cahuc, et al., 2014, p. 488). Statistical discrimination takes the form of stereotyping, based on group membership, that results from imperfect information (ibid.). For example, because of this type of discrimination, women who intend to have children may start to believe that their return to education is lower than of other groups. This belief can incentivise these workers not to acquire education or more skills. This affects the type of occupations and industries women enter. Thus a self-fulfilling prophecy may arise, since employers anticipating women with children to be less skilled discourage women's efforts to be more efficient workers (Cahuc, et al., 2014, p. 493).

Literature on the motherhood penalty in Sub-Saharan Africa (SSA) is scarce. In an overview of the South African labour market since 2008 among those aged 15 to 34 years, unemployment continues to have a strong gender dimension. As a result, unemployment rates among Africans and women remain above the national mean (Development Policy Research Unit, 2012). The statistics are even worse for mothers in this age group, the majority of whom are entitled to paid maternity leave (ibid.).

Ntuli and Wittenberg (2013) use survey data to analyse African women's participation in the labour force over the period of 1995 to 2004. The authors observe that married women might have less economic need than single women. Furthermore, fertility increases the value of a wife's time at home, negatively affecting prospects of labour market participation (ibid.). Their results indicate non-labour income, marriage, fertility and geographical variation in economic development persistently stifled women's labour force participation over the ten-year period. The probit regression results prove Black women aged between 35 and 44 years are most likely to participate in the labour force. These could be women whose children are older and more independent. Macpherson's (1993) decomposition results for non-linear models reveal that marriage significantly reduces the probability of a woman participating in the South African labour market over the period, while divorce raises the chances of women's labour force participation.

In South Africa many women are mothering from a distance, because many women migrate to other regions for work, leaving children behind. This has implications for how women manage family life when migrating to impoverished urban communities (Amoateng, Heaton, & Kalule-Sabiti, 2007). According to Baker's (2010) qualitative study, domestic arrangements, perceptions of support, occupational requirements and ideas about "good mothering" affect women's wage outcomes and vary according to context. For instance, because of high migrant labour rates in South Africa, one cannot immediately assume that mothers live with their children. Women with fewer or older children are likely to migrate to more economically thriving regions, which has implications for wage outcomes.

Posel and van der Stoep (2008) use a probit model and discover that females who are not co-resident mothers are significantly more likely to be labour force participants. Moreover, they find that more than 45% of mothers and almost 70% of non-mothers are residents in households with children who are not their own. Even among these non-mothers, living with children reduces positive labour market outcomes.

New perceptions of motherhood thus take into account the fact that a good mother is not only one who is physically present daily, but is also the one who makes sacrifices to meet the financial needs of the child (Ntsoane, 2015). With rising rural to urban migration rates in post-apartheid SA, destination households of parents may be crowded or not child-friendly, so most parents who migrate do not bring their children to live with them in their destination household. Instead, children are left in the care of other family members. According to Arendell (2000), only a small percentage (14%) of migrants' children who are members of the parental origin household are also members of the parental destination household.

Few studies have explored trends in the motherhood wage gap across the earnings distribution in South Africa. This study of the child penalty focuses specifically on wage differentials of women by biological parenthood status. Moreover, the use of the National Income Dynamics Study (NIDS), a nationally representative household survey with birth history data, provides a more detailed explanation of women's wage outcomes.

3. Data and Methodology

3.1 Data and variables

The data for this study comes from the nationally representative National Income Dynamics Study (NIDS) panel survey carried out by the Southern Africa Labour and Development Research Unit (SALDRU) at the University of Cape Town (UCT). The data for all five waves of NIDS, from 2008 to 2017, is publicly available. In the 2017 survey, about 13, 719 households and 50, 319 individuals were interviewed. We restrict the sample for this study to Black/African[2] women aged 20 to 49 who are not currently in schooling.

According to Budlender, et al. (2001), the 20–39 age group has the highest proportion of both men and women with children under the age of seven years. Nonetheless, very few labour market surveys have birth history information, let alone link mothers to their children. Dorrit Posel (2011) corroborates these details from her observation that studies on female labour force participation in

[2] Black and African are used interchangeably in this study.

South Africa have not been able to match women to their children. Even datasets from surveys considered nationally representative do not contain detailed birth history information. Fortunately, NIDS allows us to link women to their biological children for more comprehensive analysis of the motherhood penalty in SA.

Although it would be interesting to investigate the existence of a fatherhood premium, this would be difficult because of the dynamics of fatherhood in South Africa. Most Black men are migrant workers who do not reside with their children. Some fathers have no relationship with their child(ren) and others may not even know that they have a child. Linking fathers to children for measuring the wage impact of fatherhood in South Africa would therefore be a difficult task.

3.2 Model Specification

All four ordinary least square (OLS) models in this study follow first from Mincer's (1974) human capital wage equation in which individuals' log hourly wages are a function of their demographic characteristics, work experience, household characteristics, and educational attainment. To determine whether there exists a wage penalty for having additional children in the sectors covered, a dummy variable for motherhood is included in these Mincerian equations, similar to the methodology employed in Casal and Barham (2013). The specifications are semi-logarithmic linear and additive models inspired by Budig and England (2001) and Wadfogel (1998). The dependent variable, lnw_i, is the natural logarithm of the real hourly wage of women. Motherhood is the main independent variable. The indicator variable "married' and an interaction term (Mother*married) are incorporated to model the potential wage gains or losses of marriage. The work experience variable is age minus years of education minus early childhood (6 years). The work experience variable may overestimate actual work experience if women take any time off work to bear and raise children (Anderson, et al., 2003). To take into consideration the phenomenon of some mothers working part-time, a full-time dummy variable is also included in the specifications.

$$lnw_i = \alpha + \beta mother_i + \gamma_1 edu_{i1} + \gamma_2 married_i + \gamma_3 experience_i + \gamma_4 experience_i^{\,2} + \gamma_5 occupation_i + \gamma_6 married_i * mother_i + \gamma_7 province_i + \gamma_8 unionmember_i + \gamma_9 fulltime_i + \varepsilon_i \quad (1)$$

The 2nd specification is inspired by Piras and Ripani (2005), who study the effects of motherhood on wages in the developing countries of Bolivia, Brazil, Ecuador, and Peru, taking into account children's age:

$$lnw_i = \alpha + \gamma_1 edu_{i1} + \gamma_2 experience_i + \gamma_3 experience_i{}^2 + \gamma_4 occupation_i + \gamma_5 unionmember_i + \gamma_6 ChildrenUnder7yrs_i + \gamma_7 Children7to18yrs_i + \gamma_8 province_i + \gamma_9 fulltime_i + \varepsilon_i \quad (2)$$

The 3rd specification is motivated by analysis done by Aguero, et al. (2012) where they posit that the penalty on wages increases as the number of children increase:

$$lnw_i = \alpha + \gamma_1 edu_{i1} + \gamma_3 experience_i + \gamma_4 experience_i{}^2 + \gamma_5 occupation_i + \gamma_6 unionmember_i + \gamma_7 twotofourchildren_i + \gamma_8 fiveormorechildren_i + \gamma_9 province_i + \gamma_{10} fulltime_i + \varepsilon_i \quad (3)$$

Taking into account that many women are migrant workers who leave their children behind, this study is interested in understanding the penalty on wages as the number of co-resident children increases:

$$lnw_i = \alpha + \gamma_1 edu_{i1} + \gamma_2 experience_i + \gamma_3 experience_i{}^2 + \gamma_4 occupation_i + \gamma_5 unionmember_i + \gamma_6 ChildrenUnder7yrsinHH_i + \gamma_7 Children7to18yrsinHH_i + \gamma_8 province_i + \gamma_9 fulltime_i + \varepsilon_i \quad (4)$$

The variable 'children_under_7_in_hh' is the row total of children under seven residing in the household. The variable 'children_7_to_18_in_hh_wm' is the row total of children aged seven to eighteen residing in the same household as the mother.

All four model results for 2017 will be presented in the empirical results section.

3.3 Going beyond the mean – RIF and reweighting

The relationship between wages and motherhood status may vary by income level. Consequently, this study runs unconditional quantile (RIF-OLS) regressions to understand the effect of motherhood along the wage distribution. The recentered influence function (RIF) estimates the impact of changing the distribution of explanatory variables on the marginal quantiles of the outcome variable, log of hourly wages, $\ln W_i$ (Firpo, et al., 2007). The influence function (IF) for the τ^{th} unconditional quantile of the distribution of W, W (q_τ), is expressed as:

$$IF(W; q_\tau) = \frac{\tau - I(W \leq q_\tau)}{f_w(q_\tau)} \quad (5)$$

f_W and I(.) represent the marginal density function of the wage distribution and an indicator function, respectively. The RIF and ττh quantile is:

$$RIF(W; q\tau) = q_\tau + IF(W; q_\tau) \quad (6)$$

The τ^{th} quantile RIF regression aggregates to the unconditional quantile of interest and allows one to decompose the gap into endowment and unexplained effects related to the explanatory variables (Firpo, et al., 2007). The procedure provides a clear presentation of exactly where along the distribution the motherhood penalty has its greatest impact.

3.4 Oaxaca Blinder decomposition

Furthermore, this study uses a more rigorous approach by combining the Oaxaca-Blinder decomposition with the Recentered Influence Function (RIF) regression in order to decompose the log wages of working mothers and non-mothers by earning quantile, rather than merely at the mean. In the labour economics literature discrimination is usually defined as the presence of different wage rates for workers with the same productivity or ability but with different personal characteristics (motherhood status, in this case). The Oaxaca-Blinder procedure provides a way of 1) decomposing changes or differences in wages into a wage structure (unexplained) effect and a composition (explained) effect, and 2) further dividing these two components into the contribution of each covariate (Kwenda & Ntuli, 2015):

$$ln\overline{W}_{nm} - ln\overline{W}_{m} = (\bar{X}_{nm} - \bar{X}_{m})\hat{\beta}_{nm} + (\hat{\beta}_{nm} - \hat{\beta}_{m})\bar{X}_{m} \qquad (7)$$

The procedure divides the wage differential between mothers and non-mothers into one part that is explained, and a residual part that is usually seen as a measure of discrimination, but also includes effects of group differences in unobserved predictors (Jann, 2008). The study applies the technique based on the recentered influence function (RIF) regressions of Firpo, et al (2009). This methodology divides the motherhood wage differential at each unconditional quantile into a 'composition effect' (attributable to differences in observable characteristics) and a 'price effect' (attributable to unobservable differences). The method determines the partial contribution of each covariate to these components as well. Moreover, decomposition using RIF-regressions helps to clarify which variables are most important in understanding the wages of women and how much the wage differential between mothers and non-mothers remains unexplained at various points of the wage distribution.

4. Descriptive Statistics

The rate of unemployment for women in South Africa was 29,5% in the second quarter of 2018 compared with 25,3% for men, according to the official definition of unemployment (QLFS, 2018). Although some legal progress has been made in South Africa to protect the rights of pregnant women at least (van Klaveren, et al., 2009), gender representation is still below the 50% mark for positions that come with a great deal of influence.

This section presents a descriptive profiling of participation, employment and wages of mothers versus non-mothers for 2017. To reveal key and relevant trends, the descriptive statistics focus primarily on the main explanatory variables used in the regression estimates. Table 1 outlines the trends in labour market outcomes for women.

Table 1: Average (Mean) Characteristics of African women, 2017

	Has no biological Children	Has children who do not co-reside with her	Has co-resident biological children Only	Has both co-resident AND non-resident children
Age	33.74	32.9	32.1	38.8
	.0265571	*.0059338*	*.0032733*	*.0053995*
Years of schooling	9.46	11.2	10.9	9.9
	.013007	*.001993*	*.0010947*	.0025928
Married	.395	.233	.329	.493
	.0015948	*.0003443*	*.0010947*	*.0003911*
Urban	.616	.728	.572	.548
	.0015865	*.0003621*	*.00022*	*.0003893*
Household size	3.54	2.1	6.02	4.55
	.009375	*.001525*	*.0015237*	*.0020576*
Connected to Electricity	.934	.8822	.895	.8572
	.0008079	*.0002625*	.0001361	*.0002737*

Source: NIDS 2017
Note: Standard errors in parentheses

In 2017, 1% of the women in the sample have no biological children at all. Approximately 14.4% have non-resident children. 63.8% of women have biological children who all reside with them. 20.8% have both co-resident children and children who do not live with them. For this reason, to understand the motherhood penalty in this study, mothers are defined as women with at least one biological child residing with them. Non-mothers, or childless women, are those with no biological children residing with them. This would include women with no children at all and mothers who do have children but because of migration or other factors, do not live with the child(ren). This is also based on the assumption that children are not expected to constrain the labour force activity of mothers who are not living with their children, because they are not involved in day-to-day childrearing activities (Ntsoane, 2015).

In 2017, 80.7 percent of African women of working age are mothers. As the tabulated numbers indicate, most African females between the ages of 20 and 50 in the labour market are mothers. Table 2 shows the number of women who have resident children under seven and those with co-residing

children under 18. As the tabulated numbers indicate, most females in the labour market between the ages of 20 and 50 are mothers who co-reside with their children.

Table 2: No. of co-resident biological children for labour force participant mothers

No. of Children	Under 7		Between 7 and 18	
0	1,861,888	*42.47*	1,663,637	*37.95*
1	2,063,658	*47.07*	1,831,963	*41.79*
2	430,928	*9.83*	704,145	*16.06*
3	27,181	*0.62*	155,494	*3.55*
4	396	*0.01*	28,685	*0.65*
5	_	_	127	*0.00*

Source: NIDS Wave 5 (2017)
Note: Percentages in italics. Data are weighted to present the entire population.

Table 3: Total biological children for mothers who are labour force participants

No. of Children	Under 7		Between 7 and 18	
0	1,776,704	*40.53*	1,365,347	*31.14*
1	76,554	*1.75*	225,651	*5.15*
2	1,968,674	*44.91*	1,617,250	*36.89*
3	100,254	*2.29*	250,826	*5.72*
4	416,605	*9.50*	651,689	*14.86*
5	17,683	*0.40*	68,574	*1.56*
6	26220	*0.60*	164,158	*3.74*
7	961	*0.02*	11,632	*0.27*
8	396	*0.01*	27,811	*0.63*
9			986	*0.02*
11			127	*0.00*

Source: Own calculations using NIDS 2017.
Note: Results are for Black women between the ages of 20 and 50. Weights have been applied to the summary statistics.

Table 4: Educational of outcomes of employed mothers and non-mothers

	Grade 0 to 8	Grade 9 to 11	Grade 12	Diploma	Degree	Higher Degree
Mother	317160	1,328,065	560050	366,629	512,192	5423
Percent	*10.27*	*42.99*	*18.13*	*11.87*	*16.58*	*0.18*
Non-mother	81,973	404,548	215,758	170,695	176,698	1809
Percent	*7.80*	*38.47*	*20.52*	*16.23*	*16.80*	*0.17*

Source: NIDS (2017)
Note: Results are for Black women between the ages of 20 and 50. Weights have been applied to the summary statistics

A greater proportion of non-mothers have a matric or higher educational qualification compared to mothers. With that being said, mothers have been gaining more ground over the years in acquiring higher levels of educational attainment. Approximately 53.72% of child-free women have a matric or higher qualification, versus 46.8% of mothers.

Higher educational attainment is associated with more positive employment outcomes in the South African labour market. Table 5 describes the labour market status of women in 2017.

Table 5: Labour Market Status of Women in South Africa – 2017

	NEA	Discouraged	Unemployed	Employed
Mother	2,188,789	118,601	1,274,717	3,109,334
Percent	*32.70*	*1.77*	*19.04*	*46.45*
Non-mother	345340	6,942	196,619	1,053,299
Percent	*21.55*	*0.43*	*12.27*	*65.74*

Source: Own calculations using NIDS Wave 5 (2017)
Note: Strict definition of employment applied. Percentages in italics.

In terms of labour market status, mothers dominate the Not Economically Active (NEA) category compared to child-free women. More mothers or caretakers than child-free women are unemployed. Non-mothers also have higher employment rates than mothers. The fact that most mothers are unemployed or not economically active is an important issue which requires attention, especially concerning women who reside in rural areas with very limited employment opportunities. Childbearing is not expected to constrain the labour force participation of mother's who are not co-resident with their children. In South Africa, the remaining sample of co-resident mothers is likely to be a non-random sample of all mothers who are less likely to be labour force participants. A co-

residency requirement is therefore likely to bias the estimated relationship between motherhood and labour force participation in South Africa (Ntsoane, 2015, p. 41).

Posel and Stoep (2008) find that women who are not biological mothers are significantly less likely to be labour force participants if they live in households with children, consistent with the fostering of children in extended households. Mothers who do not reside with their children are more likely to be participate in the labour force, which speaks to the prominence of labour migration. For the sake of assessing the motherhood wage penalty, the rest of the study focuses on employed females in particular.

Most Black women in the NIDS dataset have low and medium skills levels. It is useful to look at more labour market trends of women and observe whether there are any significant differences in the observable traits. Table 6 displays the means, standard deviations and t-test differences between the estimated means of the labour market variables of employed mothers and non-mothers.

Table 6: Labour Market Characteristics of Employed Women – 2017

	Mother		**Non-mother**	
Age	35.7*	*.004166*	33.9*	*.007065*
Years of education	11.25*	*.0015074*	11.5*	*.0025397*
Weekly hours	39.39*	*.0083046*	41.87*	*.0131469*
Experience	18.43*	*.0046759*	16.37*	*.0078653*
Hourly wages	58.18*	*.047986*	47.66*	*.0614972*
Married	.386*	*.0002761*	.195*	*.0003862*
Household Head	.475*	*.0002832*	.717*	*.0004391*
Fulltime worker	.805*	*.0002534*	.855*	*.0003704*
Union membership	.269*	*.0002792*	.225*	*.0004293*

Source: NIDS (2017)

Notes: Weights have been applied. Standard errors in italics. The Hours variable includes hours worked by both part-time and full-time workers. The asterisk (*) denotes a significant difference between mean estimates for mothers and non-mothers at the 5% level. Data is weighted. Earnings data have been deflated to September 2014 for comparability with other years.

The results in Table 6 suggest that, on average, more mothers than non-mothers are married. Although child-free women have higher levels of educational attainment than mothers, mothers seem to have higher mean wages than non-mothers. The tabulated results above imply that on average, mothers work fewer hours per week than non-mothers. Mothers in the sample are older so they tend to have more years of work experience than their childless counterparts. Some mothers/caregivers may have taken breaks in their careers for maternity leave, which may affect their total years of

experience. This may potentially bias the results. Moreover, more mothers than non-mothers are married.

According to South Africa's Time Use Survey, on average, women do eight times as much care work than men (32 minutes and 4 minutes, respectively) per day. On average, employed women also spent more than five times as much time as men in care work (44 minutes per day compared to 5) at home (Budlender, et al., 2001). Thus, employed women spend far more time than men working (paid plus unpaid labour), but less of their time doing paid work. Correspondingly, working women in the South African labour market are over-represented in part-time employment, which is an important feature of the feminisation of the labour force (Posel & Muller, 2007). These statistics are important when considering the amount of hours mothers and non-mothers spend at the workplace. Of the women who are employed in the sample, 26.9% of mothers and 22.9% of non-mothers are union members. Still focusing on those who are employed, table 7 shows percentages of women in different occupations.

Table 7: Occupational Status of Mothers & Non-mothers – 2017

	Mother		**Non-mother**	
Private households	336,646	*13.45*	129,249	*13.87*
Agriculture, hunting, forestry, & fisheries	104,629	*4.18*	80,535	*8.64*
Mining and quarrying	31,214	*1.25*	2,995	*0.32*
Manufacturing	237,518	*9.49*	61,784	*6.63*
Electricity, gas and water supply	20,065	*0.80*	14600	*1.57*
Construction	42,396	*1.69*	12,365	*1.33*
Wholesale and retail trade	520,831	*20.81*	252,118	*27.06*
Transport storage & communication	36,398	*1.45*	6150	*0.66*
Financial intermediation, insurance, real estate & business services	204,035	*8.15*	136,826	*14.68*
Community, social & personal services	968,978	*38.72*	235,217	*25.24*

Source: NIDS 2017
Note: Percentages in italics. Data is weighted.

Table 7 paints a clearer picture of the occupations that women tend to opt into, by motherhood status. Overall, most women work in the services industry, wholesale and retail trade, and private households (e.g. as domestic workers). Many studies note that women dominate in occupations such as clerks and domestic workers (Bhorat & Goga, 2013) in South Africa. Non-mothers dominate most occupations rather than the mothers, except for the community, social and personal services occupations. As noted in the international literature, it is possible that women with children may have anticipated in the past

that they want to have kids and therefore self-select into more flexible occupations. In the case of low-skilled women in South Africa today, occupation selection is based on what jobs become available at a particular skills level, and where. Table 8 provides a breakdown of the distribution of employed women across the nine provinces of South Africa.

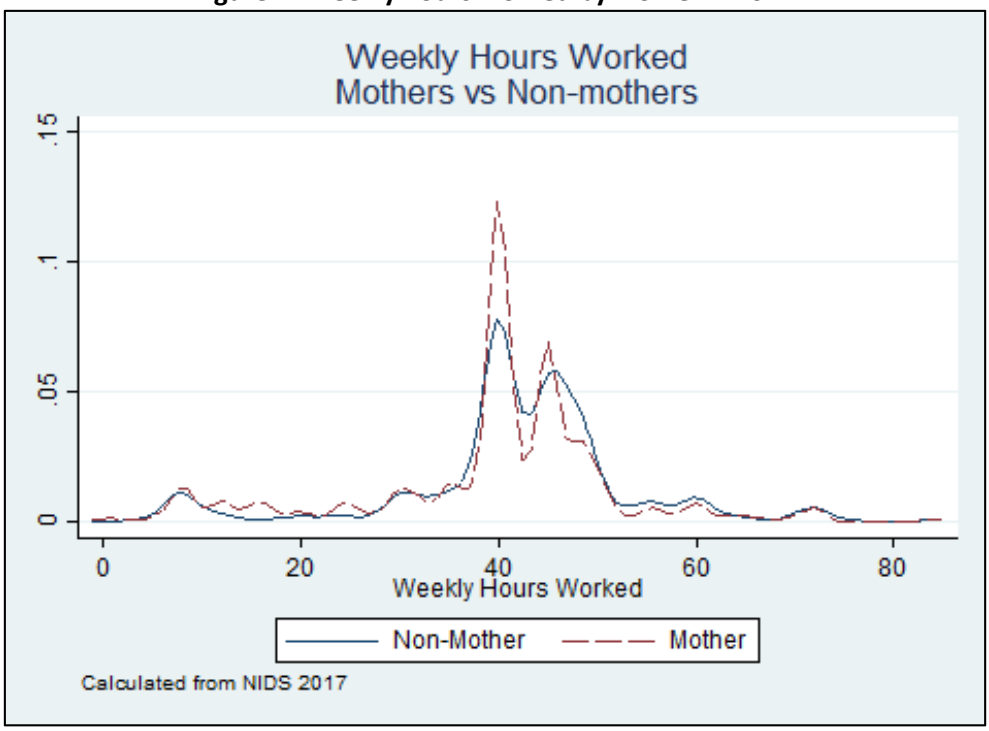
Table 8: Geographical Status of Mothers & Non-mothers: 2017

	Mother		Non-mother	
Western Cape	214,512	*6.90*	95,801	*9.10*
Eastern Cape	284,538	*9.15*	122,208	*11.60*
Northern Cape	36,279	*1.17*	9,256	*0.88*
Free State	191,899	*6.17*	27,549	*2.62*
KwaZulu-Natal	628,902	*20.23*	255,743	*24.28*
North West	156,709	*5.04*	42,158	*4.00*
Gauteng	1,037,106	*33.35*	361,288	*34.30*
Mpumalanga	277,945	*8.94*	90,395	*8.58*
Limpopo	281,444	*9.05*	48,901	*4.64*

Source: NIDS 2017
Note: Percentages in italics. Data is weighted.

Table 8 provides information on the provinces in which women reside. Most employed Black women are based in Gauteng, a province full of migrant workers, and there are more non-mothers than mothers in this region. The Northern Cape, Free State, North-West, Mpumalanga, and Limpopo Provinces contain more working mothers than non-mothers than the remaining provinces (Western Cape, KwaZulu-Natal and the Eastern Cape). The distribution of women in various provinces may speak to the industries which dominate in each province. Some women are willing to migrate to participate in these industries. This option tends to be less accessible for women living rural areas.

Figure 1: Weekly hours worked by women – 2017



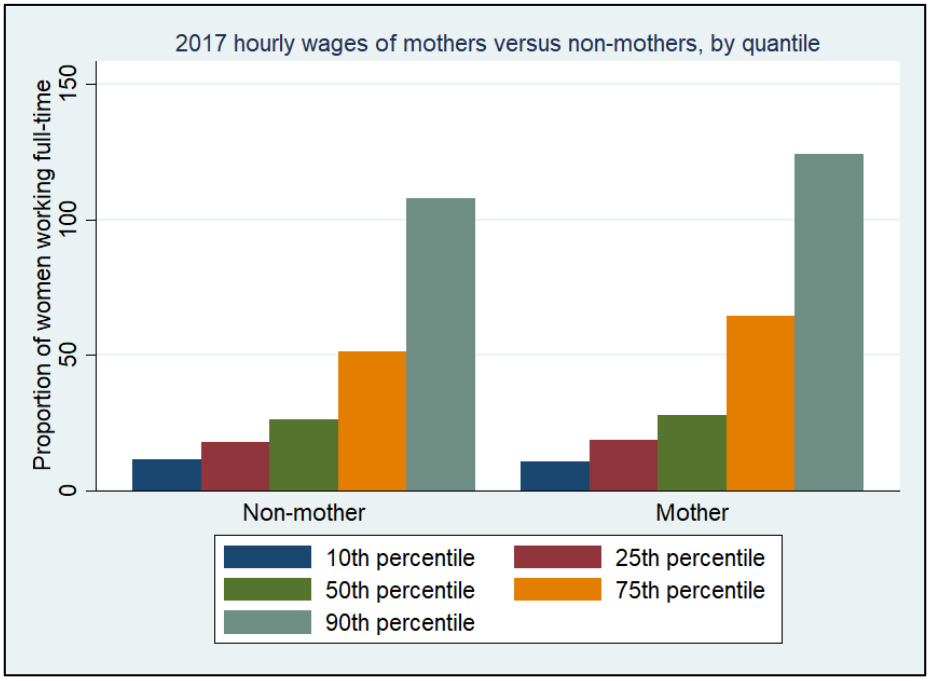
Source: Own calculations using NIDS 2017
Notes: Coding adapted from (Wittenberg, 2012).
Earnings data have been deflated to September 2014. Data are weighted.

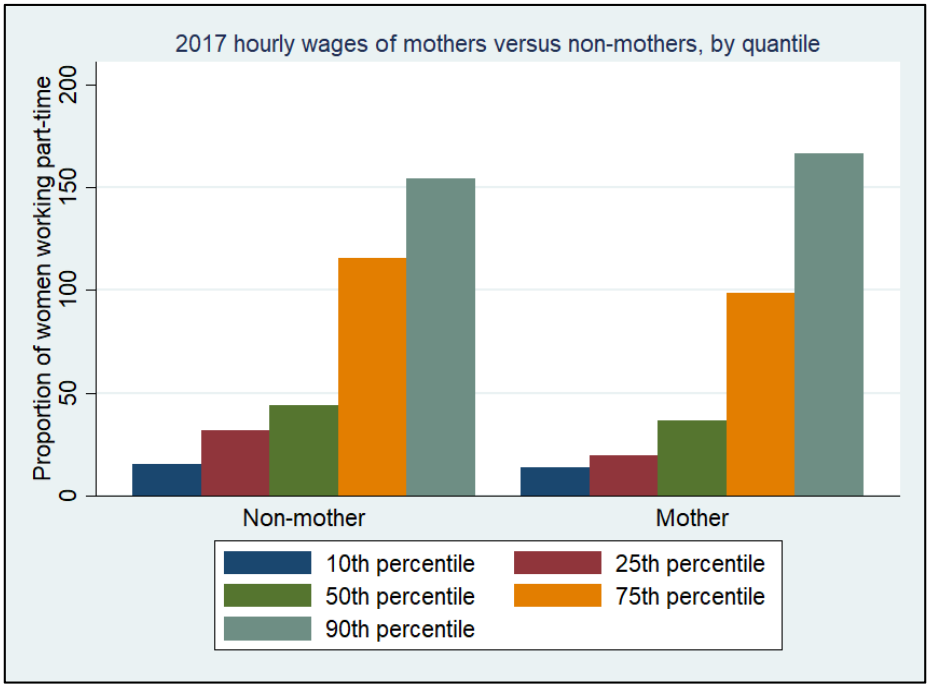
The kernel densities in Figure 1 inspect the difference in the number of workplace hours worked by women. As confirmed by the graph above, the distribution of hours for non-mothers is shifted more to the right than for mothers, meaning that women without children consistently work longer hours than mothers/caregivers. More non-mothers work 40 or more hours per week than mothers. Of course, it should be kept in mind that mothers who can afford to pay for child-care are more likely to work longer hours, especially when their children are older. There may also be a sibling effect[3] at play, where the older siblings take care of the younger ones, allowing the mother to work longer hours.

Before modelling the wage returns of mothers/caregivers and childfree women, it is useful to evaluate the difference in earnings levels between the two groups. Figures 2 (a) and (b) illustrate the difference in real earnings of women at various points along the wage distribution. A distinction has been made between the hourly wages of full-time working women versus those who work part-time (less than 35 hours per week).

[3] The sibling effect is the case where older siblings take care of younger siblings while parents are not home.

Figures 2 (a) and (b): Hourly wages for Full-time and Part-time female workers, 2017



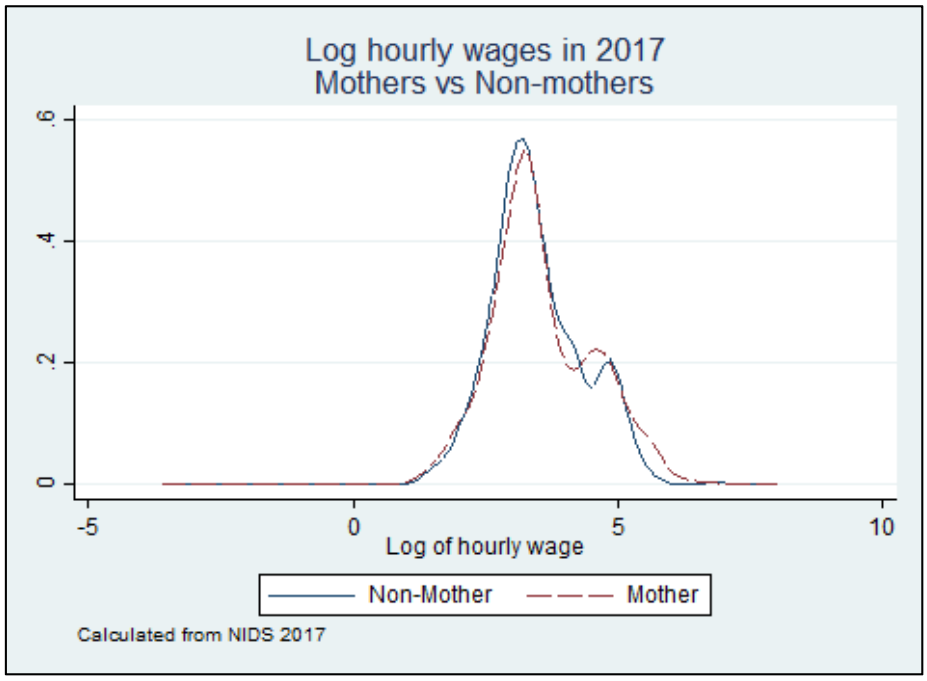


Source: Own calculations using NIDS 2017
Note: Earnings data have been deflated to September 2014. The data is weighted.

The graphical results in Figures 2 (a) and (b) show that full-time employed non-mothers earn similar hourly wages to mothers at all quantiles except at the 75th and 90th quantiles. Parents at the upper end of the earnings distribution may be able to purchase high-quality, stable childcare, for example, which could provide greater peace of mind and fewer work-related absences.

For part-time employees, non-mothers earn more hourly wages than mothers at the 10th, 25th and 50th (mean) and 75th quantiles. Using fixed effects on the LFS 2001-2004, Posel and Muller (2007) find evidence of a significant wage premium for female part-time employment. They refer to the presence of a wage floor existing below which wages for part-time workers are not allowed to fall as an explanation. Since mothers are more likely to work part-time than non-mothers, this could explain to a certain extent these illustrated wage outcomes.

Figure 3: Kernel Density Estimates of Wage[4] Distributions for Mother and Non-mothers



Source: NIDS 2017

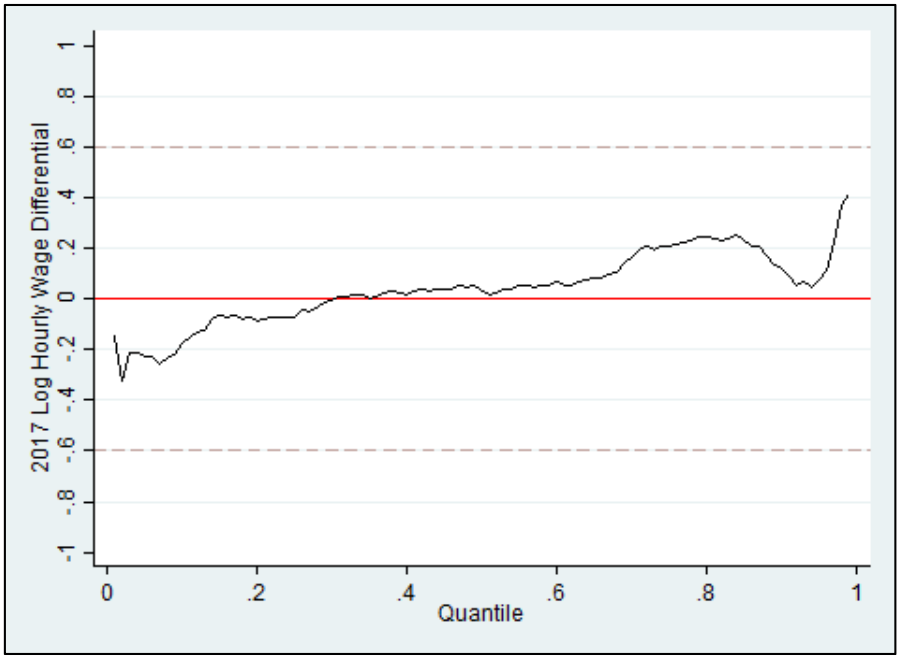
Note: Data is weighted. Coding to plot graph adapted from (Wittenberg, 2017) Stata practical notes. Earnings data have been deflated to September 2014 for comparability with other waves.

From figure 3 it is clear that the direction of the wage gap varies by income quantile. Figure 4 thus depicts mother's earnings minus non-mothers' earnings at every quantile of the wage distribution. Mothers earn less than non-mothers up until the 30th quantile. Around the median, the hourly earnings are about the same for all women. At higher quantiles (60th and up), mothers earn significantly more than non-mothers, especially around the 80th quantile. Clearly then, wage

[4] The detailed data from NIDS on individual earnings and hours worked per week in the primary job is used to construct gross hourly wages deflated to September 2014 values using the consumer price index for comparability between years.

differential trends by motherhood status will vary depending on certain (observable and unobservable) factors.

Figure 4: Difference in log hourly wages of mothers versus non-mothers by quantile, 2017



Source: Own calculations using NIDS 2017
Note: Coding for graph retrieved from Stata journal by (Cox, 2004). The graph shows mothers' log hourly wage minus non-mothers' hourly wage at every quantile of the wage distribution. Data is weighted.

5. Estimating the Motherhood/Child Wage Gap

Under Mincer's human capital framework, various factors affect earnings. Pre-market factors such as education level are useful to consider in the analysis of wage differentials. The wage estimations in this section contain experience variables instead of age dummies. As can be seen from Table 9, ceteris paribus, women in the sample exhibit positive wage returns to education. Weichselbaumer and Winter-Ebmer (2005) indicate that the marital status of an individual can be interpreted as a productivity indicator. The results under model specification (1) indicate that ceteris paribus, mothers earn 1.33% more hourly wages than non-mothers in 2017, albeit this is statistically insignificant. Interestingly, full-time workers earn lower hourly wages than part-time workers (who tend to be mothers). This has implications for the overall (hourly) wage gap between mothers and child-free women.

Under model (2), the OLS results also confirm the assumption that the negative impact of children who reside with the mother are more significant the younger the child(ren). Women with children under 7 suffer a larger wage penalty than those with older children (aged 7 to 18). Under specification (3), the result is similar: Having younger children (both resident and non-resident with the mother) confers a heavier burden than having older children. Furthermore, marriage is related to significantly positive wage outcomes for mothers in both specifications, ceteris paribus.

Under model specification (4), holding all else constant, women with two or more children carry a heavier wage penalty than those with only one child. Mothers with 5 or more children suffer a significant wage penalty.

Union members consistently earn more hourly wages than non-union members. Domestic workers in private households, the majority of whom are child-free, earn the least compared to all other occupation types. In terms of years of experience, wages increase negatively with experience (at a decreasing rate at lower quantiles and at an increasing rate at higher quantiles).

Table 9: OLS Results – 2017

VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**
Years of Education	0.185***	0.165***	0.165***	0.170***
	(0.0196)	(0.0126)	(0.0126)	(0.0126)
Agriculture, hunting, forestry and fisheries	0.188*	0.251***	0.224**	0.220**
	(0.101)	(0.0873)	(0.0877)	(0.0869)
Mining & Quarrying	0.800***	0.767***	0.727***	0.738***
	(0.163)	(0.0958)	(0.0962)	(0.0959)
Manufacturing	0.168	0.368***	0.335***	0.350***
	(0.107)	(0.0928)	(0.0928)	(0.0919)
Electricity, gas & water supply	0.536***	0.838***	0.809***	0.819***
	(0.142)	(0.145)	(0.144)	(0.145)
Construction	0.490***	0.460***	0.417***	0.431***
	(0.181)	(0.109)	(0.110)	(0.109)
Wholesale & retail trade	0.106	0.203***	0.177**	0.189**
	(0.0942)	(0.0749)	(0.0749)	(0.0736)
Transport storage & communication	0.536***	0.392***	0.349***	0.359***
	(0.171)	(0.101)	(0.103)	(0.102)
Financial intermediation, insurance, real estate and business	0.324***	0.434***	0.400***	0.408***
	(0.0915)	(0.0902)	(0.0898)	(0.0894)
Community, social and personal services	0.253***	0.419***	0.394***	0.407***
	(0.0808)	(0.0833)	(0.0820)	(0.0821)
Married	0.0891	0.189***	0.189***	0.180***
	(0.0997)	(0.0487)	(0.0485)	(0.0483)
Experience	-0.0134	-0.00853	-0.00625	-0.00962
	(0.0145)	(0.0109)	(0.0111)	(0.0110)

Table 9: OLS Results – 2017 continued

VARIABLES	(1)	(2)	(3)	(4)
Experience squared	0.000784**	0.000600**	0.000533*	0.000680**
	(0.000375)	(0.000296)	(0.000300)	(0.000291)
Mother	0.0133			
	(0.0752)			
Married mother	0.0663			
	(0.117)			
Union Member	0.551***	0.480***	0.477***	0.475***
	(0.0806)	(0.0557)	(0.0556)	(0.0557)
Full-time worker	-0.537***	-0.750***	-0.754***	-0.756***
	(0.0807)	(0.0810)	(0.0808)	(0.0809)
Resident children under 7yrs		-0.127***		
		(0.0404)		
Resident children 7 to 18yrs		-0.0830***		
		(0.0318)		
Total biological children<7			-0.0684***	
			(0.0196)	
Biological children aged 7 to 18			-0.0484***	
			(0.0158)	
2-4 children				-0.0452
				(0.0820)
5 or more children				0.204***
				(0.0763)
Constant	1.487***	1.881***	1.922***	1.669***
	(0.325)	(0.196)	(0.195)	(0.192)
Observations	1,845	3,923	3,923	3,923
R-squared	0.471	0.393	0.395	0.396

Source: Own calculations using NIDS 2017.

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is log of real hourly wages. The base category for occupation categories is private households. The province results have been omitted from the table and are available on request. Data are weighted.

Table 10: Recentered Influence Function-Ordinary Least Squares (RIF-OLS) results, 2017

VARIABLES	10th Quantile		25th Quantile		Median		75th Quantile		90th Quantile	
	Mother	Non-mother	Mother	Non-mother	Mother	Non-mother	Mother	Non-mother	Mother	Non-mother
Years of Education	0.125***	0.0442	0.145***	0.0946***	0.163***	0.0895***	0.406***	0.171***	0.282***	0.126**
	(0.0271)	(0.0531)	(0.0170)	(0.0320)	(0.0185)	(0.0318)	(0.0469)	(0.0529)	(0.0518)	(0.0509)
Agriculture, hunting, forestry and fisheries	0.0855	-0.937*	-0.00591	-0.250	-0.316***	-0.464***	-0.741***	-1.131***	-0.360**	-0.392
	(0.214)	(0.493)	(0.127)	(0.242)	(0.104)	(0.171)	(0.194)	(0.334)	(0.169)	(0.416)
Mining and Quarrying	0.373	-0.405	0.427***	-0.314	-0.142	-0.420**	-0.635**	-0.885***	-0.197	-0.244
	(0.250)	(0.498)	(0.162)	(0.275)	(0.146)	(0.199)	(0.249)	(0.338)	(0.187)	(0.362)
Manufacturing	0.144	0.152	0.286**	0.441**	0.386***	0.401*	1.663***	1.287**	1.052	0.0926
	(0.183)	(0.381)	(0.113)	(0.221)	(0.126)	(0.212)	(0.415)	(0.620)	(0.790)	(1.180)
Electricity, gas, and water supply	0.242	-0.296	0.262**	-0.237	-0.000836	-0.498**	-0.539*	-1.483***	0.286	-0.852**
	(0.233)	(0.419)	(0.125)	(0.236)	(0.131)	(0.200)	(0.319)	(0.337)	(0.378)	(0.369)
Construction	0.565**	0.0349	0.566**	0.0155	0.569**	-0.225	0.598	-0.343	0.293	2.146***
	(0.228)	(0.206)	(0.256)	(0.174)	(0.283)	(0.151)	(0.847)	(0.381)	(0.858)	(0.760)
Wholesale and retail trade	0.968***	0.0907	0.631***	0.320	0.0882	-0.424	0.246	-0.835	-0.351*	-0.442
	(0.157)	(0.281)	(0.163)	(0.219)	(0.203)	(0.441)	(0.642)	(0.567)	(0.195)	(0.465)
Transport storage and communication	0.538***	0.0380	0.269***	0.194	-0.175	-0.281*	-1.039***	-1.411***	-0.172	-0.429
	(0.144)	(0.215)	(0.0867)	(0.138)	(0.109)	(0.162)	(0.261)	(0.350)	(0.251)	(0.460)
Financial intermediation, insurance, real estate & bus.	0.462**	0.273	0.178	0.385***	0.217	0.568***	0.335	0.829	-0.178	-1.098**
	(0.190)	(0.245)	(0.150)	(0.141)	(0.161)	(0.138)	(0.587)	(0.858)	(0.590)	(0.471)
Community, social and personal services	0.556***	0.153	0.452***	-0.0190	0.282**	0.0143	-0.203	-1.156***	-0.409**	-0.711
	(0.149)	(0.248)	(0.100)	(0.241)	(0.122)	(0.232)	(0.366)	(0.436)	(0.199)	(0.540)
Married	0.152	0.256*	0.121*	0.128	0.113*	0.127	0.245*	-0.0441	0.183	-0.0287
	(0.104)	(0.146)	(0.0637)	(0.110)	(0.0670)	(0.128)	(0.147)	(0.310)	(0.139)	(0.263)
Experience	-0.00864	0.00637	-0.00380	0.0116	-0.0175	-0.0336	-0.0525	-0.0278	0.0266	-0.0348
	(0.0314)	(0.0287)	(0.0229)	(0.0264)	(0.0226)	(0.0249)	(0.0323)	(0.0386)	(0.0223)	(0.0408)
Experience sq.	0.000424	0.000160	0.000315	-0.000142	0.000779	0.00111*	0.00245***	0.00117	0.000545	0.00104
	(0.000777)	(0.000803)	(0.000599)	(0.000728)	(0.000595)	(0.000652)	(0.000781)	(0.00105)	(0.000546)	(0.000981)
Union Member	0.494***	0.174	0.466***	0.250**	0.417***	0.585***	1.168***	1.452***	0.207	0.819*
	(0.0953)	(0.154)	(0.0641)	(0.102)	(0.0927)	(0.124)	(0.226)	(0.315)	(0.222)	(0.422)
Fulltime worker	-0.444***	-0.114	-0.285***	-0.284*	-0.496***	-0.495***	-0.896***	-0.535	-0.793***	-0.475
	(0.116)	(0.239)	(0.0765)	(0.154)	(0.0835)	(0.151)	(0.228)	(0.373)	(0.210)	(0.445)
Constant	1.420***	2.094***	1.422***	2.032***	1.910***	3.178***	0.163	2.763***	1.642**	3.857***
	(0.449)	(0.625)	(0.336)	(0.398)	(0.354)	(0.457)	(0.755)	(0.833)	(0.779)	(0.852)
Observations	1,453	392	1,453	392	1,453	392	1,453	392	1,453	392
R-squared	0.143	0.151	0.291	0.254	0.357	0.403	0.406	0.535	0.218	0.326

Source: Own calculations using NIDS 2017

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The sample includes all African women between 20 and 49 who are employed and have non-missing wages and hours of work data, and the data are weighted using September 2014 Census weights. The dependent variable is log of real hourly wages. The standard errors are shown in brackets below the estimates. The base category for occupation is domestic workers in private households. The province results have been omitted from the table and are available on request.

The OLS regression results indicate that, holding all else equal, there does exist a motherhood penalty. However, it is useful to understand these correlations at different points of the wage distribution. Table 10 displays the RIF[5] estimates for women from the 10th to the 90th wage quantiles. Mothers experienced higher returns to education than non-mothers at all quantiles. The results for years of work experience are peculiar: Excluding the 90th quantile, mothers experience negative returns to experience (although this is not statistically significant). Only from the 50th quantile upwards to non-mothers experience negative returns to experience. Married non-mothers experience higher wage returns than their unmarried counterparts at all wage quantiles except for the 75th and 90th. Ceteris paribus, mothers consistently exhibit a 'marriage wage premium'. At all quantiles, women who are union members earn more than non-union members. Holding all else constant, women who work full-time, earn on average lower hourly wages than full-time workers.

Higher incomes in some professions, such as medicine, may provide strong incentives to remain employed after the birth of a child, whereas lower paid female-dominated professions may not offer similar incentives. Higher incomes may also offer greater financial resources to purchase high quality childcare.

The RIF-OLS results above confirm that the effect of motherhood may differ among lower and higher wage workers. Women in elite, male-dominated professions are likely qualitatively different from women in other professions in ways that cannot be measured (Buchmann & Mcdaniel, 2016), which may affect the results. Therefore, the unconditional or marginal quantile regression (UQR) decomposition is applied to help in testing whether penalties for motherhood, or rather wage inequalities, differ by skill and wage levels (observable traits) or by unobservable factors instead.

Decomposition Results

RIF (unconditional quantile regression – UQNR – framework) decomposition regression analysis builds on the pre-existing discrimination literature which focused on the mean, rather than on specific percentiles of the wage distribution. If one assumes that childless women are compensated fairly and mothers are undercompensated, one would use the non-mothers' coefficients as reference coefficients, and vice versa (Jann, 2008). Table 11 displays the decomposition results for 2017, using the mother coefficients as the reference coefficients.

[5] Unconditional Quantile regression gives heteroscedasticity robust standard errors (Melly, 2004).

Table 11: RIF Decomposition Results of the Motherhood Earnings Gap, 2017

	Gap		Explained		Unexplained	
10th quantile	0.0347	(0.103)	-0.0812	(0.0642)	0.116	(0.0976)
25th quantile	-0.00264	(0.0539)	-0.0347	(0.0400)	0.0320	(0.0499)
Median	-0.0517	(0.0729)	-0.0861*	(0.0517)	0.0344	(0.0605)
75th quantile	-0.161	(0.191)	-0.325**	(0.156)	0.164	(0.145)
90th quantile	-0.00580	(0.257)	-0.251	(0.209)	0.245	(0.210)
Observations	7205		7205		7205	

Source: Own calculations using NIDS 2017

Note: The gap represents log hourly earnings of non-mothers minus those of mothers. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The sample includes all African women between 20 and 50 who are employed and have non-missing wages and hours of work data, and the data are weighted. The dependent variable is log of real hourly wages.

A negative gap coefficient shows that, controlling for all observables, mothers earn more hourly wages than non-mothers at that particular quantile. The motherhood pay gap is widest at the 75th quantile, with mothers earning more than non-mothers at this point. However, this result is not statistically significant. Only at the 10th quantile do non-mothers earn more than mothers, but this result is also statistically insignificant. The motherhood pay gap is narrowest at the 90th quantile, where mothers earn more than non-mothers. The unexplained proportion of the hourly wage gap implies that at all wage levels, some proportion of the motherhood pay gap is explained by unobservable characteristics such as discrimination with regard to earnings between the two groups. It is clear from the results that most of the wage differences can be explained by observable characteristics like education level – especially at the median and 75th quantile (the only outlier is at the 10th quantile, where unobserved traits account for most of the wage gap). In other words, the results suggest that among women, productive characteristics account for more of the wage gap than unobservable traits.

6. Discussion

In their comparable study of White women in the United States, Budig and Hodges (2014) discover that mechanisms contributing towards the penalty vary by earnings level. Consequently, they posit that family resources, work effort, and compensating differentials[6] account for a greater portion of the penalty among low earners (ibid.). For high wage earners, personal and intrinsic factors might contribute to the direction and magnitude of the gap. Results for Black South African women are more nuanced compared to international studies. Most Black women lie at the lower end of the income distribution. Clearly, there exists a penalty for motherhood, but when analysing the two groups separately (mothers versus non-mothers), the penalty seems less obvious or rather prominent only at lower income quantiles.

Even for women in high-wage occupations, survey data analysis in the United States by Buchmann and Daniel (2016) confirms that mothers are paid less than childless women. However, the negative penalty is less in low-wage female dominated occupations. Where the motherhood/child penalty is stark and prominent in other studies, in the case of South Africa only women at very low income levels noticeably experience this negative phenomenon.

The decomposition results imply that most of the wage gap is due to explained characteristics. Nonetheless, in her decomposition analysis of women's labour force participation rates in South Africa, Ntuli (2007) finds that the differential in wages cannot be fully explained by differences between mothers and other women in work experience and job characteristics. Considering mothers' high non-participation and unemployment rates, the findings show that female participation responds positively to education, which is the prime factor for positive employment and wage outcomes. Among high skilled (educated) wage earners, motherhood might have a less pronounced effect on earnings differences. Furthermore, non-labour income, marriage, fertility, and geographical variation may have an effect on the decomposition results.

Motherhood affects women whether they co-reside with their children or not (Posel & van der Stoep, 2008). Authors find that co-residency upwardly biases the negative effects of motherhood in instances where labour force participation includes migration to places of employment. Non-co-resident mothers are more likely to participate in the labour force. There is weak statutory support for work-care arrangements in South African organisations, especially at lower income levels (Dancaster & Baird, 2016). Historically, trade unions in South Africa have not bargained to any great extent on work-

[6] A compensating differential is the additional amount of income that a given worker must be offered in order to motivate them to accept a given undesirable job (Cahuc, et al., 2014).

care issues for mothers. However, some studies predict that a greater female presence in trade unions, particularly in leadership positions, will influence the adoption of work in future (ibid.).

Limitations

Historically, most South African studies have dealt with the selection problem by using the Heckman procedure to account for selection effects. Here, the earnings function is modelled on the characteristics of earners conditional on the fact that these earners are a subsample of all the employed, which is in turn a subsample of potential participants (Bhorat & Goga, 2013). More recently, in line with the international literature, studies have highlighted the difficulty of applying appropriate exclusion restrictions. In addition, the selection procedure may result in a problem of measurement error, since an estimate of the expected value of the error term is used in the second stage of the procedure. In South African studies which account for selection the female selection bias correction terms were largely insignificant (Ntuli & Wittenberg, 2013). This study does not apply these correction measures, which is the first limitation of the study.

Secondly, The Oaxaca-Blinder decomposition strategy assumes three identifying assumptions (Cahuc, Carcillo, & Zylberberg, 2014, p. 507). First, the set of explanatory variables influencing wage levels should be the same for both mothers and non-others. Second is the conditional mean assumption (distribution of unobservable characteristics independent of group membership conditional on observable characteristics). This assumption may not hold considering that group membership such as union membership may be endogenous based on unobservable traits. The third is the assumption of the invariance of the conditional distributions, which excludes the possibility of equilibrium effects and self-selection into groups based on unobservable traits. Considering the nature of the sample being studied, this condition may not be satisfied.

Thirdly, because the motherhood penalty calculations are based on (hourly) wages only, it is difficult to debate differentials in bonuses and non-pecuniary work benefits among females. Unobservable factors such as the timing of child-bearing and even sibling effects may complicate modelling the impact of motherhood on labour market outcomes. Moreover, some childfree women might have to take care of elderly parents or grandparents (England, et al., 2016), which may affect their wages. The study cannot control for unobservable factors such as network effects either. It is also useful to consider the difference in the characteristics of women who stay behind to take care of children versus those who migrate to other provinces for work. Some of these traits may not be represented by available survey data variables and they therefore cannot be controlled for in the estimation, in spite of their relevance.

Finally, to calculate a motherhood pay gap between mothers and non-mothers presupposes that motherhood does not affect the pay of non-mothers. This in turn suggests that pay discrimination is separate from and not linked to women's roles as mothers, except when women are actively engaged in motherhood (Grimshaw & Rubery, 2015). Therefore behavioural studies are pertinent in understanding the dynamics surrounding any motherhood wage gap. For example, Kricheli-Katz (2012) conducts a hiring experiment in a laboratory in Israel to distinguish between discrimination-based and productivity-based explanations of the motherhood penalty. The author finds normative discrimination against mothers. Bedi, et al. (2017) discover parallel results in India with a similar study. The penalty is shown to be worse in cultures of patrilineal[7] origin in India. Societal norms therefore affect the nature and extent of labour market discrimination against women in general.

7. Conclusion

This study investigated the motherhood wage differential among women in South Africa using cross-sectional data from the 2017 National Income dynamics Study. Mothers are less likely to participate in the labour force, than their childless counterparts. Evidence from this study confirms that the motherhood penalty does exist, especially at lower wage levels. After controlling for observable labour characteristics, the results verify that the motherhood penalty is more prominent when a woman's children are younger. The women most vulnerable to wage penalties as a result of having child dependents are those at the lower end of the wage distribution. Contrary to international studies such as that of Budig and England (2014), in the case of South Africa, marriage has positive wage effects for mothers at higher wage quantiles. An interesting result is how part-time work, often undertaken by, pays higher hourly wages than full-time work. This has consequences for the hourly wage gap comparison between mothers and non-mothers.

The RIF-OLS results confirm that, at lower wage quantiles, mothers earn less than women who do not have children, while at higher quantiles, the reverse is observed. This effect may indicate that highly-skilled women with children might experience more favourable employment conditions. These findings lead to the conclusion that less skilled women tend to suffer a heavy penalty for motherhood. This highlights the value of higher education for women. Some discrimination due to motherhood may still exist at higher wage levels. However, as substantiated by the decomposition results, a better understanding of the unobservable traits is a requirement when examining the motherhood penalty.

The decomposition results confirm that a large component of the wage gap between mothers and non-mothers is explained by the model. By focusing on the experiences of working women alone, this

[7] Patrilineal means patriarchal norms shape the image of the "ideal" mother

study and others have ignored selectivity into employment and have not considered how motherhood may influence employment decisions. Selection into certain occupations may affect the unexplained difference between the groups.

Labour market policy needs to accommodate women with children, particularly if they have low wages and are the main breadwinners in their household.

- More educational attainment opportunities for women are crucial for improved labour market outcomes.
- Government policy needs to address the geographic effects of labour market participation, such as the lack of employment opportunities in rural areas.
- Behavioural studies are needed to investigate the unexplained portion of the motherhood wage gap in the South African labour market related to the low labour market participation and employment rates of mothers
- It is clear from the results that women benefit from decent part-time work opportunities. Therefore, the concept of flexible hours in mainstream occupations is a topic worth further investigation.

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SALDRU

Southern Africa Labour and Development Research Unit

The Southern Africa Labour and Development Research Unit (SALDRU) conducts research directed at improving the well-being of South Africa's poor. It was established in 1975. Over the next two decades the unit's research played a central role in documenting the human costs of apartheid. Key projects from this period included the Farm Labour Conference (1976), the Economics of Health Care Conference (1978), and the Second Carnegie Enquiry into Poverty and Development in South Africa (1983-86). At the urging of the African National Congress, from 1992-1994 SALDRU and the World Bank coordinated the Project for Statistics on Living Standards and Development (PSLSD). This project provide baseline data for the implementation of post-apartheid socio-economic policies through South Africa's first non-racial national sample survey.

In the post-apartheid period, SALDRU has continued to gather data and conduct research directed at informing and assessing anti-poverty policy. In line with its historical contribution, SALDRU's researchers continue to conduct research detailing changing patterns of well-being in South Africa and assessing the impact of government policy on the poor. Current research work falls into the following research themes: post-apartheid poverty; employment and migration dynamics; family support structures in an era of rapid social change; public works and public infrastructure programmes, financial strategies of the poor; common property resources and the poor. Key survey projects include the Langeberg Integrated Family Survey (1999), the Khayelitsha/Mitchell's Plain Survey (2000), the ongoing Cape Area Panel Study (2001-) and the Financial Diaries Project.

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