Yaseen Brey

ECO5023S

A quarter dissertation submitted in partial fulfilment of the requirements for the award of the degree of Master of Commerce specialising in Economics

Assessing the Impact of Minimum Wage on South Africa's Earnings distribution

Declaration

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2. This paper is my own work.
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1. Introduction

The topic of minimum wage has been of interest for a long time and particularly its potential in addressing wage inequality and ultimately improve the livelihoods of the most marginalized. South Africa has high prevalence of inequality and poverty and the minimum wage is touted as a potential mechanism to improve the lives of individuals at the bottom end of the wage distribution. The mainstay of analysis for minimum wage is the impact on employment. To this end, the paper will flesh out the history of minimum wages and contextualize them through their role in improving welfare.

In February 2017, the National Economic Development and Labour Council, constituted out of representatives from business, labour and government, signed the national minimum wage agreement. This agreement outlines the basis for instituting a new national minimum wage no later than 1 May 2018. The proposed new minimum wage of R20 per hour is aimed to "improve the lives of the lowest paid workers and begin to address the challenge of wage inequality" (NEDLAC, 2017). Although many sectors are already at this level, significant increases in the private security and domestic workers sector will require a large increase to come up to parity.

In terms of the political economy, the African National Congress (ANC) is undergoing significant grappling for power of South Africa's ruling party. Although it cannot be seen as more than conjecture, it is nevertheless worthwhile to view the national minimum wage as more than just labour reform, but also a bargaining chip for political gain in the 2019 national elections.

This paper estimates the impact of minimum wage on earnings inequality by assessing the impact of Agricultural, Forestry, Taxi, Domestic and Retail Workers Sectoral determination. The study looks to review the distributional effects around the time of instituting the respective wage minima as well as capturing the more recent earnings distribution for each sector. The Agricultural sector has been a central point of study in minimal wage literature due to the large scale employment losses experienced off the back of the minimum wage in 2003 (Bhorat, et al., 2014). However, the focus of this paper shifts towards a review of the impact of minimum wage on the earnings distribution.

The paper looks to model the impact of sectoral determination of wages on the earnings distribution to achieve two outcomes. Firstly, investigate the pre-existing relationship between altering agricultural, forestry, taxi, retail and wholesale and taxi minimum wages and its impact on the wage distribution. This will be conducted through the use of kernel density and inequality analysis. Secondly, the analysis looks to analyse spatial inequality with particular reference to the proportions of minimum wage workers. Minimum wage theory would mean that we would likely expect an increase in proportion of minimum wage workers to reduce the overall level of inequality within the district. Although the kernel analysis will provide a useful overview of the distribution, the analysis of spatial inequality and minimum wage will provide a more robust measure of the impact of minimum wage on earnings inequality.

Overview of South African minimum wage

The minimum wage determinations are currently determined by the Employment Conditions Commission (ECC). This body provides recommendations and formulates minimum wage legislature in an advisory capacity to the Department of Labour which is ultimately ratified by the presiding Minister of Labour. There are currently 12 sectoral determinations and have independently set minimum wages. These sectors are shown in Figure 1 with accompanying year introduced and number of wage schedules.

Table 1: Sectoral determinations across and numbers of schedules

Sector	Year introduced	Schedules within
Agriculture	March 2003	2
Private Security	November 2001	57
Domestic Workers	August 2002	2
Forestry	March 2003	1
Contract Cleaning	May 1999	3
Children in Performance Art	August 2004	1
Artistic and Cultural Activities	August 2004	1
Taxi	July 2005	4
Small Business	November 1999	1

Retail and Wholesale	February 2003	36
Learnerships	June 2001	14
Expanded Public Works	November 2010	1

Source: Department of Labour (2017)

The aforementioned sectoral determinations set the proposed price floor for wages and non-wage determinations per sector and geographical area. The introduction of a national minimum wage brings about a complete overhaul in that there would be a single determination which would govern the wage floor across all sectors. This will provide a central area of research in the coming years to assess the impact on the labour market, with specific reference to minimum wage violation, earnings inequality and potential underemployment.

2. Data

The paper will make use of the Post-Apartheid Labour Market Series (DataFirst, 2017). It is a consolidation of Statistics South Africa's October Household Survey (OHS), Labour Force Survey (LFS) and Quarterly Labour Force Survey (QLFS). The dataset provides a rich source of labor market outcome that are central to discovering the different underpinnings of South African labor market. The paper focuses on wage earners and thus excludes self-employed individuals for estimation across wage groups and to avoid potential selection issues associated with capturing self-employed individual's wages.

The PALMS data is ideal for study of labour market outcomes such as employment and earnings. Examples of its use is seen by Wittenberg (2016) "Wages and Wage Inequality in South Africa 1994–2011" which finds an increase in earnings inequality among employees over the post-apartheid time period.

3. Literature Review

The focus of minimum wage analysis has been on the employment effects with less attention paid to the earnings distribution. The majority of the distributional effects of minimum wage

has been carried out in USA. A simulation by Johnson and Browning (1983) finds a 22% increase in minimum wage relates to a negligible impact on the earnings distribution after accounting for taxation an employment effects. Lee (1999) argues that a minimum wage increases in line with inflation have very limited influence on the wage distribution specifically looking at hours worked in 1980's USA. Although these seminal papers do not find any convincing evidence based on the simulation approach, various regression approaches came about in later decades.

Dinardo, Fortin and Lemieux (1996) adopted a semiparametric approach using kernel density analysis. The paper focuses on analysing the decline in real minimum wage and the effect t has on the different wage percentiles. Essentially, Dinardo *et al* looked to breakdown a 27% decline in real wage by creating a counterfactual density off the 1988 earnings distribution obtained by raising the minimum wage back to the 1979 level. The decrease of real minimum wage by 27% accounts for 66% of the changes to the distribution between the 10^{th} and 50^{th} percentile. In other words, the changes in the real minimum wage appears to explain a large portion of the inequality, specifically for the bottom end of the distribution.

Brown, Gilroy and Kohen (1982) note that minimum wage has a significant negative impact on employment, particularly in young adults. This is particularly relevant to the South African context which has a youth unemployment rate of 39% (Statistics South Africa, 2017). Furthermore, the authors state employment status should be reviewed within the context of overall distributional impacts. In line with this, the paper finds that the income distribution is dependent on the wage distribution, with emphasis placed on the low-wage workers. Although considered one of the seminal papers to investigate the relationship between minimum wage and employment, the paper does offer guidance in the line of investigating the distributional impacts in order to fully account for the effects of the minimum wage.

Card and Krueger (1994) investigate the impact of minimum wage on employment in New Jersey and Pennsylvania, USA. The paper finds no apparent negative impact of minimum wage on employment. More notably, it marks the beginning of a new wave of literature which moves away from time series analysis towards cross-sectional and panel analysis to analyse minimum wage effect. Card and Krueger are widely credited for forming the bedrock of the new minimum wage literature, which initiates a more empirically intensive foundation of studying as opposed to the former which relies on economic theory argumentation.

Card and Krueger's (1995) book titled, *Myth and Measurement* offers insight into the study of minimum wage and income inequality. The authors' find that the minimum wage halts the rise in income inequality. However, the gains are eroded in years following the minimum wage increases which sees a decline in real income borne on the lower end of the distribution due to inflationary pressures. Card and Krueger are cited widely as creating a paradigm shift calling for a research intensive approach to investigating the impact of minimum wage as opposed to the theoretical underpinnings which followed before.

The greater the increase in the minimum wage, the bigger the opportunity for redistributive gain, but this leads to increased potential for job loss (Freeman, 1996). Although this is a simplification of the dynamic behind minimum wage setting, it nevertheless represents the main focus of testing for the relationship in the minimum wage literature. Neumark and Wascher (2008) find that a minimum wage redistributes income across low-skilled workers, but is not able to reduce overall inequality.

Burkhauser, Couch and Wittenburg find that minimum wage earners are spread evenly across family income groups in USA, largely due to children of relatively-well off families working minimum wage jobs (Burkhauser, et al., 1996). However, the disemployment effects would be disproportionately be felt by the lower end of the distribution as they do not have a significant safety net, giving rise to another mechanism whereby inequality could rise. Burkhauser *et al (*1996*)* find increases in federal and state minimum wage result in increases in pre-tax and post-tax earnings income inequality in American states.

Dube (2017) investigates the impact of minimum wage on the distribution of family income in the United States over the period 1990 to 2012. The paper introduces recentered influence functions (RIF) to estimate the unconditional quantile partial effect (UQPE)[1] of minimum wages on equivalized[2] family income distribution. The paper estimates an elasticity of approximately 0.46 for the 10^{th} quantile of family incomes, indicating a significant

[1] Explains how a unit increase in minimum wage affects a quantile of family income after controlling for covariates of interest

[2] Adjusts for family size and composition

improvement in the family income distribution at the lower end of the distribution (Dube, 2017).

Autor, Manning and Smith (2010) conducts a decomposition of minimum wage and earnings inequality, specifically controlling for division bias. The paper finds that a reduction in real minimum wage is responsible for 15% growth in male wage inequality, using the log differential of 50^{th} and 10^{th} percentile. Although this specification offers a novel approach to estimating the relationship, the outcomes are consistent with the majority of the papers in that minimum wage law has some positive relationship at the bottom end of the distribution.
Autor *et al* also suggest the use of including a quadratic for minimum wage in order to capture the effect of the minimum wage where it is a binding price floor. The minimum wage that is set too low will therefore not have a large impact on the prevailing income inequality. In other words, the inclusion of a quadratic will allow for closer scrutiny of the curvature which will ultimately capture the various rates of change in income inequality given changes in the minimum wage.

Lemos (2006) investigates the relationship between minimum wage and the wage distribution on formal and informal sector. Lemos finds that a minimum wage strongly compresses the wage distribution without any significant disemployment over the period 1982-2000. The formal sector experiences the highest increase in wage between 10^{th} and 50^{th} percentile, while the informal sector experiences significant increases in the middle of the distribution.

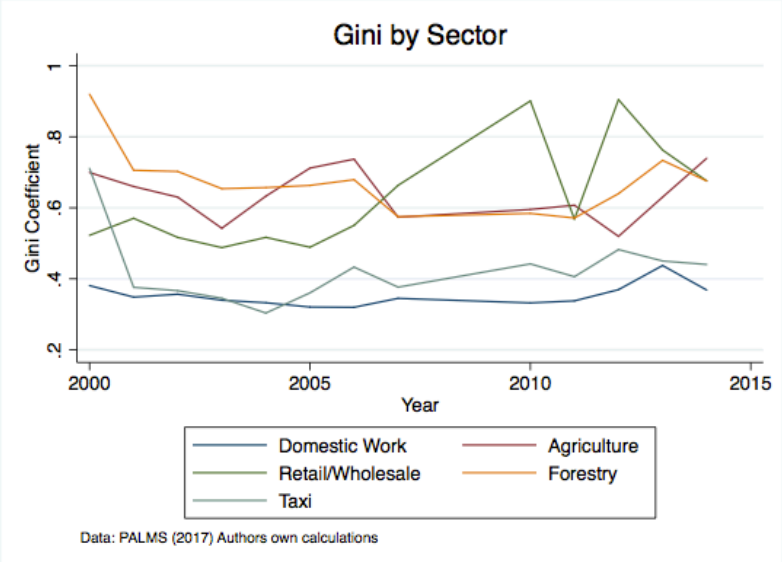
In terms of the South African literature, Bhorat, Kanbur and Stanwix (2014) find that probability of employment in South African agricultural sector decline by 9% in post law period. Part-time workers made up approximately 23% of the sample in 2002, but only 6% in 2003[3] (Bhorat, et al., 2014). In line with this finding, the overall hours worked was reduced which speaks to greater changes being found in the intensive as opposed to the extensive margins. Put simply, employers were able to manage the wage bill in order to absorb the shock of the minimum wage law.

[3] Minimum wage law comes into effect March 2003

South Africa's minimum wage impact has primarily been focused on the sectoral determination of minimum wages and its impact on employment. Bhorat, Kanbur and Mayet (2013) find no significant negative employment effects in low-wage sectors[4] as a result of increasing minimum wage. In spite of this, there is evidence of a reduction in employment in the intensive margin, meaning that employers are instead managing the wage bill and reducing total hours worked by employees (Bhorat, et al., 2013). Although the relationship of employment and minimum wage remains central, this finding implores for a more holistic approach to understanding the effects of a minimum wage.

4. Descriptive statistics

Table 2: Gini Coefficient by Sector for period 2000-2014



In reference to Table 2, the graph depicts the relationship of Gini coefficients within each of the sectoral determinations included in this study. The Gini's are mapped over time to show the inequality over time with particular reference to the minimum wage which sets in between 2002 and 2004 for the five sectoral determinations. Upon closer review of the Gini coefficients by sector, the trends are consistent with the notion that certain industries have lower inequality

[4] Retail, Domestic work, Forestry, Security, and Taxi sectors

level due to compactness of the distribution. For example, we can see that domestic workers have a lower Gini relative to the Retail and Wholesale sector as the latter has more wage schedules and thus greater inequality.

In addition to reviewing the relationship of Gini coefficients, Table 3 below displays the outcome of a Kolmogorov-Smirnov (K-S) Test. The tests identifies whether the pre- and post-minimum wage earnings distribution differ amongst the different sectoral determinations. The results of the two-sampled K-S tests reveal that Domestic workers, Agriculture and Forestry undergo significant changes to the distribution between the pre and post minimum wage periods. However, the Taxi and Retail sectors do not undergo any changes given the minimum wage shock. This might be due to minimum wage violation or that the prevailing earnings in the pre minimum wage period was roughly in line with the new minimum wage.

Table 3: Kolmogorov-Smirnov Test for Equality of Distributions

Industry	D	P-value
Domestic Worker	0.0906	0.000
Taxi	0.0266	0.972
Retail	0.0437	0.645
Forestry	0.2482	0.000
Agriculture	0.2713	0.000
Source: PALMS (2017) Authors calculation		

5. Methodology

The Labour Force Survey and Quarterly Labour Force Survey (QLFS) will be the primary source of data for analysis of the sectors upon introducing the minimum wage in 2003. Specifically, the Labour Force Surveys between 2000 and 2014are in order to capture the effects before and after the minimum wage introduced. Moreover, the analysis kesuse of cross entropy weights as opposed to the individual weights in order to create consistent and representative results (Branson, 2009).

Following Dinardo Fortin Lemieux (DFL), the effect of minimum wage on the earnings inequality will beis analysed using counterfactual density analysis. Similar to the Oaxaca (1973) decomposition, however the critical difference is that the DFL deals with the entire distribution and not just the impact of the means. This is central to the study of the earnings distribution as the earnings differentials can then be calculated throughout the distribution which reveals a more comprehensive impact of the minimum wage shock.

The counterfactual densities will be estimated using key socio-economic characteristics to identify workers from the different sectors. Moreover, the minimum wage shock will be modelled at the national level for each of the wage minima. Thereafter, the same specification will be run on a sample restricted to individuals earning below the prevailing minimum wage. Additionally, Basic Conditions of Employment Act (BCEA) basic income threshold will be substituted for the minimum wage to gauge compliance of the cut-off.

The methodological setup revolves around the kernel density estimation of the individuals in the pre and post minimum wage period. More specifically, we can break down each individual wage earner as a vector of wage, individual characteristics and time. Noting that time is reserved to pre and post minimum wage in order to capture the effect of the shock. Moreover, these individuals are then subcategorized into their respective sectors. The geographical area, highest education level, province, race and gender will form the core individual characteristic which will be used to generate the counterfactual densities in the pre and post period.

The first part of the empirical procedure sets out to review the pre and post effect of the minimum wage on the wage distribution. This control group will be comprised of wage employees from relatively unskilled backgrounds which represent similar worker, but critically are not covered by minimum wage law in the same year. This control group will be identified using International Standard Industrial Classification available in the Labour Force Survey.

There are numerous measures inequality measures that can be used to analyse the spread of data. The South African story is synonymous with the Gini coefficient measure of inequality. In terms of income inequality, the measure is recorded between 0 and 1, where 0 represents perfect equality in that each individual has the same allocation of income and 1 represents perfect inequality where one individual accounts for all the income. South Africa's Gini

coefficient measuring relative wealth is steadily around 0.65 which places it among the most unequal societies in the world. The Gini will be the primary measure of wage inequality for ease of comparison as the five sectors in question represent previously vulnerable workers which the minimum wage attempts to protect.

A shortcoming of the Gini coefficient is that it is a measure of relative wealth, or in the purpose of our study, a measure of relative wage dispersion. This gives rise to potential problem whereby an increase in the Gini coefficient only speaks to the relative changes and might not account for improvements in headcount poverty measures. However, for the purpose of the impact of minimum wages on the wage distribution, the Gini coefficient is a suitable measure as we are primarily interested in the relative distribution and not the absolute wage changes.

Given the shortcomings of the Gini coefficient, the study will also make use of 90-50 and 50-10 measures of inequality to capture the wage differentials between the full spectrum of earners. The Gini attempts to summarise the inequality over the distribution with one number, however the reality of wage inequality is that the minimum wage is likely to affect different regions of the distribution in different ways.

An illustration of the shortcomings of the various inequality measures is shown by Dinardo *et al.* (1996) which shows that the minimum wage has greater affects onthe lower end of the distribution. Moreover, studies into earnings of top executives and widening inequality would require insight into the top end of the distribution. Therefore, the use of distributional analysis is very important in gaining a complete review of staggering wage inequality.

The Gini Coefficient offers an intuitive approach to deciphering the inequality of a given population, however the Gini is not additively decomposable (Davies, et al., 2017). Meaning that the overall inequality is a summation of the between-group estimator and the weighted average of the population wealth share. Therefore, the paper has used the Gini extensively for the use of generating descriptive statistics.

5.1 Dinardo Fortin Lemieux

The DFL method is a nonparametric technique of decomposition. The method aims at improving on the Oaxaca-blinder decomposition of the mean by examining counterfactual distributions and reviewing the effect throughout the distribution (Leibbrandt & Levinsohn, 2011). However, a disadvantage of nonparametric testing comes via the inability to conduct

further inference which is possible under the structure of a parametric model. To this end, the analyses will extend to include additional means of analyzing inequality in order to create a holistic view of South Africa's wage inequality.

The paper also notes a potential pitfall in using the DFL method if there is an inherent selection problem in the labour market. For instance, if there is a significant change in selection into employment along racial lines, then we can expect the DFL method to deliver skewed results (Leibbrandt, et al., 2005). Although selection problems would alter the outcomes of the different distributions, inclusion of the additional specifications to review the inequality at different points of the distribution will indicate if the findings are consistent or if there is indeed a selection problem.

The kernel density estimation for the 5 sectoral determinations is displayed in the following notation[5]:

(1) : $F_{Y_{AC}}(y) = \int F_{Y_A}|_{X_A}(y|X)\,\Psi(X)\,dF_{X_A}(X)$

(2) where $\Psi(X) = dF_{X_B}(X)/dF_{X_A}(X)$

The above notation encompasses the full DFL notation. The left-hand side of the function captures the reweighted counterfactual distribution of earnings. $\Psi(X)$ captures the reweighting factor which ultimately transformed the marginal distribution of the control group with the treatment. In our case, this implies that we are giving the distribution of the pre-minimum wage sample the same characteristics as the group in the post period. This is practically achieved through using a logit model of the outcome variable conditional on the control variables. Finally, the predicted probabilities of this procedure is used to reweight each observation in order to generate the complete distribution.

An important aspect of the DFL procedure is that the assumption of invariance holds. In other words, the counterfactual distribution of the wage in the pre-minimum wage period ought to be the same as the post-minimum wage period. The validity of this assumption is difficult to measure as it relies on the unobservable aspects to have a constant conditional variance over the period in question.

After the DFL, the paper looks to review the impact of wage inequality with specific reference to location. This specification supplements the findings of the DFL in that it provides details of the

[5] Adapted from Fortin, Lemieux and Firpo (2011)

interaction between the proportion of minimum wage workers on spatial inequality, holding constant a set of control variables.

The control variable is an important aspect of ensuring that the DFL procedure is properly specified. In reference to specification 1 above, the conditional distribution of the earnings variable on the set of control variables is central to ensuring the appropriate counterfactual density is determined. To this end, the following control variables are selected to be part of the procedure, namely; Highest education level, age, gender, race and union status. In completing the role of control variables, it is possible to then proceed with estimating the reweighting function shown in specification 1. Ultimately, the combination of conditional distribution and counterfactual estimation afford the opportunity to model the characteristics of the minimum wage workers in their requisite sector so that they are in line with the characteristics of like workers in 2015, while holding the conditional distribution of wages in the minimum wage years constant.

5.2 Quantile Analysis

Following the DFL, the quantile regression provides insight into the effects of certain control variables on inequality. The advantage of using quantile analysis comes primarily from the ability to review dynamic relationships that would not necessarily be apparent under simple OLS. In the minimum wage context, this means that OLS would deliver an average mean effect of the control variable on the dependent, but the quantile regressions allows for more meaningful analysis in the context of our distribution. For example, an increase in proportion of minimum wage earnings might result in a reduction of inequality under one scenario, but could also result in an increase in inequality in another. Thus, it is a useful exercise to supplement the DFL study with a further review of the distribution. The specification will look as follows:

$$(3)\ y_i = \beta_0^{(p)} + \beta_1^{(p)} x_i + \varepsilon_i^{(p)}$$

In reference to (3) above, the y_i represents the spatial gini coefficient. This variable was generated by calculating the prevailing gini coefficients across South Africa's district councils. The control variables in the quantile regression are chosen to unpack the relationship between being a minimum wage earner relative to the individual's earnings above this threshold.

Therefore the proportion of minimum wage earners[6] to non-minimum wage earners is adopted as the best measure to review the relationship at varying levels of inequality. Furthermore, age, gender, education is added to provide further context to the changes in inequality. Finally, the proportion of unionized to non-unionised workers enter the specification to avoid potential selection bias.

6. Results

The results section is organized into the DFL and quantile analysis sections. The DFL aims to provide insight into the effects of minimum wage on the earnings distribution. Thereafter, the quantile analysis delves into the relationship between inequality and a host of controls, including proportion of minimum wage earners.

6.1 Dinardo Fortin Lemieux

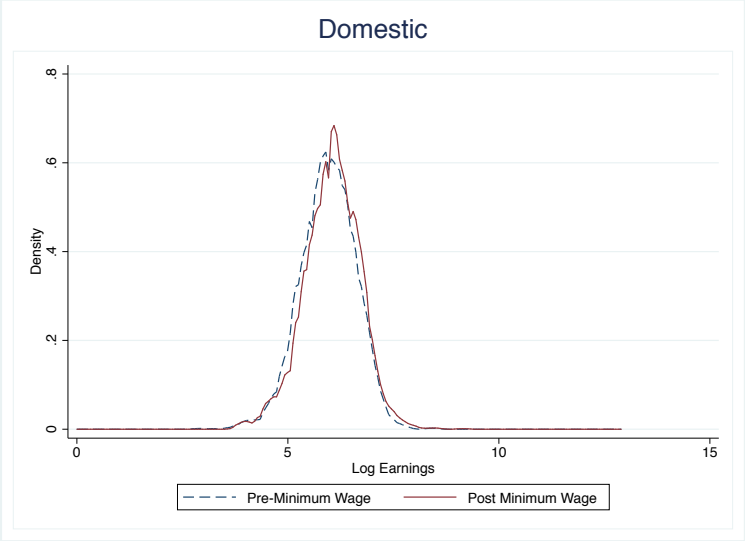


Figure 1: DFL for Domestic Workers

In reference to Figure 1 above, the DFL is conducted strictly for domestic workers. The dotted line represents the initial earnings distribution for the distribution as of 2002 (The final period before the minimum wage was instituted). The solid-line represents the hypothesized change

[6] Minimum wage earners are identified by individuals who earn below a given threshold and have at most 12 years education and preside in minimum wage occupations as per the relevant industry codes and sectoral determinations

in the distribution had they been paid the new minimum wage rate. In line with the intention of the minimum wage, we find that the minimum wage brings about a significant increase in the lower end of the earnings distribution. The nature of earnings of domestic workers suggests that there is a concentration of earnings around the stipulated minimum wage. Therefore, it would be unlikely for the upper end of the distribution to experience any significant changes.

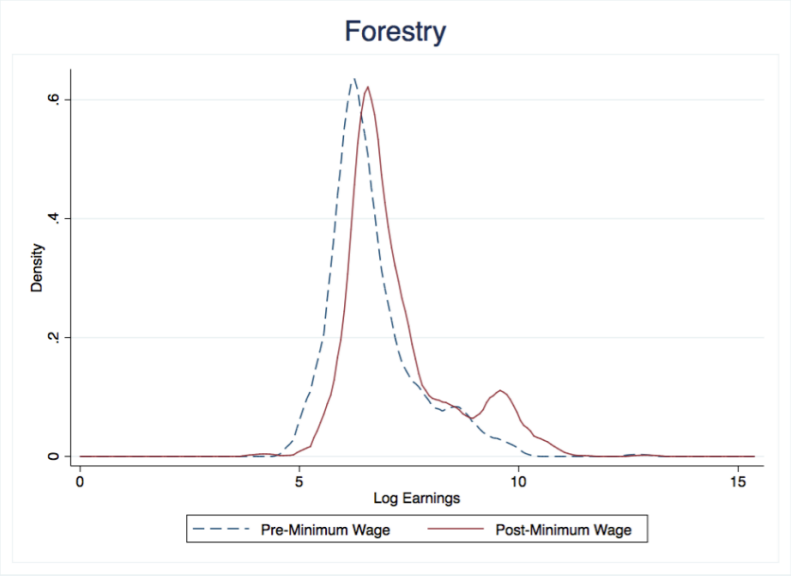


Figure 2: DFL for Forestry Workers

In reference to Figure 2 above, the DFL of forestry workers is conducted to track changes in the earnings distribution between the pre-minimum wage period (March 2003) and the post period. Again, the dotted line isolates the earning distribution of forestry workers in the period before the minimum wage came into effect. The shift in distribution between the pre and post period highlights that there has been a near equalizing effect in the distribution of wages which sees the majority of the distribution experiencing an equal rise in earnings. However, the shift in the distribution hints that the bottom end of the distribution experienced a bigger increase in earnings as compares to individuals of the same characteristics in the 2015 period. Despite a clear increase in earnings across the distribution, the stark reality of minimum wage violation

plagues the forestry sector. Roughly 53% of forestry workers earned below the minimum wage as of 2007 (Bhorat, et al., 2011) . The level of minimum wage violation in the forestry sector is among the highest across all the minimum wage sectors. Collating these two findings, it is clear that minimum wage brings about an unambiguous increase in the earnings distribution of the most marginalized, but this need not translate into a decrease in the headcount compliance of minimum wage.

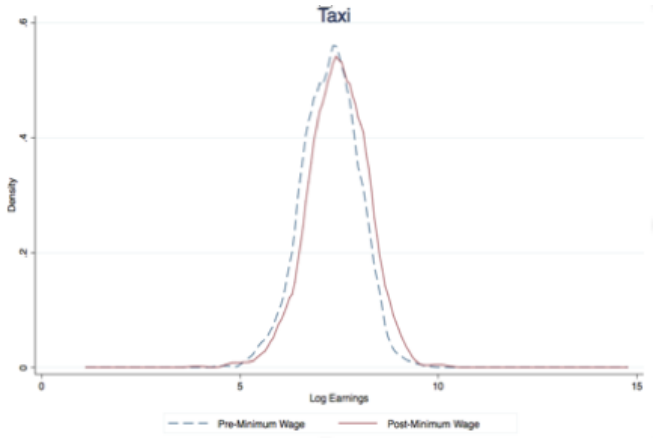


Figure 3:DFL for Taxi Industry

In reference to Figure 3 above, the DFL of the taxi industry is tracked to understand the changes to the earnings after the minimum wage earnings is taken into account. In line with the findings in Table 3, the Gini coefficient in the taxi industry is low which means that there is a more equitable distribution of earnings within the industry. In relation to the DFL of the taxi sector, this would translate into having a proportional effect on the changes in the different earnings level. This is a useful checkpoint as the consolidation of the sector Gini as well as the DFL shows that there is consistency in the findings.

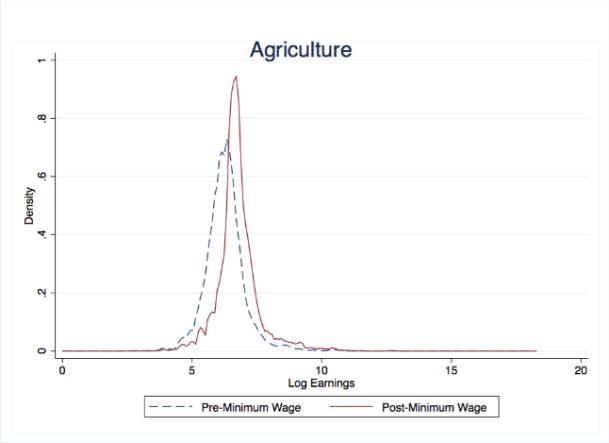


Figure 4: DFL for Farm Workers

In reference to Figure 4, the DFL of the Agricultural sector is displayed with reference to the pre-minimum wage standard in 2002 and comparing it to the 2015 conditional distribution. Relative to the other sectors, the DFL suggests the biggest increase to the lower 50% of the earnings distribution. However, it would be premature to assume that this finding is unambiguously positive. The promulgation of the 2003 agricultural minimum wage brought about job losses in excess of 200 000 without evidence of other potential disemployment effects (Bhorat, et al., 2014). Upon closer inspection, the sectoral minimum wage brings about approximately a 30% increase in agricultural earnings when compared against workers with similar characteristics (Bhorat, et al., 2014). This feature is consistent with the findings in Table 7 below, in understanding that the largest increase in earnings is concentrated around the minimum wage itself. Moreover, the magnitude of change in earnings inequality and proximity of individual earnings to the minimum wage will become clearer in the second part of the results.

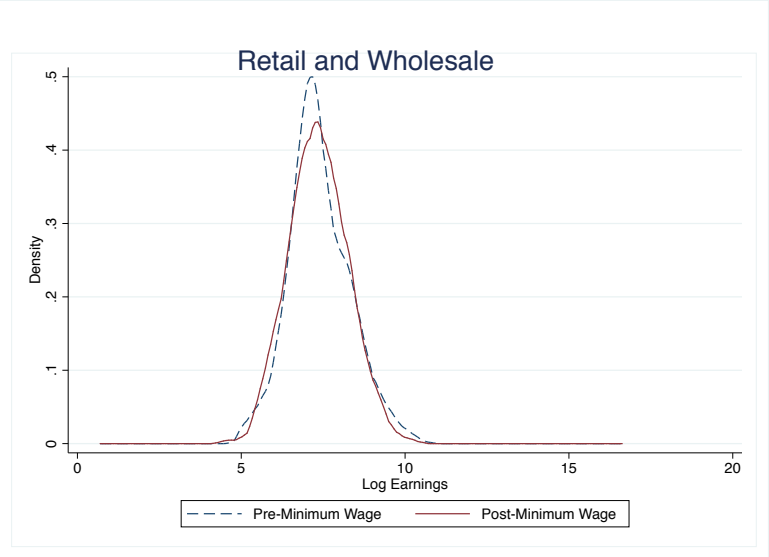


Figure 5: DFL for Retail/Wholesale Workers

The DFL of the retail and wholesale sector is reported with reference to the February 2003 minimum wage. The sector was governed by a total of 36 different schedules attributable to the various job roles associated with Retail and Wholesale. The workers in the sector experienced a statistically significant wage increase of R3.50 per hour, but average work hours was also reduced (Bhorat, et al., 2013). Although similar evidence is found in the agricultural sector, the reduction of work hours and the increase in the average hourly wage translates to an overall unchanged shape in the distribution. In reference to Table 7, it is evident that there has not been a significant change to any point of the distribution. Despite the increase in overall wages, the reduction in work hours results in an almost netted out effect of whereby the headline unemployment remains unchanged, however the average hours worked has been reduced.

The DFL tool offers insight into the overall effect of the change in minimum wage on the earnings distribution. In supplementing this, a quantile regression approach is presented in section 6.2 to provide insight into the underlying dynamics of change to the wage distribution.

6.2 Quantile Analysis

The DFL provides useful insight into the distributional impacts of the minimum wage. However, in providing more granular analysis, a quantile regression is employed to review the underlying relationships along the distribution. The literature often focusses on the effect of minimum wage on a host of outcomes specifically for the bottom half of the distribution. To

this end, the following section seeks to take this analysis further in understanding potential shifts in inequality given changes in a host of control variables.

Table 4: OLS and Quantile Regression of Gini on host of determinants (Sample:108202)

	-1	-2	-3	-4	-5	-6
Log Gini	OLS	Quantile 0.1	Quantile 0.5	Quantile 0.9	Interquantile (0.1-0.5)	Interquantile (0.5-0.9)
Min Wage/Non-Min Wage	0.0221***	0.0228***	0.0110***	0.00897***	-0.0118***	-0.00207*
	(0.000877)	(0.00316)	(0.000677)	(0.000344)	(0.00233)	(0.00125)
Tertiary/School	0.000427	0.0228***	-0.00247***	0.00135***	-0.0253***	0.00382***
	(0.000527)	(0.00190)	(0.000406)	(0.000207)	(0.00181)	(0.000824)
Age Category	0.00846***	0.0228***	0.00597***	0.00270***	-0.0169***	-0.00327***
	(0.000577)	(0.00208)	(0.000445)	(0.000226)	(0.00204)	(0.000772)
Union Member	0.0138***	0.0246***	0.00758***	0.00492***	-0.0170***	-0.00267***
	(0.000907)	(0.00327)	(0.000700)	(0.000356)	(0.00366)	(0.000833)
Constant	-0.643***	-0.898***	-0.619***	-0.502***	0.279***	0.117***
	(0.00186)	(0.00671)	(0.00144)	(0.000731)	(0.00635)	(0.00344)
Observations	108,202	108,202	108,202	108,202	108,202	108,202
R-squared	0.008					

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: PALMS(2017) Authors own calculation

In reference to Table 4, the OLS, quantile regression and interquantile regression provide insight of the relationship between inequality and the earnings of minimum wage workers relative to non-minimum wage earners. For ease of understanding, the Gini variable is logged to create an elasticity interpretation. Gini is a proportion of 0 to 1 and thus it would be less useful to interpret in its linear state.

The OLS results highlight that an increase in the ratio of minimum wage earners to non-minimum wage earners has a positive relationship with inequality. Moreover, an increase in the proportion of age and education also results in increases to the inequality levels. Although statistically significant, the OLS does not provide economic significance as it attempts to characterize an entire distribution of inequalities with one elasticity. Therefore, the quantile and interquantile section provides a more granular approach in understanding how the relationships change given differing levels on inequality.

The quantile regression at the 10^{th} percentile shows that in instances of low inequality, an increase in the proportion of minimum wage earners to non-minimum wage earners results in an increase in the Gini by approximately 2.3%. This is line with expectations in saying that at low levels of inequality, the more workers earning minimum wage will naturally increase the level of inequality. It follows that under quantiles 0.5 and 0.9 that an increase in the proportion of minimum wage workers would negate the increases in earnings inequality. However, our paper finds that there is a negligible impact under instances of high inequality.

The interquantile analysis offers additional insight in reviewing the relationships across different bands of inequality. The analysis includes interquantile for the lower and upper portions of the distribution. An increase in the proportion of minimum wage workers to non-minimum wage workers brings about a reduction in Gini by 1.1%. This finding offers a critical insight into the potential for minimum wage to reduce earnings inequality. Moreover, the interquantile regressions highlight that an increase in tertiary education holders relative to school earners also sees a significant reduction in earnings inequality.

Although the results may seem to be inconclusive in proving that minimum wage unequivocally reduces inequality, it is nevertheless insightful to note how changes to the characteristics of workers impact different levels of earnings inequality.

7. Discussion

The efficacy of a minimum wage in reducing earnings inequality remains a central topic of study for policy-makers. In light of the evidence presented, the minimum wage appears to offer some respite against rising inequality, however the relationship remains unclear for

the upper end of the distribution. South Africa is currently undergoing a significant shift in the political landscape, citing changes to leadership in the ruling party. Although economic rigour does not often incorporate political considerations, it might be important for a follow up study to review the impact of the new national minimum wage. Particularly given that Cyril Ramaphosa, president of the ruling party and recently sworn-in president of the republic, was a central figure in lobbying for a national minimum wage.

On a technical note, the study could be improved by incorporating the new national minimum wage in order to gauge the extent of minimum wage violation. This will likely become the next major limitation to improving welfare given the amalgamation of the various sectoral determinations into one national minimum wage.

8. Conclusion

The paper outlines the various minimum wage schools of thought in developed and developing world. Upon review of the existing literature, it was evident that the literature is sparse in dealing analysing the inequality and distribution effects The assessment of minimum wage on the earnings distribution as well as inequality revealed itself as the most important question facing the current minimum wage in the South African context.

The main findings of the DFL display's the minimum wage in the agricultural, forestry, retail and wholesale, taxi and domestic service witnesses a marginal improvement in earnings. However, this finding is consolidated with findings of significant job loss in the part-time workers of agricultural sector as well as the full-time workers in retail and wholesale.

The quantile and interquantile analysis provides key insight into the drivers behind inequality. The standout finding is that minimum wage earners are central to reducing inequality, however the efficacy is reduced for high levels of inequality. Moreover, the paper finds that an increase in the proportion of tertiary education holders to matric holder also holds a key to reducing the earnings inequality level. Although the mechanism behind implementing a functional basic and tertiary education system continues to plague labour market outcomes. A broader and more in-depth study of wage minima across a multitude of socio-economic indicators would be useful in the wake of the new national minimum wage.

Finally, the paper reaches a conservative conclusion in stating that the minimum wage has the ability to improve the livelihoods of the most vulnerable. However the true impact of the minimum wage on reducing inequality depends on a host of inputs and requires more attention before coming to an unambiguous conclusion of whether or not it can be used to close the vast income inequality that continues to plague South Africa's economy.

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