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Employment effects of bargaining council decisions

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South Africa has a unique collective bargaining structure; one whereby wages are mostly set at a sectoral level. One of the approaches to this sectoral wage determination is through bargaining councils. This paper tests the effects of bargaining councils on wage and employment outcomes in the South African labour market. This paper concludes that despite minimum wages prescribed by said bargaining councils, the average employee still receives a wage that is 42% below the stipulated minimum. Furthermore, the extension of updated bargaining council agreements is shown to have a detrimental effect on the mass of employment, whereby it decreases by approximately 8%. These results are robust to both individual and firm level characteristics.

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An analysis of minimum wages in South Africa

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<u>Abstract</u>

South Africa has a unique collective bargaining structure; one whereby wages are mostly set at a sectoral level. One of the approaches to this sectoral wage determination is through bargaining councils. This paper tests the effects of bargaining councils on wage and employment outcomes in the South African labour market. This paper concludes that despite minimum wages prescribed by said bargaining councils, the average employee still receives a wage that is 42% below the stipulated minimum. Furthermore, the extension of updated bargaining council agreements is shown to have a detrimental effect on the mass of employment, whereby it decreases by approximately 8%. These results are robust to both individual and firm level characteristics.



Foreword

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Abbreviations

AMERU	African Microeconomic Research Unit
ANC	African National Congress
BCDD	Bargaining Council Decision Dataset
BCEA	Basic Conditions of Employment Act
DoL	Department of Labour
EEA	Employment Equity Act
FGT	Foster-Greer-Thorbecke
IPAP	Industrial Policy Action Plan
LFS	Labour Force Survey
LRA	Labour Relations Act
NDP	National Development Plan
NT	National Treasury
OCR	Optical Character Recognition
OHS	October Household Surveys
PALMS	Post-Apartheid Labour Market Series
QLFS	Quarterly Labour Force Survey
SARS	South African Revenue Services
SALDRU	South African Labour and Development Research Unit
SDA	Skills Development Act
SMMEs	Small, micro, and medium enterprises



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1. Introduction

After the fall of Apartheid in 1994, unions played a crucial role in South Africa's early stages of transformation. However, shortly after a new government had been ushered in; questions were already being asked of the effects of these unions and their potential collective bargaining effects on the South African economy. With research arguing that these unions and bargaining councils induce a wage premium and labour market inflexibility (Bocca & Moll, 1997), it is still an essential question to revisit, especially with the current arguments for and against a national minimum wage.

South Africa has a unique collective bargaining structure – one whereby wages are mostly set at a sectoral level. In this structure wages are set in two ways. The first occurs where worker organization is difficult. In this circumstance, the Minister of Labour, along with a panel of experts, will agree upon a minimum wage for a sector which then applies to all workers within that sector. This minimum wage applies regardless of the job level but may differ geographically. The second approach to wage setting is through bargaining councils - these bargaining councils are made up of the employer and employee representative. The decisions made by these bargaining councils, if these councils are deemed to be sufficiently representative of the sector, are assumed to operate "*ergo omnes*" – which means that these decisions are extended to all workers and firms in the sector, even those who were not part of the decision making process. These bargaining councils set minimum wages for different levels of employee which may differ by region. In practice 'representivity' is interpreted as employing more than half of the workers within the industry and large employers tend to dominate these councils.

Advocates for the existence of these bargaining councils claim that the decisions made by them are essential for South Africa, specifically in a transformation context, whereby minimum wages set by these bargaining councils have been argued to be necessary for supporting not only the worker, but the extended family of said worker due to the lingering effects of the Apartheid regime¹. Furthermore, these advocates argue that the existence of bargaining councils and the extension of their decisions protect workers from low wages,

¹ These effects include (but are not limited to): a lack of skills of an individual; insufficient work experience of an individual due to being excluded from the workforce during Apartheid.



long hours, and unhygienic conditions (Finnemore & van der Merwe, 1987). Critics of the collective bargaining system have shown the deleterious effects of the system whereby it places a special burden on small firms, increase business failures and discourages start-ups, and contributes to South Africa's high unemployment rate. However, these studies have only used cross-sections of data and broad definitions of coverage (Magruder, 2012) or focused on a specific industry (Nattrass and Seekings, 2012) and have not considered how they may constrain firm level adjustment, and consequently employment, to increasing import competition. This paper will provide a detailed analysis of these bargaining councils and their relationship with wages and employment during a period of increasing trade in South Africa.

This paper requires that a database of bargaining councils and their decisions is built through the extraction of information from government gazettes. Wages and working conditions agreed upon by bargaining councils vary by coverage of the council, by region and by job description. This database will capture the various agreements of these councils and will link these to individual level outcomes in officially collected labour market data.

Using this database, the paper exploits three aspects of variation to identify the effect of bargaining councils on employment and wages: first, regional variation in coverage (some areas are covered by bargaining councils whilst others are not); second, time variation (different bargaining councils have rounds of collective bargaining at different times); and third, variation in wage levels for different occupations within a bargaining council (different occupational levels have different set wages for different sectors and these do not correspond across sectors). This variation, and the changes which occur after different rounds of collective bargaining, can then be used to examine whether these agreements are associated with wage outcomes, employment levels and employment by different sizes of firms.

The results from this analysis can be used to discuss how this collective bargaining structure may constrain firm responses to increases in competition through imports. It seems likely that these structures will prevent firms from adjusting to increased competition, potentially from imports, by decreasing real wages (Rankin, 2016). This in turn raises questions about how countries can create, or protect, better paying 'decent' jobs in a globalized environment.



2. Literature review

2.1 A brief history of South African bargaining councils

The Industrial Conciliation Act² of 1924 set up the industrial council system³, and represented the first institutionalized representation of collective bargaining in South Africa (SALDRU, 1990). According to Bhorat et al. (2009), "the Act provided the legislative framework for the establishment of industrial councils as well as the framework for the regulation of collective bargaining and industrial conflict"; with the primary aim of the Act being to establish national, industry-wide councils that would allow industrial sectors to govern themselves by representative employer organizations and trade unions (Godfrey, 1992).

An industrial council was formed when an employer (or a group of employers), met with a registered trade union, and agreed upon the conditions for the industrial council, and then registered the council in term of the Act. Once such a council had been registered, it became a permanent fixture within the collective bargaining system of South Africa (Godfrey, 1992). The establishment of such a council was voluntary, and the geographical and industrial scope was left to be determined by the council itself. However, the Industrial Conciliation Act of 1924 did have an important conditionality to it – a requirement that the council must be representative of the jurisdiction for which the council was seeking registration. The decisions made by these councils are assumed to operate "*ergo omnes*", which extends these decisions to workers and firms in the sector that may not even be part of the bargaining council.

One of the more nuanced statements within the Act was that only employees whom belonged to registered unions could be represented in the industrial council negotiations. The Act went further to define exactly what was recognized as an employee; amongst all of the conditions set out to define an individual as an employee, this Act laid out an important caveat which excluded African people⁴ from this definition (Butcher & Rouse, 2001). With African workers formally excluded as employees, their unions were defined as unregistered, but not

² Later renamed to the Labour Relations Act of 1956.

³ Now known as the bargaining council system.

⁴ "African" refers to an individual that is black (black is a blanket term to represent African, Coloured, and Indian individuals).



illegal, ensuring that they could not have a say in industrial council bargaining decisions (Bendix, 1989), creating a system that only benefitted white employees. The exclusion of African workers essentially resulted in a dual system of industrial relations which was defined by race (Godfrey, 1992), with the collective bargaining process for White South African workers being highly centralized, and that of African workers being decentralized.

The voluntary nature of the industrial council system created a situation whereby industrial councils developed in a massively uneven and excessively diverse way (Bhorat et al., 2009). The initial hope of national industrial councils failed to come to fruition due to a variety of factors, including but not limited to: (i) the exclusion of African employees, (ii) deep racial and skills divisions between trade unions, (iii) diverse patterns of industrial development, and (iv) low levels of trade union organization (Bhorat et al., 2009). These factors bred a system whereby there existed many local and regional industrial councils, but a severely limited amount of national industrial councils.

Employer organizations dominated the majority of these councils due to weak trade union organization, while trade union representation was generally dominated by artisans (Godfrey & Macun, 1991). Thus, employers generally dictated the levels at which collective bargaining took place within the industrial councils, resulting in low levels of prescribed minimum wages, especially for less skilled employees (Godfrey & Macun, 1991). The exclusion of African workers from the bargaining system only served to deepen the systematic wage gap between African and white workers, while reinforcing the dual nature of industrial relations. This exclusion of African workers also lead to a situation whereby white workers, particularly in the unskilled and semi-skilled brackets, were replaced by African workers, as employers were able to avoid paying the prescribed minimum wage(Godfrey & Macun, 1991).

African worker participation in the bargaining council system started to increase in the early 1980s when the Labour Relations Amendment Act of 1981 removed race from the definition of employee (Butcher & Rouse, 2001) – essentially ending the dual system that had initially been created. Following the Amendment, African workers were encouraged to register and to



start to work within the existing system; however the distrust of the system⁵ led African workers to continue to work outside of the existing system by resorting to firm/plant level bargaining instead.

Over the course of the 1980's, there was a call for greater African worker participation in the bargaining councils, with many of the larger unions pressing for more intensive, focused collective bargaining, claiming that it would be more effective than the firm-by-firm strategy that had been followed to that point (Butcher & Rouse, 2001).

The 1990s saw greater change in the bargaining council system. With the first democratically elected government succeeding the Apartheid government, there was need for an overhaul of South African labour regulation to reflect the period of transformation and inclusion. The main aim of Acts introduced in this period was to ensure that a socially acceptable minimum standard of working conditions was in place in South Africa, and to bring South African employment legislation into line with the international standards (Black & Rankin, 1998). The five main acts⁶ that were introduced during this period consisted of:

- 1. The Labour Relations Act (LRA) of 1995: The key aim of the LRA was to ensure orderly collective bargaining and workplace democracy; as well as to ensure effective labour market dispute resolution through the Commission for Conciliation, Mediation and Arbitration (CCMA). This act covered all workers apart from those employed by the South African defense force, secret services, and essential services⁷ (Flowerday et al., 2016).
- 2. The Basic Conditions of Employment Act (BCEA) of 1997: The key aim of the BCEA was to improve the minimum rights for all workers in South Africa, including

⁵ As the system was still seen as primarily associated with White workers of the Apartheid regime.

⁶ A sixth act was added in 2001 by means of the Unemployment Insurance Act (UIA), which set out the conditions pertaining to unemployment insurance.

⁷Almost twenty years after the introduction of the LRA, a set of amendments to the LRA were passed in 2014. These amendments focused primarily on how to treat part-time and contract workers and those employed through temporary employment services (or labour brokers). These amendments generally strengthen the position of those already in jobs and reduce the flexibility of firms in terms of hiring (Edwards et al., 2015).



part-time workers, but excluding those employed by the South African defense force, secret services, and essential services (Flowerday et al., 2016).

- The Employment Equity Act (EEA) of 1998: The key aim of the EEA was to eliminate unfair discrimination and ensure the implementation of affirmative action in South Africa. This act was only pertinent to designated firms – i.e. firms with excess of 50 employees (Flowerday et al., 2016).
- 4. The Skills Development Act (SDA) of 1998: The key aim of the SDA was to design and implement national, sector, and workplace strategies to improve the skill set of the South African workforce (Flowerday et al., 2016).
- 5. The Skills Development Levies Act (SDLA) of 1999: This act was utilized to collect funding for the National Skills Fund a fund which was inherently supported by all employers except for public service, religious, and charity organizations (Flowerday et al., 2016).

The inclusion of prescriptions from these Acts, brings us to the system that exists today, whereby bargaining councils are made up of the employers and employees of what are typically the larger firms within a sector. With the transformation laid out within the aforementioned Acts, the inclusion of African employees has essentially shifted the balance of power from being a "whites only" phenomenon, to a situation whereby the African workforce has largely captured these institutions.

This paper focuses on the implications of the modern day South African bargaining council, and the following section of this paper will delve into previous academic literature that has been created to better understand the potential benefits and pitfalls of this system.



2.2 The effects of bargaining councils in South Africa

The effects of bargaining councils in South Africa have been widely discussed in the past two decades⁸; however, much of the academic research has been limited by the availability of data. Existing research has dealt with this in two ways. First, by only conducting a cross-sectional analysis, ignoring time effects and, secondly, by focusing only on a specific industry or sector. This section will proceed to outline the literature in two components, the first being that of a theoretical model as described by Moll (1996), and the second being that of South African empirical literature outlining the impact of bargaining councils in the South African context.

2.2.1 Moll's minimum wage model

Since the right to bargain centrally is one which must be voluntarily exercised, it is possible that bargaining council agreements exist systematically in the industries, magisterial districts, and years in which local labour markets make them particularly profitable for the firms who pursue centralized bargaining (Magruder, 2011). Moll (1996) followed this rationale and outlined a theoretical model discussing the implications of bargaining councils for small and large firms. This model rests on the basis of a few assumptions. Firstly, it is assumed that there is no government intervention in labour markets, and that wages are correlated with firm size. This is because there are economies of scale in union organization, so union densities are higher at large firms, and because there are no unions below a threshold firm size. In the absence of a bargaining agreement, large unionized firms would pay a privately bargained wage (w^{LU}), while non-unionized firms and small firms would pay a wage dictated by market forces, (w^{MF}). If a bargaining council agreement existed, and a wage accord was reached under this agreement, there would be a third wage possibility, (w^{BC}). Due the *ergo omnes* nature of bargaining councils, all firms within the sector would have to comply with the prescribed wage, w^{BC} .

According to Moll (1996), it is presumed that $w^{LU} > w^{BC} > w^{MF}$, making it readily apparent that under a bargaining council agreement the wages for large unionized firms decrease, while the wages for small firms and large non-unionized firms increase. The net result of this is that larger firms pay a lower wage than they would have if market forces had dictated the

⁸ See Godfrey & Macun, 1991; Godfey, 1992; Moll, 1996; Schultz & Mwabu, 1998; Butcher & Rouse, 2001; Bhorat et al., 2009; Magruder, 2011.



wage, and some small firms are forced out of the market, with others facing a barrier to entry. With lower amounts of small firms within the market competition is decreased, and larger firms have lower incentive to operate efficiently, resulting in a pervasive negative effect on economic growth⁹.

The following section of this paper outlines existing literature which demonstrates the impact of bargaining councils on the South African labour market, as well as evidence that supports Moll's model.

2.2.2 The impact of South African bargaining councils

Schultz and Mwabu (1998) investigated the impact of unions on South African wages. The authors used a national probability sample of the South African population collected at the end of 1993 by the South African Labour and Development Research Unit. Some 43 974 individuals from 9 000 households were drawn from 360 sample clusters. Schultz and Mwabu (1998) used quantile Ordinary Least Squares regressions to first examine the impact of union status dummy across deciles on wages. The wage function estimates show that union membership among African workers increases their wages by 145% at the bottom 10th percentile of the wage distribution and by 11% at the top 90th percentile. Among white workers, the relative increase in union wages is 21% at the 10th percentile but is associated at the 90th percentile with a reduction of 24%. The authors found that on average a unionized African worker received a wage that was 60% higher than a non-unionized African worker with the same characteristics. A white union worker received a wage that was 5% lower than their un-unionized counterpart. Schultz and Mwabu (1998) observed that the centralized bargaining system in South Africa was meant to minimize 'within-industry union and nonunion' wage differentials; however they found wage differentials to still be significant (controlling for human capital variables, rural residence and industry). The authors estimated that cutting the union wage effect by half could reduce unemployment for young Africans by 2% and increase labour force participation rate.

⁹ For a more in-depth analysis of the application of this model and its predicted results, please see Moll (1995, 1996).



Building on the implications for small firms that ultimately pay higher wages¹⁰, many papers have shown that bargaining councils induce a wage premium for their members (Butcher & Rouse, 2001), particularly at the bottom of the income distribution (Schultz & Mwabu, 1998). Bhorat et al. (2009) leveled a major criticism against bargaining council agreements in that, due to the ergo omnes nature of the agreements small firms, and consequently employees of small firms are negatively affected. The authors use the 1995 October Household Survey and the September 2005 Labour Force Survey (LFS) to estimate the proportion of workers covered by bargaining councils. In 1995, 15% of formally employed workers were part of bargaining councils; the figure stood at 32% in 2005. Through quantile regressions Bhorat et al. (2009) estimated the impact of a range of explanatory variables on the wage distribution. Between 1995 and 2005, union membership awarded a wage premium across the wage distribution; it also reduced wage earnings especially at the lower end of the distribution. Another major finding of the paper was that public sector bargaining council members earned more than private sector bargaining council members, and on average more than workers not covered by the bargaining council system. This observation held true across employees of all races, genders, and even held when controlling for occupation. There was a strong association between wage premium and union membership between 1995 and 2005.

Magruder (2012) used the South African Labour Force Survey and Government Gazette to estimate the effect of bargaining council on wages and employment, paying attention to variations with space, across industries and over time. The author assumed spatial continuity and used a difference-in-differences approach as a benchmark for bargaining councils on employment and small firm employment. Magruder (2012) argued that although bargaining council agreements are enforced in a spatially discontinuous way, it can be assumed that labour markets are spatially continuous within South Africa. The author then employed a spatial regression discontinuity, and spatial fixed effects to show that bargaining councils in South Africa are associated with lower employment in a particular industry, higher wages and lower employment in small firms; the employment per industry decreased by an estimated 8-13% due to bargaining council agreements, with the loss in employment being largely concentrated in small firms. For spatial fixed effects, Magruder (2012) found that the

¹⁰ As discussed in section 2.2.1



estimates were robust to magisterial district, magisterial district-year and magisterial districtindustry effects.

Revisiting the bargaining council dilemma, Bhorat et al. (2012) examined union and bargaining council wage premia for formally employed Africans using the Labour Force Survey of 2005. The authors argue that previous literature found higher estimates of the wage premium by failing to control for variables that capture the nature of the workplace such as firm size, type of work and non-wage benefits. Utilizing an OLS regression the authors estimated a union wage gap of between 6% and 41%, depending on the specifications used. To correct for the fact that the union status may be endogenous with respect to wages, the authors then utilized a probit model in the wage equation. The authors found that the wage premiums for non-union workers were 9% and 10% for private and public sector bargaining council systems respectively. Bhorat et al. (2012) further found evidence that unions negotiate for awards for their members outside of the bargaining system.

von Fintel (2016) investigated South Africa's unemployment problem from both a supply side and demand perspective. The author made use of district pseudo-panel compiled from Household Surveys and OLS estimated elasticities of labour demand, labour supply and unemployment with respect to wages. The author estimated various labour market outcomes to district level wages and concluded that the labour market was primarily driven by wages, while labour supply was less sensitive to changes in wages. A major finding of the paper is that in comparison to low paid workers, the wage effects of middle to highly paid workers lead to suppressed demand for labour and increased local unemployment. Cross-district unionization rates and the distribution of large firms were responsible for this observation. According to von Fintel (2016), significant component of the wage effect on labour market outcomes were due to these wage-setting institutions.

Nattrass & Seekings (2012) further the criticism of bargaining councils by stating that "bargaining councils push some employers to restructure production in more capital and skill intensive directions. The result is job destruction (sic)." This is not the first South African policy to be criticized for achieving the exact opposite of its goal. Flowerday et al. (2016) shows that the implementation of the Employment Equity Act of 1998 in South Africa had



similar results in terms of restructuring and not the protection effects of workers as it had intended – a similar result that Nattrass and Seekings (2012) shows to be true of bargaining councils.

This paper aims to address 3 primary shortcomings of the previous analyses¹¹. Firstly, this paper will not be restricted to a cross-sectional analysis, and thus can identify trends over time. Secondly, this paper will not be limited to a single sector or industry and can thus study effects between industries. Lastly, this paper has largely disaggregated data and can thus exploit between variations of occupation, industry, and region.

3. Data

3.1 Bargaining council decision data – capturing, cleaning, and transformations

The dataset used in this paper is one that was created specifically for studying the effect of bargaining council decisions and their implications on employment effects – the bargaining council decision dataset (BCDD¹²). Prior to this paper there has been no fully-fledged dataset containing the minimum wages prescribed by the respective bargaining councils, and digital copies of South African bargaining council decisions are rare. The majority of these bargaining council decisions exist in the form of government gazettes, which are published by the South African government printing works; yet again, access to historical gazettes is limited as not all of these gazettes have been published online. For these reasons it was essential to partner with the South African Department of Labour (DoL) in order to gain access to all physical copies of these gazettes. The following sections of this paper will outline the dataset in brief, cleaning and digitizing methods employed, the variables used, and the employment and wage data with which these data were matched..

Due to the lack of digital copies of bargaining council decisions (or of government gazettes for this matter) this paper had to rely on manual and optical character recognition (OCR) data

¹¹ Of which each previous paper suffered from at least one.

 $^{^{12}}$ This dataset is a product of a partnership between the researchers, AMERU, and the r4d project; it is not yet in the public domain – to discuss potential access to the data please contact the authors of this paper.



capturing techniques¹³. In brief, the physical copies of these documents were scanned to create digital copies; once this had been done OCR was applied (which has been automated using basic scripting techniques in Python); and then the data was cleaned and checked. Since the presentation of the wage tables disseminated by the respective bargaining councils can vary from year to year, with even greater variation existing in the presentation of these tables between sectors, there is no way to eliminate the manual element of the capturing process entirely – in short, the original layout of the data (as presented in the bargaining council tables) differed between industries, within industries, and overtime; there was no generic template for the presentation of these wages (Flowerday, 2017).

As it currently stands, the BCDD contains the minimum wage decisions of three bargaining councils^{14,15}; (i) Metal and Engineering, (ii) Textiles, and (iii) Clothing. The data on these bargaining councils were chosen as the first to be captured because they represent 3 of the top 5 largest bargaining councils, in terms of their coverage (Bhorat et al., 2009). Table 1 shows an excerpt of Bhorat et al. (2009) in order to illustrate the magnitude of this coverage. The table shows how many employees are covered by the respective bargaining councils, the coverage by other bargaining councils, and what percentage both of the aforementioned represent of total formal employment.

Tuble It Estimated Surgaming counter coverage (1990; 2000)						
	19	95	2005			
	Number	Percent	Number	Percent		
Metal and engineering	293,998	3.62%	196,825	2.45%		
Textiles	79,355	0.98%	35,919	0.45%		
Clothing	104,217	1.28%	102,132	1.27%		
Other bargaining councils	716,027	8.82%	2,245,455	27.93%		
Total employees covered by a bargaining council	1,193,597	15%	2,580,331	32%		
Total formal employment	8,120,279	100%	8,039,401	100%		

Table 1: Estimated bargaining council coverage (1995; 2005)

Source: Bhorat et al. (2009)

Note: Other bargaining councils have been omitted from the above table, but are available in Bhorat et al. (2009)

¹³ A more detailed discussion of the data collection and cleaning procedure is available in Flowerday (2017).

¹⁴ A full list of all 38 existing bargaining councils is contained in Appendix A.

¹⁵ Work is currently under way to capture the remaining bargaining councils' data.



The BCDD is a collection of extremely disaggregated data, and this disaggregation exists at multiple levels including, subsector, occupational, experience, regional, and incentive scheme disaggregation. Each level of disaggregation is now discussed, in turn:

i. <u>Subsector:</u>

Each bargaining council exists at the sectoral level; however, minimum wages can (and often are) prescribed differently per subsector of the overarching sector.

For example; the textiles sector is comprised of the following subsectors, (i) blankets, (ii) braiding, (iii) carpets, (iv) clothing accessories, (v) home textiles, (vi) manufactured fibres, (vii), non-woven textiles, (viii) wool and mohair processors, (ix) worsted, and (x) the woven and crochet subsector.

ii. <u>Occupation (also referred to as 'Grade structure'):</u>

Different minimum wages are prescribed according to varying occupations of employees – naturally, more skilled occupations are prescribed higher minimum wages than those occupations which are low skilled. However, this disaggregation goes even further. Within each subsector, of each sector, there are two ways in which minimum wages can be prescribed. The first being where wages are assigned on specific occupations, while the second approach encompasses subsectors which have been assigned a 'grade structure' upon which employees are paid. In this context, an example may be beneficial.

The first approach is self-explanatory; subsectors utilizing this approach assign a different wage to each occupation that is covered by a bargaining council agreement. I.e. a cleaner would be assigned a lower wage than that of a motor-vehicle driver.

The second approach is more involved. Each grade within a specific subsector's grade structure represents a variety of occupations. Under this approach, a cleaner (along with other very low-skilled occupations) would be classified under a lower grade than what a driver (and other similarly skilled occupations) is. As mentioned above, these grade structures vary from subsector to subsector.



To further illustrate how these grade structures may vary, the following example is considered. When considering the textile sector, if the 'woven and crochet' subsector grade structure is compared with the 'carpet' subsector grade structure (shown below), it is immediately noticeable that the 'woven and crochet' subsector has a more disaggregated grade structure than that of the 'carpet' subsector. With different grade structures existing within most of the captured subsectors, this brings a lot of disaggregation into the data.

Woven and crochet¹⁶:

Grade A1 < Grade A2 < Grade A3 < Grade B1 < Grade B2 < Grade B3 < GradeB4

Carpets¹⁷:

Grade 1 < Grade 2 < Grade 3 < Grade 4 < Grade 5

iii. Experience:

The prescribed minimum wage may vary according to the level or experience possessed by an employee within a specific occupation – this is generally applied to employees that are new to the occupation, and are still classified as new-comers. As shown in table 2, this disaggregation generally follows a pattern of (i) first four months of experience, (ii) second four months of experience, (iii) third four months of experience, and (iv) qualified. The measurement of said experience is at a sub-sectoral level, and not at a firm-specific level.

iv. <u>Regional:</u>

Wage agreements can be region specific – the most notable example here would be the Clothing subsector whereby minimum wages are prescribed at a provincial level.

¹⁶ Grade A1 is the lowest skilled -i.e. has the lowest minimum wage.

 $^{^{17}}$ Grade 1 is the lowest skilled – i.e. has the lowest minimum wage.



v. <u>Incentive schemes:</u>

Sectors may prescribe wages on the basis that an employee is on a particular incentive scheme, versus an employee that is not. These generally take the form of performance incentives whereby an employee receives additional remuneration for meeting predetermined targets within an agreed upon timeframe.

Table 2 provides an illustrated version of the general presentation of this disaggregation for bargaining council wage tables for a given year.

	<u>given year</u>								
Subsector	Grade	Wage							
		Group A	Group B	Group A	Group B				
		(Employees on	(Employees NOT	(Employees on	(Employees NOT				
		Incentive	on Incentive	Incentive	on Incentive				
		Scheme) – In	Scheme) – In	Scheme) – In	Scheme) – In				
		area XX	area XX	area YY	area YY				
		Rands (Weekly)	Rands (Weekly)	Rands (Weekly)	Rands (Weekly)				
(a)	Grade 1:								
	(i) Qualified	X11	X12	X13	X14				
	Learners:								
	(ii) First four								
	months	X21	X22	X23	X24				
	experience								
	(ii) Second								
	four months	X31	X32	X33	X34				
	experience								
	(ii) Third four								
	months	X41	X42	X43	X44				
	experience								
	(ii)								
	Thereafter,								
	qualified	X51	X52	X53	X54				
	wage								
(b)	Grade 2:	I	1	1	1				
:	:	:	÷	÷	E				

Table 2: Illustration of the general presentation of bargaining council wage tables for a

Source: Flowerday (2016)



No South African employment and wage dataset exists with the same (or even similar) levels of disaggregation; as a result, the BCDD had to be transformed into a workable form for the purposes of this paper. This transformation involved removing specific levels of disaggregation and methodical collapsing of the data until a workable format was achieved. An explanation of this process now follows:

i. <u>Subsector:</u>

No employment or wage data accurately captures which subsector of a particular sector an employee works for - as a result, the mean wage was taken across subsectors to define a minimum wage at the sectoral level.

ii. Occupation (also known as 'Grade'):

As discussed earlier, there are two primary ways of prescribing a minimum wages for different occupations. In order to ensure comparability, this paper created a standardized grade structure upon into which wages were reassigned, with Grade 1 being the least skilled, and Grade 5 being the most skilled¹⁸.

Grade 1 < Grade 2 < Grade 3 < Grade 4 < Grade 5

In the context of subsectors with prescribed wages on a grade structure, these grade structures were collapsed to fit into the new, standardized grade structure. For subsectors that assigned a unique minimum wage for each occupation, these occupations were manually assigned into the new grade structure based on the varying skill level that each distinct occupation entails¹⁹.

Finally, these minimum wages were collapsed utilizing the average wages prescribed per sector, per year, thus resulting in metal and engineering, textiles, and clothing, all having a specific minimum wage for the new, standardized grade scale in each time period.

¹⁸ (1) Least skilled; (2) Less skilled; (3) Average skilled; (4); More skilled; (5) Most skilled.

¹⁹ These occupations were compared with similar occupations in other subsectors in order to gather an idea of what skill level should be assigned, as well as checking that minimum wages were higher for higher skilled individuals after reassignment had taken place



iii. <u>Experience:</u>

Employment and wage data cannot accurately account for the experience a worker may have in a specific occupation, thus this paper kept only the minimum wage prescribed for a qualified²⁰ worker, and ignored wages prescribed at other levels of experience.

iv. <u>Regional:</u>

No treatment required as provincial information is captured within employment and wage data.

v. <u>Incentive schemes:</u>

No employment or wage data captures whether or not employees or on schemes of this sort - as a result, only the minimum wage prescribed to workers not on an incentive scheme was used.

3.2 Employment and wage data

To conduct the analysis in this paper, the BCDD is matched with employment and wage data drawn from the Post-Apartheid Labour Market Series (PALMS).

PALMS is a stacked, cross-sectional dataset containing microdata from 1994-2015, the majority of which had been collected through various surveys over time by Statistics South Africa (StatsSA). The dataset is comprised of the October Household Surveys (OHS) which ran from 1994 to 1999, the bi-annual Labour Force Survey (LFS) running from 2000 to 2007, and the Quarterly Labour Force Surveys (QLFS) which is available from 2008 to 2015. The data is collected at the household level, with each member of the household being surveyed and then weighted using census weights in order to create a sample that was representative of the South African population. The PALMS dataset captures approximately 120 different variables across time (Kerr et al., 2016), but none of these captured variables included

²⁰ Qualified refers to employees that are no longer new-comers, and are assumed to be capable of all duties outlined by a specific occupation. These employees are assumed to be able to operate independently, and do not have to act as an apprentice or learn from other employees that have been in the same occupation for a longer timeframe.



information as to whether or not workers were covered by a bargaining council – as a result, complementary sources of information were used to estimate the coverage of these councils.

Information contained within the government gazettes, described in the previous section, was used to estimate coverage of the considered bargaining councils. These gazettes outline which particular subsectors are covered, their regions of coverage, as well as potential subsectors and job classifications that must be excluded from coverage estimations²¹. In terms of these exclusions from coverage, barring the sector specific exclusions²², there are other conditions that must be taken into account when estimating the coverage of bargaining councils.

Firstly, the division between formal and informal employment is of crucial importance. Bargaining council agreements are generally only extended to employers and employees whom form part of the formal sector – for this reason, individuals that reported to be selfemployed or as being employed in the informal sector were removed from the sample. This was further restricted to only include workers that have written contracts with their employers, as a bargaining council agreement cannot be binding without one.

Secondly, managers, professionals, associate professionals, and technicians are generally excluded from bargaining council coverage. Bhorat et al. (2009), mentions that this is not a legal prescription, but rather one that has been propagated throughout history. The paper goes on to mention that this is only the case in the private sector and not in the public sector. Since the bargaining councils covered by this paper all fall within the private sector, the condition was imposed, and individuals matching this description were removed.

Lastly, specific occupations that were not covered by the bargaining councils (as stated in the government gazettes) were removed – this resulted in a sample that generally falls into the bracket of unskilled and semi-skilled (with little to no skilled individuals²³).

 $^{^{21}}$ Since the classification of sector, subsector, and occupation is broader within the PALMS data than what is offered in the government gazettes, there were instances whereby the exact specifications outlined by the gazettes could not be followed – thus, it is possible that coverage may have been slightly over or underestimated – Appendix B offers more clarification on this issue.

²² These sector specific exclusions are outlined in Appendix B.

²³ This is corroborated in Bhorat et al., (2009).



Having restricted the sample to only those individuals that meet the aforementioned criteria, the same, new, standardized grade structure utilized for the BCDD was imposed on the PALMS data. This was incrementally more difficult than imposing the same structure on the BCDD, as the PALMS occupational reporting is not as detailed – for example, an individual in PALMS may report to be a "clerk", however, bargaining councils distinguish between different types of clerks within the same industry, making it impossible to match completely accurately on occupation titles.

To overcome this, median wages were sorted by sector and occupation. Once sorted, each quantile was assigned into the new grade structure, with the first 20% being assigned "Grade 1", the next 20% "Grade 2", and so forth. In order to ensure accuracy and consistency, each occupation²⁴ was then checked to ensure that it had an appropriate grade assigned to it (and that no wage outliers had driven a lower-skilled job into a higher part of the new grade structure).

With the PALMS dataset having being adequately restricted to only those employees who are covered by a bargaining council agreement, the dataset was matched with the BCDD on four distinct variables, namely: year, sector, region, and grade. This resulted in a matched dataset that contains employment and wage information at the individual level, along with the minimum wage that said individual should receive, with that minimum wage depending on the year, sector, region, and grade that the individual falls into.

4. Bargaining councils and their effects - an analysis

This paper exploits three key aspects of variation to identify the effect of bargaining councils on employment and wages: first, regional variation in coverage; second, time variation (different bargaining councils have rounds of collective bargaining at different times); and third, variation in wage levels for different occupations within a bargaining council (different occupational levels have different set wages for different sectors and these do not correspond across sectors). This variation, and the changes which occur after different rounds of

²⁴ Occupational codes and their subsequent job descriptions are provided by Statistics South Africa.



collective bargaining, can then be used to examine whether these agreements are associated with wage outcomes, employment levels and employment by different sizes of firms.

This paper departs with an exploration of the coverage of bargaining councils, whether or not there is a non-compliance of minimum wage agreements by employers, and the effect of bargaining council agreements on wages and employment.

4.1 Coverage by bargaining councils

4.1.1 Estimation of bargaining council coverage

Extending the work of Bhorat et al. (2009), this analysis begins by estimating the number of employees covered by bargaining council agreements for our three sectors of interest. Covered employees are defined in the same way as they were in section 3.2, namely they are formal employees, working for a wage, with a written contract, in the private sector, and they are not managers, professionals, associate professionals, or technicians. The number of covered employees is expressed numerically, and as a percentage of total formal employment in table 3, below.

			<u>employment</u>				
	2009	2010	2011	2012	2013	2014	2015
Clothing	107,545	95,004	98,869	90,654	88,761	97,284	85,956
	(1.17%)	(1.15%)	(1.17%)	(0.95%)	(0.88%)	(0.94%)	(0.82%)
Metal and Engineering	288,577	271,471	256,295	267,185	267,701	260,303	219,030
	(3.14%)	(3.29%)	(3.03%)	(2.80%)	(2.67%)	(2.50%)	(2.10%)
Textiles	48,523	33,696	38,061	39,568	36,366	39,142	41,595
	(0.53%)	(0.41%)	(0.45%)	(0.41%)	(0.36%)	(0.38%)	(0.40%)
Total formal employment	9,200,493	8,247,306	8,458,264	9,546,210	10,034,927	10,398,459	10,423,018

Table 3: Estimated bargaining council coverage by percentage of total formal

A noticeable pattern emerges from the results in terms of coverage and its relationship with total formal employment – as we proceed forward in time, total formal employment grows,



while the percentage of employees covered by bargaining councils relative to total formal employment falls. This can potentially be partially explained by the fact that all 3 of the captured bargaining councils fall under the manufacturing (when talking about the sectoral organization in terms of national accounts), and in recent years, even though total formal employment has been growing in South Africa (in absolute terms), there has been a decline in the number of employees in the manufacturing sector (SARB, 2016).

Noting the decline in employment in the manufacturing sector, we turn our attention to the coverage of our three bargaining councils, relative to total formal manufacturing employment. Table 4 illustrates that on average, the clothing bargaining council covers approximately 6.7% of formal manufacturing employees, while metal and engineering, and textiles cover approximately 18.6% and 2.8% respectively. These three bargaining councils alone cover approximately 28% of all formal manufacturing employees – again validating the choice of these three councils for analysis²⁵.

	manufacturing employees								
	2009	2010	2011	2012	2013	2014	2015		
Clothing	107,545	95,004	98,869	90,654	88,761	97,284	85,956		
	(7.43%)	(7.06%)	(7.14%)	(6.28%)	(6.14%)	(6.85%)	(6.34%)		
Metal and Engineering	288,577	271,471	256,295	267,185	267,701	260,303	219,030		
	(19.95%)	(20.18%)	(18.52%)	(18.52%)	(18.52%)	(18.32%)	(16.15%)		
Textiles	48,523	33,696	38,061	39,568	36,366	39,142	41,595		
	(3.35%)	(2.50%)	(2.75%)	(2.74%)	(2.52%)	(2.75%)	(3.07%)		
Total formal manufacturing employment	1,446,590	1,345,425	1,384,240	1,442,983	1,445,456	1,421,201	1,355,953		

Table 4: Estimated bargaining council	coverage by percentage of total formal
monufocturi	ng omnlovoog

Source: PALMS (2009-2015) and BCDD, authors' own calculations.

Tables 3 and 4 have expressed how many employees are covered by the three bargaining councils in question, relative to both total formal employment, and total formal

²⁵ There are other bargaining councils within the manufacturing sector; however, they were not captured for this paper.



manufacturing employment. The result being that a sizable portion of employees are covered by these three bargaining councils alone, and as a consequence, a large portion of employees are therefore entitled to some form of minimum wage. However, as implied by Bhorat et al. (2011) and Basu et al. (2010), the existence of a minimum wage, and employees actually earning said minimum are not mutually exclusive. The following section of this paper is dedicated to quantifying the gap between reported earnings, and prescribed minimum wages.

4.2 The gap between reported real earnings and the prescribed minimum wage

When utilizing matched employment and minimum wage data, the existence of a minimum wage is by no means a guarantee that earnings reported by an employee will be greater than or equal to said minimum wage. An increasing body of literature outlines *non-compliance* with minimum wage agreements as the primary reason for this observed gap²⁶.

An employer that is covered by a bargaining council agreement, yet fails to adhere to the conditions laid out therein can be considered to have been *non-compliant* with the agreement. It is the responsibility of the South African Department of Labour to monitor and enforce compliance with the agreements; this is done using a team of labour inspectors. If through the course of an inspection, a firm is found to have violated the conditions of these agreements, the inspector issues a warning to the firm and gives said firm 21 days in which to comply. If at the end of 21 days the firm is still found to be in non-compliance of the conditions of the agreement, the firm is issued with another written document, namely a compliance order (Bhorat et al., 2011). If at the end of the next 21 days, the firm is still non-compliant, the case is referred to the South African Labour Court, which will institute punitive measures upon the firm if the firm is found to be in non-compliance, the most notable being the idea of *exemptions*.

An employer may apply to be exempt from some or all clauses of the extension of the bargaining council agreement. This application will then be considered by the respective bargaining council, and a decision will be made as to whether or not the application for exemption will be accepted or denied. There can be up to nine criterions upon which the

²⁶ See Bhorat et al., 2011; Ronconi, 2008; Andalón & Pages, 2008; Lemos, 2009; and Maloney & Nuňes, 2003.



bargaining council makes their decision, and it is unknown what weight each criterion carries in the decision making process (Godfrey, 2006). These exemptions are the most critical way in which an SMME may be able to bypass the extension of these agreements if they cannot comply with the requirements²⁷.

According to Bhorat et al. (2011), South Africa has a large degree of non-compliance of bargaining council agreements by employers – especially with respect to the prescribed minimum wage. The authors utilize 2007 South African labour force data, and estimate that, on average, 44% of workers covered by a bargaining agreement are paid a wage below the minimum²⁸; furthermore, the authors estimate that the average shortfall was approximately 35% of the prescribed minimum wage. These figures are extremely high, and give reason for alarm. However, it is likely that these numbers have been over-estimated; upon inspection of Bhorat at al. (2011), this paper has indentified three elements that could be influencing this potential over-estimation.

The first element is that of the matching procedure. Bhorat et al. (2011), mention that employees are matched with minimum wages, however, no further discussion is offered as to how this is carried out– this in and of itself could be leading to an overstatement of the level of non-compliance. Rigorous matching is essential to ensure that the worker under consideration from employment data is actually entitled to the prescribed minimum wage that said worker has been matched with. Inability to do so accurately could lead to a situation whereby the level of non-compliance is either over or under-estimated.

The second element is one that all researchers have to be aware of when utilizing surveyed wage data - the issue of systematic underreporting. Underreporting can be caused by a variety of factors, including (but not limited to), an employee not taking taxation and benefits into account when reporting wages, an employee's inability to remember their actual earnings accurately, as well as "motivated mis-remembering" whereby individuals underreport their wage in order to ensure a continuation of any monetary support by the state (Moore et al.,

²⁷ Anecdotal evidence suggests that a key element in the bargaining councils' decision making process is the profitability of the firm – if the firm is shown to be profitable, the request for exemption is often denied.

²⁸ 44% is the average percentage of employees that work below minimum wage, whilst covered by a bargaining council agreement; when considering each sector individually, this percentage varied between 8 and 70 percent.



1997; Finn, 2015). Taking both of these aforementioned elements into account, it is possible that what is reported by Bhorat et al. (2011) is an overestimation of non-compliance.

The final element is that of exemptions – without being able to accurately identify how many employers (and consequently their employees) are exempt from the minimum wage, it is difficult to categorically state that the reason for the observed gap between reported earnings and the minimum wage is due to non-compliance.

While this paper has been circumspect with regard to matching, attempting to limit this overestimation by utilizing the new, standardized grade structure upon which workers were matched with their respective, prescribed minimum wage, there is still a distinct possibility that underreporting of wages in the PALMS dataset does exist. This paper does attempt to control for a variety of factors to limit the effect of this potential underreporting. However, there is no perfect set of controls that can completely offset the effects of this potential underreporting.

Ultimately, to truly untangle the issue of non-compliance from matching issues, underreporting, and lack of data of exemptions, more complete data are required. It is for these reasons that this paper focuses on the gap between reported earnings and the prescribed minimum wage, and is excessively circumspect when making claims that this gap could stem from non-compliance.

The rest of this section unpacks this wage gap via three methods, the first being that of a graphical approach, whereby kernel density functions are estimated to illustrate the distribution of wages relative to the prescribed minimum wage. The second approach follows a family of indices measuring differences between prescribed minima and reported wages²⁹. Lastly, this paper utilizes regressions with a variety of controls to attempt to reduce the potential levels of underreporting.

²⁹ As outline in Bhorat et al., (2011).



4.2.1 Kernel density estimates of the gap between reported earnings and prescribed minima

To begin analysis, a graphical approach is utilized in order to investigate the distribution of reported earnings by employees relative to the prescribed minimum wages – this is done across all 3 sectors, for all 5 grades, and for the time period: 2010 - 2014. This graphical approach takes the form of kernel density plot, whereby $(x_1, x_2, ..., x_n)$ is an independent and identically distributed sample drawn from some distribution with an unknown density, *f*. To approximate the probability density function f(x), the following equation is utilized:

$$\hat{f}_h(x) = \frac{1}{n} \sum_{i=1}^n K_h(x - x_i) = \frac{1}{nh} \sum_{i=1}^n K(\frac{x - x_i}{h})$$
(1)

where function K refers to the kernel, which determines the weights of the estimation, and h is the smoothing parameter (also known as the scale parameter) (Lancaster University, 2017). To ensure smooth estimates, this paper utilized an Epanechnikov kernel for K, where K(u) takes a value of $\frac{3}{4}(1-u^2)$ if the absolute value of x is smaller than 1, and 0 otherwise.

$$K(u) = \begin{cases} \frac{3}{4}(1-u^2) & \text{for } |u| \le 1\\ 0 & \text{otherwise} \end{cases}$$
(2)

The results of these approximations are shown in figures 1 - 3, where the imposed vertical line represents the prescribed minimum wage relevant to each combination of sector, grade, and year. If workers received the minimum wage prescribed, it would be expected that there would be a spike in density around the vertical line, with no part of said density lying to the left of the minimum wage line³⁰.

³⁰ For a more detailed discussion on Kernel Density Estimation please see Lancaster University (2017).



Figure 1: Kernel density estimates of real earnings, clothing sector, (2010-2014)



Figure 2: Kernel density estimates of real earnings, metal and engineering sector, (2010-2014)







Figure 3: Kernel density estimates of real earnings, textile sector, (2010-2014)

As can be seen from the preceding figures, a large degree of the considered combinations of sector, grade, and year show a density that peaks below the minimum wage line. This implies that there are a large number of employees across the considered sample that are earning below their prescribed minimum wage. As discussed in the previous section, this could be reflective of non-compliance by employers with minimum wage agreements; however, it is also likely that a degree of over-estimation is also reflected via these results.

While this graphical approach affords meaningful insight into the story the of wage gap between reported earnings and their relevant prescribed minima, due to the variation of this gap between different grades and sectors, a more numerical approach may prove beneficial.

4.2.2 Minimum wage shortfall indices

To investigate the gap between reported earnings and prescribed minima in more quantitative terms, this paper follows a methodology laid out by Bhorat et al., (2011). This approach utilizes a family of indices which are analogous to the family of poverty indices introduced in 1984 by Foster, Greer, and Thorbecke. The approach allows for the calculation of the



percentage of those who report earnings which are below the prescribed minimum wage, the normalized gap between the reported wage and minimum wage, as well as the normalized square of this gap. The model takes on the following form:

$$V_{\alpha} = E\left\{ \left[\frac{\left(w^{\min} - w \right)}{w} \right]^{\alpha} \right\}$$
(3)

where *w* is the reported wage received by individual *i*, w^{min} is the minimum wage relevant to individual *i*, α is an index that emphasizes concern about the size of the gap between reported earnings and the relevant minima, and *E* is the expectation operator with respect to the wage distribution in the sector to which w^{min} applies (Bhorat et al., 2011). When α =0, the index collapses to a standard measure of the percentage of workers covered by a bargaining council agreement with reported wages below the prescribed minimum wage. When α =1, the index captures the size of the gap – more weight is placed on larger gaps as α increases. Lastly, when α =2, we receive the square of the size of the gap. Table 5 depicts the weighted results of this analysis including the ratio, V_{I}/V_{0} , which illustrates the average wage shortfall below the respective minima.

	V_{0}	V_1	V_2	V_{1}/V_{0}
Clothing	0.67	0.27	0.14	0.40
Least skilled	0.67	0.27	0.15	0.40
Less skilled	0.69	0.27	0.14	0.39
Average skill	0.40	0.16	0.09	0.40
More skilled	0.54	0.22	0.13	0.41
Most skilled	0.60	0.22	0.11	0.37
Metal and Engineering	0.72	0.33	0.20	0.46
Least skilled	0.84	0.43	0.27	0.51
Less skilled	0.80	0.37	0.22	0.46
Average skill	0.74	0.34	0.20	0.46
More skilled	0.62	0.28	0.17	0.45
Most skilled	0.60	0.29	0.18	0.48
Textiles	0.55	0.23	0.13	0.42
Least skilled	0.65	0.24	0.13	0.37
Less skilled	0.61	0.28	0.17	0.46
Average skill	0.43	0.19	0.10	0.44
More skilled	0.37	0.17	0.10	0.46
Most skilled	0.31	0.16	0.10	0.52
Total	0.69	0.31	0.18	0.45

Table 5: Estimates of minimum wage shortfall indices (by grade and sector)

Source: PALMS (2010-2014) and BCDD, authors' own calculations.



Following the method laid out by Bhorat et al. (2011), it can be seen that the total share of employees below the minimum wage is close to 70%, while the average wage shortfall per employee (V_{1}/V_{0}) is approximately 45%. Employees in the 'more skilled', and 'most skilled' classification have the lowest incidence of being paid below the prescribed minimum, while employees in 'less skilled' and 'least skilled' have a significantly higher probability of being paid below the minimum wage. At 72% of employees paid under the relevant minima, and an average of the wage being 46% less than the prescribed minima, the metal and engineering sector seems to be representative of the largest gap between reported real earnings and the prescribed minimum wage.

These results are congruent with the findings of Bhorat et al. (2011), and fall within a similar range of that of other developing countries³¹. These findings promote the idea that non-compliance is evidently very present, and that it is contributing to the gap between reported real earnings and the legislative minima. As stated previously, there is likely to be a degree of overestimation present in these findings; however, it is unlikely that this potential overestimation can override the conclusion that there is a large degree of non-compliance amongst employers with regard to the minimum wages in the sectors that this paper considers. Irrespective, the paper will proceed with a series of regressions to control for underreporting of wages in the following section.

4.2.3 Regression estimates of wage shortfall

In this paper's final attempt to unpack the gap between reported earnings, and prescribed minimum wages, a series of regressions are used. These regressions control for various factors which should limit the effect of underreporting on results, allowing the paper to make a more substantial comment on the topic of non-compliance. This paper utilizes both ordinary least squares (OLS) regressions, and quantile regressions; OLS is completed with multiple specifications in order to ensure robust results, and quantile regressions are based on the subsequent preferred specification.

The OLS regression takes the form of:

³¹ See Andalón & Pages, 2008; Lemos, 2009; and Maloney & Nuňes, 2003; Murahwa, 2016.



$\ln(RRE)_i - \ln(RMW)_i = \alpha + \beta_1 X_{ki} + \varepsilon_i \qquad (4)$

where $ln(RRE)_i$ is the reported real earnings of an individual, and $ln(RMW)_i$ is the real minimum wage applicable to the same individual. X_{ki} is a vector containing control variables such as sector of employment of the individual, grade of individual, age and experience of the individual, province, firm size, gender, and race. The constant and disturbance term are provided by α and ε respectively.

Quantile regressions are utilized in order to investigate effects of explanatory variables at different points in the distribution of the difference between reported earnings, and the respective minimum wage. While through OLS estimation, a sample mean is derived through the minimizing of the sum of squared residuals, quantile regressions derive the sample median through the minimization of the sum of absolute residuals. The quantile regression estimator for quantile q minimizes the following function:

$$Q(\beta_q) = \sum_{i:y_i \ge x_i}^{N} q |y_i - x_i'\beta_q| + \sum_{i:y_i < x_i}^{N} (1 - q) |y_i - x_i'\beta_q|$$
(5)

The above function provides the solution for the q^{th} quantile, where $0 < q < 1^{32}$, facilitating the estimation of Q at any point in the distribution of the variable of interest (i.e. our dependent variable). y_i is the difference between real reported earnings and the real minimum wage, while x_i is a vector of control variables (Baum, 2013).

4.2.3.1 Ordinary least squares regression estimates

As mentioned in the previous section, OLS is run under multiple specifications, namely: (i) firm characteristics only, (ii) firm and employee characteristics, and (iii) firm and employee characteristics including year dummies. The results of these specifications are shown in table 6.

 $^{^{32}}$ Where q=0.5, estimation is conducted at the median, whereas OLS provides estimation at the mean.



Table 6: Ordinary least squares estimation of the logged difference between reported real earnings, and real minimum wage, under multiple specifications

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Log[RRE-RMW]	Specification [i]	Specification [ii]	Specification [iii]
Sector [Clothing=Base]			
Metal and Engineering	-0.240***	-0.464***	-0.467***
	[0.024]	[0.032]	[0.032]
Textiles	0.097***	0.000	-0.002
	[0.036]	[0.037]	[0.037]
Firm size [Small=Base]			
Medium/Large	0.050**	0.080***	0.088***
	[0.021]	[0.021]	[0.021]
Province [Gauteng=Base]			
Western Cape	-0.106***	-0.092*	-0.082*
	[0.029]	[0.040]	[0.040]
Eastern Cape	-0.020	-0.072	-0.071
	[0.042]	[0.042]	[0.042]
Northern Cape	-0.370***	-0.350**	-0.347**
	[0.108]	[0.107]	[0.106]
Free State	-0.290***	-0.242***	-0.240***
	[0.045]	[0.044]	[0.044]
KwaZulu-Natal	-0.123***	-0.172***	-0.169***
	[0.030]	[0.031]	[0.031]
North West	0.014	0.041	0.041
	[0.052]	[0.051]	[0.051]
Mpumalanga	0.333***	0.309***	0.302***
	[0.058]	[0.057]	[0.057]
Limpopo	-0.495***	-0.425***	-0.378***
	[0.095]	[0.094]	[0.094]
Race [Black=Base]			
Coloured		0.074*	0.067
		[0.037]	[0.037]
Indian/Asian		0.354***	0.345***
		[0.044]	[0.044]
White		0.570***	0.564***
		[0.043]	[0.043]
Grade [[5] - Most skilled = Base]			
[1] - Least skilled		0.004	0.002
		[0.042]	[0.042]
[2] - Less skilled		-0.074*	-0.071
		[0.038]	[0.038]
[3] - Average skilled		-0.009	-0.005
		[0.037]	[0.037]
[4] - More skilled		0.113**	0.111**
		[0.041]	[0.040]
Experience		0.004**	0.004**



		[0.001]	[0.001]
Gender [Male=Base]			
Female		-0.249***	-0.251***
		[0.025]	[0.024]
Years of education		0.047***	0.047***
		[0.004]	[0.004]
Hours worked in last 7 days		-0.001	0.000
		[0.001]	[0.001]
Year [Base=2010]			
2011			-0.018
			[0.029]
2012			-0.077*
			[0.030]
2013			-0.154***
			[0.030]
2014			-0.216***
			[0.030]
Constant	-0.175***	-0.504***	-0.421***
	[0.033]	[0.085]	[0.087]
Observations	8924	8831	8831

Source: PALMS (2010-2014) and BCDD, authors' own calculations. Standard errors are given in parentheses Note:

*p<0.05 ** *p*<0.05 *** p<0.001

Across all 3 specifications, certain commonalities emerge - the first being that of a significant, negative constant³³. This implies a negative difference between real reported earnings and the real minimum wage, indicating that a significant portion of individuals are earning less than the prescribed minima. Secondly, individuals employed by medium or large firms³⁴ are shown to have approximately 8% larger (i.e. more likely to pay above minimum wage) than those employed by small firms³⁵, implying that these employees are more likely to be paid above the minimum wage

The third finding is that relative to the clothing sector, textiles are not significantly different, and the coefficient indicates almost no change when switching from clothing to textiles. However, metal and engineering indicates a much larger, significant difference when

³³ Note: A negative coefficient implies that a wage gap exists such that RRE<RMW. A positive coefficient implies RRE>RMW.

³⁴ Firm size specification is based on the National Small Business Act 102 of 1996, whereby small firms have less than 50 employees, medium firms have less than 100 employees, and large firms have in excess of 100 employees. ³⁵ When looking at specification (ii) or (iii).



switching from clothing. This difference indicates that individuals in metal and engineering have a 46% larger wage gap³⁶ than those individuals in clothing. These findings reiterate what was shown in table 5, whereby clothing and textiles were shown to have similar wage gaps and metal and engineering had the highest wage gap of the considered sectors. The final commonality indicates that all provinces (except for Mpumalanga) characterize a larger wage gap relative to individuals employed within Gauteng.

Specification (iii) is the preferred specification of the model, combining firm and individual characteristics, as well as a time component; as a result all subsequent discussion will center on this specification.

The inclusion of individual characteristics illustrates effects that are to be expected within the South African context. Females demonstrate a significant, larger wage gap relative to males (25% larger); years of education, and years of experience are shown to have a significant positive effect, thus reducing the gap between reported real earnings and real minima by approximately 4.7%, and 4% respectively. All races are shown to have a smaller wage gap relative to the one experienced by black workers, with white workers having a gap that is approximately half that of black workers.

Over time, there appears to be a widening of the wage gap. This could be reflective of economy wide factors, including the economic slowdown in South Africa, which had a pronounced effect on the manufacturing sector (under which all 3 of these considered subsectors fall). Previous works by Flowerday et al., (2016) have shown South Africa to be an economy which is very adept at switching between capital and labour when costs are exacerbated in terms of labour. With decreasing economic returns due to slowed growth (World Bank, 2015), it is possible that firms did not keep up with wage updating, allowing for the widening of the wage gap over time.

Grade is shown to have an ambiguous effect on the wage gap experience by workers. When compared to the most skilled workers, it is seen that those falling into group (2) and (3),less skilled, and average skilled respectively, have a larger wage gap than that of the most skilled

³⁶ When looking at specification (ii) or (iii).



workers. However, employees falling into the least skilled (1) and more skilled (4) categories are shown to have a smaller wage gap than employees in the most skilled category. Barring the effect on group (4), the rest of the coefficients are insignificant, implying that the grade or occupation of an employee may not have a significant bearing on how likely they are to be paid above or below the prescribed minimum wage.

Being cognizant of the fact that these effects shown here can strengthen or dissipate at different point in the distribution, a series of quantile regressions is necessary.

4.2.3.2 Quantile regression estimates

Building on specification (iii) as discussed in the previous section, the quantile regression estimates of the model are shown in table 7.

Similar findings emerge through the quantile regressions as to what was shown vis-à-vis the OLS estimation. In all quantiles, metal and engineering employees are shown to have a larger incidence of a negative wage gap relative to the clothing industry, while the textile industry again shows no significant difference relative to the clothing industry.

Firm size again emerges as a significant determinant for the wage gap; those employed by medium or large firms experience a larger wage gap (i.e. more likely to pay above minimum wage) than those employed by small firms. This result confirms what was expressed by Moll's (1996) model, where it was shown that small firms are less likely to be able to absorb the prescribed minimum wage costs assigned by bargaining councils. Thus, what these results seem to reflect is that smaller firms are more likely to pay employees beneath the minimum wage, as they cannot as easily keep up with the wage as easily as their medium and large counterparts.

Province, race, gender, experience, and years of education reflect similar results as expressed in table 6, whereby increased experience or years of education are shown to decrease the wage gap, whilst being in any province relative to Gauteng (except Mpumalanga) is shown to increase the prevalence of a wage gap. Unpacking the race variable also indicates that all races are less likely to be paid below the minimum wage when contrasted with black



employees. Again, females exhibit a higher incidence of a gap between their real reported wage and their prescribed minimum wage when compared to male individuals.

The unpacking of grade via a quantile regression belies an interesting result that could not be observed via OLS. Individuals in lower grades (relative to grade 5, most skilled), have a smaller wage gap at the lower end of the distribution, and a larger wage gap at the top end of the distribution. This result confirms what should be expected a priori, whereby a skilled individual that lies in the bottom of the distribution is clearly underpaid relative to their prescribed minimum wage, however, as we move along the distribution, this effect is dampened, and these workers are more likely to receive the minima they have been prescribed, relative to the other grades.

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Log[RRE-RMW]	Quantile [0.1]	Quantile [0.25]	Quantile [0.5]	Quantile [0.75]	Quantile [0.9]
Sector [Clothing=Base]					
Metal and Engineering	-0.559***	-0.478***	-0.385***	-0.355***	-0.434***
	[0.079]	[0.039]	[0.029]	[0.028]	[0.052]
Textiles	-0.001	-0.042	0.028	0.049	0.022
	[0.091]	[0.045]	[0.033]	[0.032]	[0.060]
Race [Black=Base]					
Coloured	-0.083	-0.044	0.020	0.149***	0.247***
	[0.092]	[0.045]	[0.033]	[0.032]	[0.060]
Indian/Asian	0.467***	0.472***	0.440***	0.353***	0.227**
	[0.108]	[0.053]	[0.039]	[0.038]	[0.071]
White	0.395***	0.456***	0.655***	0.692***	0.757***
	[0.105]	[0.052]	[0.038]	[0.037]	[0.069]
Grade [[5] - Most skilled = Bas	se]				
[1] - Least skilled	0.217*	0.122*	0.027	-0.098**	-0.200**
	[0.103]	[0.051]	[0.037]	[0.036]	[0.068]
[2] - Less skilled	0.106	0.048	-0.057	-0.159***	-0.165**
	[0.093]	[0.046]	[0.034]	[0.032]	[0.061]
[3] - Average skilled	0.105	0.028	-0.032	-0.126***	-0.093
	[0.090]	[0.045]	[0.033]	[0.032]	[0.059]
[4] - More skilled	0.249*	0.062	0.073*	0.026	0.077
	[0.101]	[0.050]	[0.037]	[0.035	[0.066]
Experience	0.000	0.006***	0.011***	0.010***	0.007**
	[0.003]	[0.002]	[0.001]	[0.001]	[0.002]
Province [Gauteng=Base]					
Western Cape	-0.088	-0.001	-0.045	-0.132***	-0.266***

<u>Table 7: Quantile estimation of the logged difference between reported real earnings,</u> and real minimum wage, at different quantiles



Observations	8831	8831	8831	8831	8831
	[0.214]	[0.106]	[0.077]	[0.075]	[0.140]
Constant	-1.395***	-0.757***	-0.391***	0.047	0.307*
2014	-0.010*** [0.075]	-0.083* [0.037]	-0.111*** [0.027]	-0.060* [0.026]	0.048
2014	[0.075]	[0.037]	[0.027]	[0.026]	[0.049]
2013	-0.445***	-0.184***	-0.083**	-0.058*	0.097*
	[0.074]	[0.036]	[0.027]	[0.026]	[0.048]
2012	-0.168*	-0.061	-0.033	0.000	0.047
	[0.073]	[0.036]	[0.026]	[0.025]	[0.048]
2011	-0.060	-0.038	-0.015	0.023	-0.004
Year [Base=2010]					
	[0.003]	[0.001]	[0.001]	[0.001]	[0.002]
Hours worked in last 7 days	0.003	0.001	0.000	-0.001	0.001
	[0.010]	[0.005]	[0.004]	[0.004]	[0.007]
Vears of education	0.032j	0.020	0.036***	0.042***	0.056***
Medium/Large	0.101	0.0553*	0.101***	0.095***	0.058
Firm size [Small=Base]	0 101	0.0550*	0 101 ****	0.005****	0.050
	[0.060]	[0.030]	[0.022]	[0.021]	[0.040]
Female	-0.282***	-0.323***	-0.217***	-0.278***	-0.294***
Gender [Male=Base]					
	[0.233]	[0.115]	[0.084]	[0.081]	[0.152]
Limpopo	-0.211	-0.465***	-0.497***	-0.405***	-0.396**
_ ~	[0.141]	[0.069]	[0.051]	[0.049]	[0.092]
Mpumalanga	-0.062	0.049	0.203***	0.325***	0.465***
	[0.125]	[0.062]	[0.045]	[0.044]	[0.082]
North West	0.046	0.004	-0.006	-0.045	-0.111
Kwazulu-Walai	[0.075]	[0.037]	[0.027]	[0.026]	[0.049]
KwaZulu Natal	0.160*	0.235***	0.281***	0.215***	0.212***
Free State	-0.172	-0.223*** [0.053]	-0.345*** [0.039]	-0.338*** [0.038]	-U.368*** [0.071]
	[0.262]	[0.129]	[0.095]	[0.092]	[0.172]
Northern Cape	-0.162	-0.173	-0.127	-0.105	-0.104
	[0.103]	[0.051]	[0.037]	[0.036]	[0.068]
Eastern Cape	-0.101	-0.060	-0.097**	-0.087*	-0.227***
	[0.099]	[0.049]	[0.036]	[0.034]	[0.065]

Source: PALMS (2010-2014) and BCDD, authors' own calculations.

Note: Standard errors are given in parentheses

p*<0.05 ** *p*<0.05 * *p*<0.001

4.2.4 Conclusions on the gap between reported earnings and prescribed minima

From all of the preceding sets of results, it is clear that there is a wage gap between the real reported earnings of an employee, and the prescribed minimum wage that should be received. As this paper has stated before, there are numerous factors that could lead to an over-



estimation of this result, however, even when controlling for these factors (as best as this paper can without having richer data), the wage gap is still present.

The omnipresent wage gap that reveals itself reinforces the findings of Bhorat et al. (2011), whereby the authors claim that there is a significant amount of non-compliance with these bargaining council agreements by employers. This paper has found that even when controlling for factors that influence the underreporting of real wages, this wage gap still exists, leading to the conclusion that non-compliance with bargaining council agreements is a critical issue within the South African labour market.

This non-compliance could be indicative of a firm's inability to keep up with minimum wages, especially in an increasingly competitive time frame in the South African economy. Results revealed that it is small firms that have employees that are most critically underpaid with respect to the prescribed minimum wage, reinforcing Moll's (1996) model, and illustrating that these are the firms that are potentially the hardest hit by increasing labour legislation.

4.3 Effects on employment

This papers' analysis of employment differs from past studies in one fundamental way – rather than utilizing bargaining council coverage as an independent variable, this paper instead utilizes whether or not there was a new bargaining council agreement issued³⁷.

Conceptually the terms sound similar, thus digression is necessary. When referring to bargaining council coverage, this is an estimate of how many individuals fall within the criterion that defines the coverage of a particular bargaining council. A bargaining council agreement on the other hand can only exist for those whom are covered by a bargaining council. These agreements are typically issued periodically and contain updated conditions which must be met by an employer with respect to employees. Not all conditions of employment change with each new agreement; however, minimum wages are always part of the conditions that are updated.

³⁷ This is done, because as it was explained earlier on in this paper, every individual within the matched dataset is assumed to be covered by a bargaining council.



Employers and firms are likely to react negatively to changes that increase operating cost, such as increased wages or increased labour regulation. Firms and employers are more likely to restructure operations and switch to more capital intensive measures when labour regulations are changed (or increased) to better the conditions of an individual's employment (Flowerday et al., 2016). Thus, it is crucial to unpack the effects that bargaining councils have had on South African employment.

This paper will now proceed to analyze the effect on employment when a new bargaining agreement is extended to employers and employees. The data is treated as a pooled cross-section, whereby we assume that no individual is followed over time, and if an individual does enter the dataset more than once, this is purely due to random selection.

This section follows a similar methodology to section 4.2.3, except that the OLS regression for this section is stated as:

$$\log(L)_{i} = \alpha + \beta_{1} BCA_{i} + \beta_{2} X_{ki} + \varepsilon_{i}$$
(6)

where $ln(L)_i$ is the logged mass of employment – in other words, the log of the weight³⁸ that each individual surveyed represents within the sample. BCA_i is a dummy variable indicating whether or not a new bargaining council agreement had been issued that was applicable to individual *i*. X_{ki} is a vector containing control variables such as sector of employment of the individual, grade of individual, union status of an individual, province, firm size, gender, and race. The constant and disturbance term are provided by α and ε respectively. This approach is conducted under multiple specifications.

After selection of the preferred specification, quantile regressions are utilized in order to investigate effects of explanatory variables at different points in the distribution of the logged mass of employment. The mathematical representation of these quantile regressions is expressed in equation (5).

³⁸ The weights created by PALMS are done by taking into account individual characteristics of each individual, thus each weight is a unique solution to any combination of these characteristics. Furthermore, these weights take into account sectoral determinants, providing a truly unique solution. For more, please see Kerr et al., (2016).



4.3.1 Ordinary least squares regression estimates

As mentioned in the previous section, OLS is run under multiple specifications, the differences in these specifications range from the inclusion of firm effects, to individual effects, and the inclusion of different interaction terms. These results are shown in table 6.

Across all specifications, the effect of a new agreement being present is shown to be significant and negative, implying that the presence of new agreements results in a decrease in the mass of employment. This is congruent with the findings of Magruder (2012), which stated that the presence of bargaining council agreements can be shown to cause a reduction in the levels of employment within a labour force. Furthermore, under all specifications, where the coefficient of sector is shown to be significant, the coefficient is also positive, implying that out of the three sectors of interest in this paper, the clothing sector shows the greatest negative change in the logged mass of employment.

Grade is shown to have a positive, significant effect on the logged mass of employment for every grade relative to those individuals that are least skilled; however, this relationship only holds under specification (1), as more covariates are added the regression, the significance of this explanatory variable is dampened and drops off.

This paper considers specification (6) as the preferred specification of the model. The variables included match those of Bhorat et al. (2009), and this specification exhibits the largest explanatory power, whilst avoiding over-fitting. The rest of this discussion on these results will rest on specification (6).

Union status, log of years of education, gender, race, province, and firm size are all shown to be significant determinates of the log of the mass of employment. The effect of unions is shown to have a negative effect on this mass when switching from individuals that are not part of a union, to individuals that are. Gender and race both exhibit results that are in accordance with a priori expectation – being female has a negative impact on the mass of employment, whilst only white individuals relative to black workers show a higher mass of employment – this can be attributed to the larger presence of black workers in the South African labour force relative to coloureds, and Indians/Asians (SARB, 2016). White individuals still show a higher mass of employment, as they represent the race with the lowest



incidence of unemployment within the South African labour market (SARB, 2016). Logged years of education and province enter in the equation in a similar way to that of the previous section, whereby additional years of education is shown to have a positive effect, whilst each province has a lower logged mass of employment relative to Gauteng.

Firm size shows a significant negative coefficient, implying that medium or large firms are absorbing 2% less of the logged mass of employment, relative to small firms. A fact that is not too surprising since According to Abor and Quartey (2010), small businesses contribute approximately 57% to the South African GDP, and are responsible for approximately 61% of South African employment. Looking at the interaction of new agreements and firm size, it is noticeable that an insignificant effect is experienced, implying that the effect of the presence of a new bargaining council agreement does not rely on firm size.

Considering the effects of other interaction terms included in the model leads to some interesting results. It is immediately noticeable that the interaction between grade of an employee and the presence of a new bargaining agreement is shown to have no significant effect. This implies that any effect induced by new bargaining agreements does not differentiate between the grade or occupation of an individual, and that effects are more likely to be seen at a sectoral level. This is confirmed via the interaction between sector and new bargaining agreements. The result indicates that the metal and engineering sector is likely to have a higher mass of employment (relative to the clothing sector), when a new bargaining council agreement is introduced. The effect is the opposite for the textile sector, which indicates a more adverse effect on the logged mass of employment when compared with the clothing sector.

Having unpacked these effects at the aggregated mean level, this paper now moves to its final set of estimations, whereby specification (6) is estimated via a series of quantile regressions.



Table 6: Ordinary least squares estimation of the logged mass of employment, under multiple specifications

	<u>multiple specifications</u>						
	Specification 1	Specification 2	Specification 3	Specification 4	Specification 5	Specification 6	
New Agreement (NAgr)							
(Base=No)	-0.037**	-0.131***	-0.025*	-0.084***	-0.070**	-0.080*	
	[0.014]	[0.024]	[0.012]	[0.022]	[0.024]	[0.032]	
Sector							
Metal and engineering	0.207***	0.063*	0.060***	-0.031	0.061***	-0.044*	
	[0.016]	[0.029]	[0.016]	[0.027]	[0.016]	[0.034]	
Textiles	0.092***	0.223***	-0.004	0.101*	-0.002	0.094*	
Grade ((1) - Least skilled = Base)	[0.020]	[0.048]	[0.019]	[0.043]	[0.019]	[0.045]	
(2) - Less skilled	0.073***	0.072***	0.040*	0.039*	0.038	0.087*	
(2) 2000 511100	[0 017]	[0.017]	[0.016]	[0.016]	[0.033]	[0.036]	
(3) - Average skilled	0.040*	0.038*	-0.005	-0.006	-0.070*	0.020	
(e) 11/01/0ge 55500	[0 020]	[0 019]	[0 018]	[0 018]	[0 034]	[0.041]	
(4) - More skilled	0.070**	0.068**	0.027	0.025	-0.068	0.003	
(1) More shined	[0.022]	[0.022]	[0.021]	[0.021]	[0 039]	[0.044]	
(5) - Most skilled	0.056*	0.056*	0.032	0.031	-0.012	0.067	
(<i>c</i>) - 11105t Skined	0.020	10.0221	10.0211	10.0211	10.0401	[0.046]	
Union (Base-No)	-0.045***	-0.046***	-0.033**	-0.033**	-0.033**	-0.033**	
Union (Base=100)	0.045	10.0111	10 0101	10 0101	10 0101	[0 010]	
Total formal employment	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	
i otar for mar employment	10000	10000	10000	10000	10000	10000	
Firm size (Small-Base)	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	
Modium/Largo	0 035**	0.036**	0.024*	0.025*	0.025*	-0.037	
Meuluii/Laige	-0.035	-0.030	-0.02 4	-0.023	-0.023	[0 024]	
Sector#NAgr (Clothing#NAgr =Base) Metal and	[0.012]	[0.012]	[0.011]	[0.011]	[0.011]	[0.021]	
Engineering#NAgr		0.180***		0.116***		0.132***	
		[0.030]		[0.027]		[0.038]	
Textiles #NAgr		-0.149**		-0.120*		-0.112*	
		[0.052]		[0.047]		[0.049]	
Gender (Base=male)							
Female			-0.142***	-0.143***	-0.142***	-0.143***	
			[0.012]	[0.012]	[0.012]	[0.012]	
Race (Black=Base)							
Coloured			-0.109***	-0.107***	-0.109***	-0.108***	
			[0.018]	[0.018]	[0.018]	[0.018]	
Indian/Asian			-0.215***	-0.214***	-0.214***	-0.213***	
			[0.021]	[0.021]	[0.021]	[0.021]	
White			0.020	0.022	0.021	0.022	
			[0.021]	[0.021]	[0.021]	[0.021]	
Province (Gauteng=Base)							



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Western Cape			-0.369***	-0.367***	-0.368***	-0.366***
			[0.020]	[0.020]	[0.020]	[0.020]
Eastern Cape			-0.372***	-0.367***	-0.369***	-0.366***
			[0.020]	[0.020]	[0.020]	[0.021]
Northern Cape			-1.238***	-1.231***	-1.235***	-1.231***
			[0.048]	[0.048]	[0.048]	[0.048]
Free State			-0.721***	-0.712***	-0.718***	-0.711***
			[0.023]	[0.023]	[0.023]	[0.023]
KwaZulu-Natal			-0.141***	-0.137***	-0.140***	-0.136***
			[0.015]	[0.015]	[0.015]	[0.015]
North West			-0.449***	-0.447***	-0.450***	-0.448***
			[0.025]	[0.025]	[0.025]	[0.025]
Mpumalanga			-0.509***	-0.505***	-0.508***	-0.505***
			[0.029]	[0.029]	[0.029]	[0.029]
Limpopo			-0.367***	-0.364***	-0.365***	-0.363***
			[0.047]	[0.047]	[0.047]	[0.047]
Log of years of education			0.081***	0.081***	0.082***	0.081***
			[0.018]	[0.018]	[0.018]	[0.018]
Log of hours worked in			0.020	0.026	0.027	0.036
past week			0.039	0.050	0.057	0.030
Firm Size#Nagr			[0.031]	[0.031]	[0.031]	[0.051]
(Small#Nagr=Base)						
Medium/Large#NAgr						0.014
						[0.026]
Grade#NAgr ((1) #NAgr =Base)						
(2)#NAgr					0.002	-0.058
					[0.035]	[0.039]
(3)#NAgr					0.080*	-0.031
					[0.035]	[0.045]
(4)#NAgr					0.118**	0.029
					[0.042]	[0.049]
(5)#NAgr					0.054	-0.044
					[0.043]	[0.050]
Constant	5.760***	5.914***	5.925***	6.032***	5.973***	6.032***
	[0.066]	[0.069]	[0.136]	[0.138]	[0.138]	[0.139]
Observations	9468	9468	9140	9140	9140	9140
Adjusted R-squared	0.057	0.063	0.266	0.268	0.267	0.269

Source: PALMS (2010-2014) and BCDD, authors' own calculations.

Note:

Standard errors are given in parentheses *p<0.05 ** p<0.05 *** *** p<0.001



4.3.2 Quantile regression estimates

The quantile regression estimations help to confirm some of the findings from the previous analysis.

Firstly; union status, log of years of education, gender, race, province, and firm size enter the specification in a similar way to OLS for the majority of the considered quantiles. Secondly, the presence of a new bargaining council agreement is still shown to have a significant effect, but only at the lower end of the distribution; the effect is still negative, implying that a presence of a new agreement reduces the logged mass of employment, specifically below the 50^{th} percentile.

Grade and the presence of a new bargaining council agreement interacted with grade show an insignificant impact on the mass of employment than what was seen under the OLS specification, and the same can be said for the interaction between firm size and the presence of a new agreement. However, the interaction of sector and the presence of a new agreement is still shown to have a significant impact. This impact, when considering metal and engineering relative to clothing, is still shown to be positive, specifically at the lower end of the distribution, whilst textiles show a negative significant relationship in the top end of the distribution.

	Quantile 0.1	Quantile 0.25	Quantile 0.5	Quantile 0.75	Quantile 0.9
New Agreement (NAgr)					
(Base=No)	-0.114*	-0.079*	-0.065	-0.056	-0.084
	[0.052]	[0.037]	[0.034]	[0.040]	[0.060]
Sector					
Metal and engineering	-0.135*	-0.077	-0.067	-0.036	0.122
	[0.056]	[0.040]	[0.037]	[0.043]	[0.065]
Textiles	0.043	0.090	0.090	0.079	0.215*
	[0.073]	[0.053]	[0.048]	[0.056]	[0.085]
Firm size (Small=Base)					
Medium/Large	-0.030	-0.037	-0.048	-0.071*	-0.020
	[0.039]	[0.028]	[0.025]	[0.030]	[0.045]
Sector#NAgr (Clothing#NAgr=Base)					
Metal and Engineering#NAgr	0.196**	0.144**	0.121**	0.104*	0.053
	[0.062]	[0.044]	[0.040]	[0.047]	[0.072]
Textiles #NAgr	-0.067	-0.096	-0.087	-0.109	-0.243**

Table 9: Quantile estimation of the logged mass of employment, at different quantiles



	[0.080]	[0.057]	[0.052]	[0.061]	[0.093]
Grade ((1) - Least skilled = Base)					
(2) - Less skilled	0.067	0.043	0.085*	0.116**	-0.014
	[0.059]	[0.042]	[0.038]	[0.045]	[0.068]
(3) - Average skilled	0.064	0.034	0.021	0.034	-0.039
	[0.068]	[0 049]	[0 044]	[0.052]	[0 079]
(4) - More skilled	0.057	0.045	0.041	0.022	-0.157
	[0.073]	[0.052]	[0 048]	[0.056]	[0.085]
(5) - Most skilled	0.138	0.063	0.122*	0.050	-0.036
	[0.075]	[0.054]	[0 049]	[0.057]	[0.087]
Grade.NA (1.NA=Base)	[0.075]	[0.00 1]	[0.017]	[0.057]	[0.007]
(2)#NAgr	-0.048	-0.048	-0.064	-0.082	0.048
	[0.065]	[0.046]	[0.042]	[0.049]	[0.075]
(3)#NAgr	-0.071	-0.045	-0.015	-0.037	-0.017
	[0 074]	[0.053]	[0.048]	[0.057]	[0.086]
(4)#NAgr	-0.072	-0.053	-0.035	-0.005	0.204*
_	[0.081]	[0.058]	[0.053]	[0.062]	[0.094]
(5)#NAgr	-0.111	-0.067	-0.095	-0.054	-0.009
	[0.083]	[0.059]	[0.054]	[0.063]	[0.096]
Firm Size#Nagr	[0:000]	[01003]	[0100.1]	[01000]	[0.03.0]
(Small#Nagr=Base)					
Medium/Large#NAgr	0.023	0.031	0.028	0.026	0.001
	[0.043]	[0.031]	[0.028]	[0.032]	[0.050]
Union (Base=No)	-0.001	-0.03**	-0.038***	-0.024	-0.034
	[0.017]	[0.012]	[0.011]	[0.013]	[0.019]
Gender (Base=male)					
Female	-0.185***	-0.133***	-0.123***	-0.126***	-0.158***
	[0.020]	[0.014]	[0.013]	[0.015]	[0.023]
Race (Black=Base)					
Coloured	-0.112***	-0.088***	-0.079***	-0.087***	-0.163***
	[0.030]	[0.022]	[0.020]	[0.023]	[0.035]
Indian/Asian	-0.384***	-0.231***	-0.112***	-0.059*	-0.100*
	[0.035]	[0.025]	[0.023]	[0.027]	[0.040]
White	-0.141***	-0.024	0.074***	0.148***	0.086*
	[0.035]	[0.025]	[0.023]	[0.026]	[0.040]
Province (Gauteng=Base)					
Western Cape	-0.319***	-0.349***	-0.350***	-0.369***	-0.403***
	[0.032]	[0.023]	[0.021]	[0.025]	[0.037]
Eastern Cape	-0.377***	-0.301***	-0.264***	-0.313***	-0.386***
	[0.034]	[0.024]	[0.022]	[0.026]	[0.039]
Northern Cape	-1.266***	-1.222***	-1.124***	-1.173***	-1.288***
Ever State	[0.079]	[0.057]	[0.052]	[0.060]	[0.092]
r ree State	-0.677***	-0.657***	-0.707***	-0.745***	-0.755***
V-uo Z-ubu No4ol	[0.037]	[0.027]	[0.024]	[0.028]	[0.043]
wazuiu-inatai	-0.165***	-0.144***	-0.095***	-0.111***	-0.148***
	[0.025]	[0.018]	[0.016]	[0.019]	[0.029]



North West	-0.515***	-0.481***	-0.393***	-0.371***	-0.382***
Mpumalanga	[0.041]	[0.030]	[0.027]	[0.031]	[0.048]
	-0.465***	-0.503***	-0.444***	-0.461***	-0.604***
Limpopo	[0.048]	[0.034]	[0.031]	[0.037]	[0.056]
	-0.298***	-0.267***	-0.296***	-0.325***	-0.464***
Log of years of education	[0.078]	[0.056]	[0.051]	[0.059]	[0.090]
	0.148***	0.122***	0.076***	0.013	0.044
Log of hours worked in past week	[0.029]	[0.021]	[0.019]	[0.022]	[0.033]
	-0.002	-0.010	0.029	0.061	0.045
Total formal employment	[0.051]	[0.037]	[0.033]	[0.039]	[0.059]
	0.000***	0.000***	0.000***	0.000***	0.000***
Constant	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
	5.337***	5.641***	5.910***	6.454***	7.165***
	[0.228]	[0.163]	[0.148]	[0.174]	[0.265]
Observations	9140	9140	9140	9140	9140

Source: PALMS (2010-2014) and BCDD, authors' own calculations.

Note: Standard errors are given in parentheses

*p<0.05 ** p<0.05 *** p<0.001

4.3.3 Conclusions on the effects of bargaining council agreements on employment

The estimation of employment effects induced by new bargaining council agreements has added to the existing literature by exploring the topic of employment and its relationship with bargaining councils in a way that has not been done with regard to the South African labour market before. Rather than estimating the effects on employment by whether or not an employee is covered by a bargaining council, this paper utilized a sample whereby all individuals are members of a bargaining council already, and estimated the impact of updated bargaining council agreements on the mass of employment.

The results speak to the idea that the introduction of new agreements does decrease the mass of employment, thus having a negative effect on employment within the South African labour market. This magnitude of this effect has a sectoral component to it, but it does not seem to be influence by the grade (occupation) of an employee, nor by the size of the firm where an employee is hired. Conventional covariates exhibit the expected signs and magnitudes, whereby the mass of employment is directly affected by the race, gender, location, union status, years of experience, and years of education of employee.



On a holistic level, these results reinforce the finding of Magruder (2012), whereby it was stated that the existence of bargaining council agreements has a detrimental effect on South African labour market outcomes, especially that of employment. Magruder (2012) also found that this effect is more concentrated in small firms; however, this paper has found no indication of this relationship.

5. Overall conclusions

Bargaining council agreements are the outcome of a complex bargaining process. This paper set out to explore the relationship between bargaining council agreements and labour market outcomes in South Africa. By exploiting different forms of variation within the way bargaining councils assign minimum wages in their agreements, this paper was able to unpack the effects of these agreements in terms of wages and employment in the South African labour market.

Focusing on 3 sub-sectors (clothing, metal and engineering, and textiles), this paper constructed a dataset which is comprised of the minimum wages prescribed by each of the respective bargaining councils at different points in time. Matching this data with employment and earnings data from the PALMS dataset, this paper was able to estimate effects associated with bargaining council agreements.

The introduction of new bargaining council agreements is associated with a decreased mass of employment, which was shown to be around 8%. This size of this decrease is lowest in the metal and engineering industry, while clothing and textiles exhibit a similar level to each other. When interacting the grade (occupation) of an employee, and the size of the firm in which they are employed with an indicator for whether or not a new bargaining council agreement was present, the effect was shown to be insignificant – implying that the effect of the introduction of new bargaining council agreements exists only at a sectoral level, and does not differentiate between firm size, or the occupation of an employee.

This paper studied the effect of bargaining council agreements on wages in a unique way by looking at the relationship between bargaining council agreements, and the wage received by employees. This effect was estimated by regressing the difference between the reported real earnings of an employee and the prescribed minimum wage that said employee should



received on a number of covariates. This paper concludes that even when controlling for factors that influence the underreporting of real wages, this gap is large, standing at an approximate value of 42% - that is, the average employee earns 42% below their prescribed minimum wage.

These conclusions spark concern surrounding South African labour market regulation. Bargaining councils seem to be associated with the opposite of the outcomes that they aim to achieve – instead of promoting employment, the introduction of a new bargaining council agreement is shown to actually decrease employment. Furthermore, rather than having employees earn above a prescribed minimum wage, most workers still appear to be earning below their prescribed minima – inspiring the idea that the enforcement of this particular branch of labour legislation is perhaps not effective enough.

Bargaining councils are an integral part in the complex South African labour system, and they have a significant role to play in the transformation of the post-Apartheid landscape that the country finds itself in. The results from this paper, illustrate that the effects of bargaining councils in their current format are not achieving their goals of increasing wages and employment for those in the labour market that remain most vulnerable. If South Africa is to truly achieve its goals in reducing unemployment and inequality, then perhaps the bargaining council system needs to be revisited and adjusted in a way that it can truly benefit the individuals that it aims to support.



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7. Appendix A – List of current bargaining councils³⁹

Amanzi Bargaining Council Registered on 06/09/2012

Bargaining Council for the Building Industry (Bloemfontein) Registered on 17/09/1934

Building Industry Bargaining Council (Kimberley) Registered on 27/09/1945

Building Industry Bargaining Council (Southern and Eastern Cape) Registered on 16/07/1937

Building Industry Bargaining Council (Cape of Good Hope) Registered on 16/06/1944

Building Industry Bargaining Council (East London) Registered on 15/10/1948

Building Bargaining Council (North and West Boland) Registered on 13/04/1950

Bargaining Council for the Canvas Goods Industry Registered on 21/09/1921

National Bargaining Council for Clothing Manufacturing Industry Registered on 07/08/2003

Bargaining Council for the Contract Cleaning Services Industry Registered on 30/09/1992

Bargaining Council for the Civil Engineering Industry Registered on 07/12/2012

National Bargaining Council for the Chemical Industry Registered on 03/12/2001

The Bargaining Council for the Diamond Cutting Industry Registered on 19/02/1960

National Bargaining Council for the Electrical Industry of South Africa Registered on 15/12/1998

Bargaining Council for the Fishing Industry Registered on 14/12/2001

Bargaining Council for the Food Retail, Restaurant, Catering & Allied Trades Registered on 30/09/1941

Bargaining Council for the Restaurant, Catering and Allied Trades Registered on 13/07/1936

³⁹ Accurate as of May 2016



Furniture Bargaining Council

Registered on 26/04/2006

Bargaining Council for the Furniture Manufacturing Industry of the Western Cape Registered on 08/08/1958

Bargaining Council for the Furniture Manufacturing Industry of the Eastern Cape Registered on 19/02/1959

Bargaining Council for the Furniture Manufacturing Industry of the South Western Districts Registered on 23/02/1959

Bargaining Council for the Furniture Manufacturing Industry, KwaZulu/Natal Registered on 03/06/1954

Bargaining Council for the Grain Industry Registered on 27/03/1990

National Bargaining Council for the Hairdressing, Cosmetology, Beauty and Skincare Industry Registered on 14/11/2013

Bargaining Council for the Laundry, Cleaning and Dyeing Industry (Cape) Registered on 08/01/1946

Bargaining Council for the Laundry, Cleaning and Dyeing Industry (Kwa Zulu Natal) Registered on 03/03/1955

National Bargaining Council of the Leather Industry of South Africa Registered on 19/08/1934

Bargaining Council for the Meat Trade, Gauteng Registered on 01/04/1999

Metal and Engineering Industries Bargaining Council Registered on 16/06/1947

Motor Industry Bargaining Council Registered on 15/07/1952

Motor Ferry Industry Bargaining Council of South Africa Registered on 28/05/2003

Bargaining Council for the New Tyre Manufacturing Industry Registered on 19/08/1970

National Bargaining Council for the Road Freight and Logistics Industry (NBCRFLI) Registered on 11/05/1953

South African Road Passenger Bargaining Council (SARPBAC) Registered on 20/11/1998

National Bargaining Council for the Sugar Manufacturing and Refining Industry Registered on 19/05/1947

National Textile Bargaining Council Registered on 26/01/2004



Transnet Bargaining Council (National) Registered on 02/10/1991

National Bargaining Council for the Wood and Paper Sector Registered on 27/05/2005

8. Appendix B – Technical notes on bargaining councils used

National Bargaining Council for the Clothing Industry

(Registered on 07/08/2003)

- Wage agreements are broken down provincially. Province is definable within the PALMS data.
- Similar occupation descriptions exist within each province.

Employer organizations party to agreement (as of 2016):

- Cape Clothing Association
- Coastal Clothing Manufacturers' Association
- Eastern Province Clothing Manufacturers' Association
- Free State and Northern Cape Clothing Manufacturers' Association
- South African Clothing Manufacturers' Association
- Transvaal Clothing Manufacturers' Association

Employee organizations party to agreement (as of 2016):

• Southern African Clothing and Textile Workers' Union

Metal and Engineering Industries Bargaining Council

(Registered on 16/06/1947)

- Consolidated Main Agreement as well as Government Gazettes were used as the primary source of occupational information.
- Overestimation of coverage is possible, as it is not possible to extract subsectors not covered by the agreements.
- While certain subsectors were excluded by region, it was not possible to isolate these regions in the PALMS.



Employer organizations party to agreement (as of 2016):

- Association of Electrical Cable Manufacturers of South Africa
- Association of Metal Service Centers of South Africa
- Constructional Engineering Association (South Africa)
- Eastern Cape Engineering and Allied Industries Association (ECEAIA)
- Electrical Engineering and Allied Industries' Association
- Electrical Manufacturers' Association of South Africa (EMASA)
- Gate and Fence Association
- Hand Tool Manufacturers' Association (HATMA)
- KwaZulu-Natal Engineering Industries' Association
- Lift Engineering Association of South Africa
- Light Engineering Industries' Association of South Africa
- Non-ferrous Metal Industries' Association of South Africa
- Pressure Vessel Manufacturers' Association of South Africa
- Refrigeration and Air Conditioning Manufacturers' and Suppliers' Association
- South African Electro-Plating Industries' Association
- South African Engineers' and Founders' Association
- South African Fastener Manufacturers' Association (SAFMA)
- South African Refrigeration and Air Conditioning Contractors' Association (SARACCA)
- South African Post Tensioning Association (SAPTA)
- South African Pump Manufacturers' Association
- South African Reinforced Concrete Engineers' Association (SARCEA)
- South African Valve and Actuator Manufacturers' Association (SAVAMA)

Employee organizations party to agreement (as of 2016):

- Chemical, Energy, Paper, Printing, Wood and Allied Workers' Union (CEPPWAWU)
- Metal and Electrical Workers Union of South Africa (MEWUSA)
- Solidarity / Solidariteit
- United Association of S.A. (UASA The Union)



- National Union of Metalworkers of South Africa (NUMSA)
- S.A. Equity Workers' Association (SAEWA)

Textile Industry Bargaining Council

(Registered on 26/01/2004)

• No disaggregated wage exists for the 'Carpet' subsector – all employees are prescribed the same minimum wage.

Employer organizations party to agreement (as of 2016):

- South African Cotton Textile Processing Employers' Association (SACTPEA)
- South African Carpet Manufacturing Employers' Association (SACMEA)
- National Manufactured Fibres Employers' Association (NMFEA)
- National Association of Worsted Textile Manufacturers (NAWTM)
- Narrow Fabric Manufacturers Association (NFMA)
- South African Wool and Mohair Processors' Employers' Association (SAWAMPEO)
- National Textile Manufacturers' Association (NTMA)
- South African Home Textiles Manufacturers Employers' Organisation (HOMETEX)
- South African Blankets Manufacturers Employers' Organisation (SABMEO)

Employee organizations party to agreement (as of 2016):

• South African Clothing and Textile Workers' Union (SACTWU)