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DO INDUSTRIAL DISPUTES
REDUCE EMPLOYMENT?
EVIDENCE FROM SOUTH AFRICA

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Abstract

Theory predicts that an increase in employment protection may reduce employment levels by acting as a tax on firms by constraining hiring and firing decisions. We use a unique administrative database of the country's dispute resolution body—the Commission for Conciliation, Mediation and Arbitration (CCMA)—to create a nuanced and empirically based measure of employment protection for the labor market in South Africa. Drawing on district-level labor force data, we evaluate the empirical link between industrial disputes, a function of quantity and efficiency parameters of the CCMA, and employment levels in the domestic labor market. We assume a positive relationship between the number of industrial disputes and the level of employment protection in the labor market. We utilize an augmented Lazear model, where a two-stage, endogeneity-corrected, least-square model is used to predict the impact of differentially measured indices of industrial disputes on time and regional variation in employment levels in South Africa. Our estimates suggest that an increase in industrial disputes, measured both in the number of industrial dispute cases brought to the CCMA and in the efficiency levels of this body, decreases regional-level employment in the South African labor market.

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INTRODUCTION

Employment protection and its impact on the operation of labor markets have been extensively researched since the seminal work of Lazear (1990). Through the use of a cross-country panel dataset, Lazear (1990) illustrated how employment protection raised unemployment levels while reducing participation and working hours. Theoretical work suggests that employment protection, particularly dismissal costs, operates as a tax on firms by constraining hiring and firing decisions. If dismissal costs increase, employers refrain from hiring or firing workers to avoid unnecessary expenditure. Efficiency levels might also be reduced as firms are forced to retain low-productivity workers or substitute labor with capital instead of hiring new workers (Autor, Kerr and Kugler 2007). Labor demand therefore, decreases as firms are more reluctant to hire new employees in the face of higher firing costs amidst rising labor supply.

While South Africa is categorized as an upper middle-income country, the economy has one of the highest unemployment rates in the world—with an official estimate of 24.9 percent in the second quarter of 2012. This distinctive feature, together with the fact that the economy is characterized by vocal and politically strong trade unions, means that the labor regulatory environment and framework remain significant within the policy arena in South Africa. In the South African context, the literature on labor regulation and worker protection focuses primarily on perception-based evidence with little empirical research. However, attempts have been made more recently to provide a more nuanced and empirical analysis of labor regulation within South Africa. For example, Benjamin, Bhorat and Cheadle (2010) provide empirical evidence of labor market rigidity using the World Bank's Cost of Doing Business Survey (DBS) and the Investment Climate Survey (ICS). However, they do state that the DBS provides a useful, but not complete analysis of labor regulation within the economy.

In attempting to contribute to the expanding literature on the impact of employment protection on the operation of labor markets, this paper has two key objectives. Firstly, we utilize a unique administrative database to provide a more nuanced and empirically based measure of employment protection for the labor market in South Africa. We propose to measure employment protection as a function of the quantity and efficiency parameters of the country's dispute

resolution body. Secondly, we attempt to determine the impact of the employment protection measure (derived from the quantity of industrial disputes and the efficiency with which these disputes are resolved) on the South African labor market through the use of an augmented Lazear model. Regional and time-dependent data are utilized to predict the effect that increased industrial disputes have on employment in South Africa. We expect that our model will show that increased industrial disputes (reflecting higher levels of employment protection) decreases employment levels, complementing some of the cross-country work in this area (Grubb and Wells 1993; Nickell 1997; Elmeskov 1998; Heckman and Pagés 2000; Feldmann 2008).

The article is structured as follows: Section II provides a brief literature review while Section III gives a short overview of the CCMA and its function while also introducing the data utilized in this article. We present a descriptive overview of all variables used in the analysis in Section IV, while Section V describes the methodology. The econometric results are presented in Section VI. The final section, Section VII, concludes.

I. LITERATURE REVIEW

Theoretical work on the breaching of contracts started in the 1930s with Fuller & Perdue (1936). This work introduced the conceptual framework for contract law in the law and economics realm. The aim of their paper was to postulate a model for damages of contract breach. Three ways to measure damages were introduced: expectation damages, restitution interest and reliance interest. The expectation damages rule is to "give the promisee the value of the expectancy which the promise created," (Fuller & Perdue 1936) whereas the restitution interest rule strives to restore the party harmed to the position he/she was before the contract was agreed upon. The third rule, reliance interest, states that the plaintiff has confidence in the promise of damages reimbursement if the defendant changes his/her position. This rule, for example, may expect workers to repay training expenses if they leave employment early.

In the 1980s, Rogerson (1984) and Shavell (1984) merged contract law with economics even further by evaluating which damages rules identified by Fuller and Purdue (1936) lead to the most efficient level of investment when parties have made sunken investments into the relationship. Their research and an influential paper by Grout (1984) introduced the hold-up problem. The hold-up problem occurs when the buyer (employee) or seller (employer) attempts to change the terms of an agreement (i.e., the employment contract) after there have been sunken investments (e.g., the worker has relocated or firm has trained the worker) by either party. Breaching of the employment contract usually emerges in the case of the hold-up problem or when the parties have not delivered the promised quality according to the employment contract. If firms feel that workers have not performed, or workers believe that firms have not compensated or continued employment as promised, disputes arise.

In the 1990s, a new wave of studies emanating from Lazear (1990) integrated the debate of labor market regulation with the traditional economic contract law research. Botero et al. (2003) coded labor regulation in 85 countries to examine the impact of state regulation on the labor market. Labor regulation was indexed into three categories: employment laws, collective relations and social security laws. They tested each index's impact on a variety of economic variables and found that heavier regulation reduced labor force participation and increased unemployment, especially for youth. Autor et al. (2007) utilized the adoption of wrongful discharge in America as a proxy for dismissal costs and estimated the impact of it on important margins of firm behavior, namely the impact on employment fluctuations (measured in absolute year-to-year employment changes as well as quarterly production worker employment variations), the effect on firm entries and exits, changes in the log of employment, and finally the fluctuation in capital stock and total factor productivity. They conclude that the introduction of dismissal protection reduced employment fluctuations, while firms increased non-production worker employment and raised capital investments. This lead to a decline in total factor productivity suggesting that an increase in dismissal costs is associated with a reduction in firm-level efficiency. Besley and Burgess (2004) focused on the manufacturing sector in India. Their well-known results suggest that an increase in pro-worker regulation is associated with lower levels of output, investment and employment in Indian manufacturing. McLeod (2011), however, offers the most comprehensive overview of the employment protection literature to date and draws an important conclusion suggesting that there is overwhelming evidence indicating that employment protection effects are either negatively related to labor market outcomes or do not play a role in these outcomes.

As noted above, reliable economic research studying the effect of employment protection in South Africa is limited. The most comprehensive empirical research that is available has focused on regulatory impact assessment regarding amendments to the Labour Relations Act. Notably, Benjamin, Bhorat and Van Der Westhuizen (2010) attempted to provide a framework for possible economic welfare and efficiency costs and benefits associated with amendments to the Labour Relation Act of 2002. The core amendments dealt with the abuse of fixed-term contracts and repeal of labor brokering services in the labor market. The authors found that if the proposed amendment were to be implemented, unemployment would rise as a result of temporary workers losing their jobs, if employers are unwilling to incur the administrative and other costs associated with directly employing these workers. As a result, the cost of doing business in the domestic economy will increase due to higher financial costs associated with converting temporary/fixed-term contracts to permanent employment contracts. Regarding the cost of doing business, Benjamin, Bhorat and Cheadle (2010) examined the role of labor regulation in the cost of doing business in the domestic market. Utilizing the World Bank's Cost of Doing Business Survey, they attempt to use the "employing workers" indicators from the 2006 survey as a proxy for worker protection in the labor market. They found that South Africa's labor market is neither overregulated nor underregulated, yet South Africa's indices for "difficulty of hiring" and "difficulty of firing" are above the sample mean, indicating that the cost of doing business within the labor market is above average when compared with estimates for similar countries.

II. MEASURES OF INDUSTRIAL DISPUTES AND DATA

The Commission for Conciliation, Mediation and Arbitration (CCMA) was established in terms of South Africa's Labour Relations Act 66 of 1995 (LRA) (RSA, 1995). Its aim is to provide an effective and efficient dispute resolution service for disputes within its jurisdiction between employers and employees in the South African economy. Disputes referred to the CCMA can be classified into disputes of interest and disputes of rights. Disputes of interest focus on new rights and can incorporate claims for wage increases or beneficial changes to terms and conditions of employment. In turn, rights disputes deal with existing rights, for example, a rights dispute can arise from a claim by one of the parties to a dispute that their rights as set out in a contract, statute or the South African Constitution have been violated.

Industrial disputes heard by the CCMA can be resolved through one of three processes, namely conciliation, arbitration and con-arbs. The conciliation process[1] is the first phase in the dispute resolution process. It is an informal meeting between the parties involved and a commissioner who acts as a mediator to encourage the parties to settle. If a matter is unresolved at the conciliation stage, the next stage for eligible cases as per Section 191(5) of the LRA is arbitration. This process is more formal and allows both parties an opportunity to present their cases. A commissioner hears both sides of the dispute and determines an outcome based on the evidence presented. The decision of the commissioner is legally binding on the parties and resolves the dispute. Amendments to the LRA in 2002 in terms of Section 191(5A) introduced a unique dispute resolution process, namely the con-arb. The con-arb process was introduced to further improve the efficiency of dispute resolution proceedings within the CCMA, since it combines the first hearing into both a conciliation and

arbitration, thus eliminating the automatic lag between conciliations and arbitrations. The con-arb process is governed by the same rules as individual conciliations and arbitrations.[2]

Ultimately, we utilized these different processes of dispute resolution as an indicator of the prevalence of industrial disputes in the South African labor market. Both the simple annual count of disputes as well as the efficiency with which such cases are resolved serve as measures of industrial disputes prevalent in the domestic economy. In essence then, the quantity of these disputes, the type of disputes and the time taken to resolve them are utilized as proxy measures for the level and resolution of industrial disputes in South Africa. For example, we would expect that the higher number of disputes, the higher share of cases proceeding to arbitration and reduced levels of efficiency of dispute resolution to be key indicators of increased rigidity in the labor market. This increased rigidity or labor protection may in turn have negative employment effects, as firms may respond at the extensive margin.

Data

The Case Management System (CMS) is the CCMA's national administrative database which serves as a live register of all cases that have been referred to the CCMA since its establishment in 1996. Thus, details are captured for every case referred to the CCMA, regardless of the jurisdiction of the case. Since the CMS was designed for administrative purposes, once a case has been referred, a host of mainly administrative data is recorded on the CMS. This data include the details of the parties involved in the case, the date the case was referred, the reason for the dispute, the office to which it was referred, and the sectoral categorization of the case.[3] Furthermore, the CMS tracks the passage of cases that have been activated through the different

processes administered and captures the outcomes of cases, as well as any awards or compensation issued. The CMS thus contains a rich collection of administrative, case-related and outcome data for all cases that are either referred to or progress through the CCMA. It remains the most important source of dispute resolution data in South Africa.

The data from the CMS is over the period 2000/01 to 2007/8. Each case is captured individually by the CMS, however, it does not capture individual characteristics such as gender, age, education level and so on of the referring party. In order to predict the impact of industrial disputes on the domestic labor market, the CMS has to be aggregated at the regional level to match with regional labor market data available from the national labor force survey data. Each region is assigned the total number of cases, total number of cases by determinative dispute and a mean "internal inefficiency" measure.[4] In other words, all cases originating from a regional office are aggregated to create a total caseload as well as a total caseload by dispute type estimation for every regional office. The internal inefficiency measure (IIM), calculates each case's IIM and a mean estimate is assigned to each regional office for the analysis. The CCMA has 19 regional offices, including the national office. For this analysis, however, we only utilize the 13 regions that have complete data for all the years under consideration. Regional labor market data is matched with the CCMA regional offices and was obtained from the country's labor force surveys (LFS).

III. DESCRIPTIVE OVERVIEW

The initial data consist of 103 observations for 13 regions over an eight-year period between 2000/1 and 2007/08.[5] The variables collected from the CMS, LFS and Provincial Accounts[6] can be organized into four broad categories: labor regulation, economic activity, individual characteristics and employment characteristics variables. Table 1 presents the descriptive statistics for the variables used in our analysis. Between 2000 and 2007, an average of approximately 5,300 cases was heard by the CCMA every year in each of the 13 regions. The mean number of conciliation and arbitration cases heard is almost similar, with a slightly lower mean for the con-arb caseload over the period. The pooled average time to complete conciliation was approximately 38 days, while arbitrations and con-arbs were concluded within 137 and 33 days respectively. The mean internal inefficiency measure is 1.41, suggesting that over the time period, the average time to complete an industrial dispute exceeded the maximum prescribed time by 41 percent. The pooled average real GDP growth rate was 3.9 percent per annum, while real wage changes increased by approximately 2.9 percent per annum over the same period. These numbers mean that we analyze industrial dispute data over a period where the economy was growing and real wages rose steadily.

The set of individual characteristics variables shows that Africans comprise the largest proportion of the employed population with a pooled average of around 68 percent. Males dominate the workforce with a pooled average of 57 percent of all employed, whereas the majority of workers have an intermediate level of education (Completed General Education and Training [GET], Completed Further Education and Training [FET], Diploma and/or Certificate)[7]. The bulk of the employed are younger than 34 years, while only approximately 26 percent (pooled average) belong to a trade union.

The employment characteristics variable set indicates that most workers are employed in the tertiary sector and in small firms (one to nine employees). The majority of the workforce is employed in the formal sector, with the informal sector only constituting approximately 37 percent (pooled average) of those employed. Overall, then, our statistics suggest that the average worker is likely to be an African male with some form of post-secondary or secondary schooling working in a formal small- or medium-sized tertiary sector firm.

Table 2 presents the average annualized growth rates for the different industrial dispute variables based on the determinative processes as well as the growth rate in employment levels. Employment grew by an average of 5 percent per annum, clearly well below the rapid rise in con-arbs, but faster than the increase in the aggregate caseload.

As discussed earlier, the con-arb process was introduced in 2002 to improve the efficiency of dispute resolution processes within the CCMA. Therefore, it combines the first hearing into both a conciliation and arbitration. Since most cases are scheduled as con-arbs by default, it is not surprising that the number of cases set down for con-arb increased by more than 150 percent per annum between 2002 and 2007. While the absolute number of cases for each year is not shown here, the estimates for each year indicate that the steepest increase in the con-arb caseload took place between 2002 and 2003, directly after the introduction of the process. As expected, the number of cases scheduled for conciliation declined between 2000 and 2007 as a result of the introduction of con-arb. Over the 2002-2007 period, the arbitration caseload increased by just more than one percent, while the total number of cases heard by the CCMA grew by 3.5 percent. Overall employment grew at a faster rate than

Table 1: Measures of Industrial Disputes and Key Labor Market Characteristics: Descriptive Statistics		Mean (Standard Deviation)
Labor Regulation	Total Cases	5347.6 (5961.58)
	Arbitration Caseload	2120.74 (2661.25)
	Conciliation Caseload	2027.61 (2428.36)
	Con-arb Caseload	1635.62 (1969.37)
	Conciliation Mean Time	38.44 (32.4)
	Arbitration Mean Time	136.73 (73.87)
	Con-arb Mean Time	33.41 (11.53)
	Internal Inefficiency Measure	1.41 (0.64)
Economic Activity	Real GDP growth (at 2005 prices)	3.92 (1.66)
	Real Wage change (at 2005 prices)	2.9 (17.63)
Individual Characteristics (% Share in Sample)	African	67.8 (19.99)
	Coloured + Indian	13.58 (13.76)
	White	18.37 (9.98)
	Male	56.73 (5.34)
	Female	43.25 (5.34)
	Grade 0-Grade 8	5.48 (3.81)
	Completed GET(Gr9-Gr11)	26.25 (7.55)
	Completed FET (Gr12)	22.69 (3.19)

Table 1: Measures of Industrial Disputes and Key Labor Market Characteristics: Descriptive Statistics		
		Mean (Standard Deviation)
Individual Characteristics *continued* (% Share in Sample)	Diploma /Certificate	32.41 (7.38)
	Degree	8.69 (3.62)
	15-24	10.84 (2.83)
	25-34	33.47 (4.17)
	35+	55.69 (4.99)
	Trade Union	26.95 (7.6)
Employment Characteristics (% Share in Sample)	Primary Sector	11.87 (12.58)
	Secondary Sector	20.59 (6.57)
	Tertiary Sector	67.17 (9.91)
	Small Firm Size	41.53 (8.15)
	Medium Firm Size	28.42 (5.45)
	Large Firm Size	27.83 (7.7)
	Formal Sector	62.91 (12.66)

Sources: Statistics South Africa: Labour Force Survey (September 2000-2007)—Own Calculations; CMS (2000-2007)—Own Calculations

Table 2: Industrial Disputes and Employment Growth, 2000-2007	
	% Change
Total Cases	3.52
Arbitration Caseload	1.22
Conciliation Caseload	-7.59
Con-arb Caseload[1]	156.32
Employment	5.06

Notes: The average annualized growth rate for the con-arb caseload is measured from 2002 to 2007 as con-arbs were only introduced in 2002.
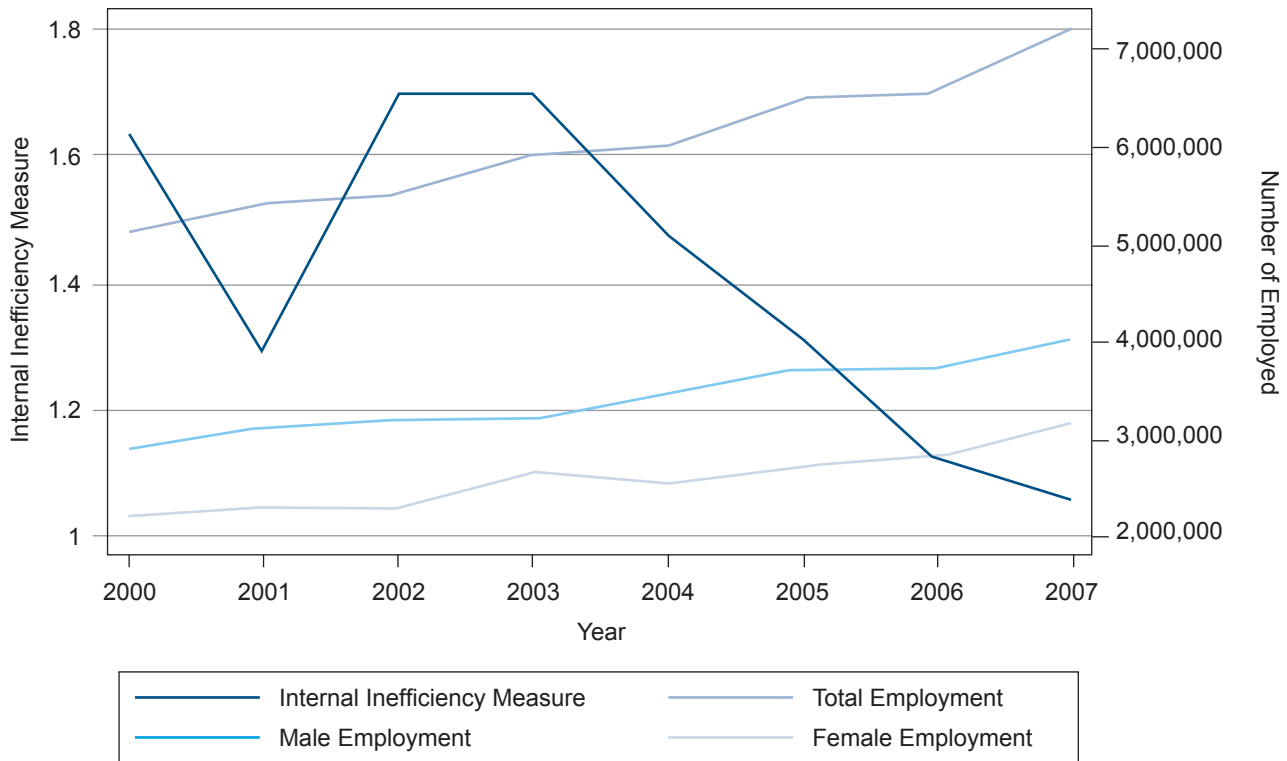
Sources: Statistics South Africa: Labour Force Survey (September 2000-2007)—Own Calculations; CMS (2000-2007)—Own Calculations

aggregate caseload while not surprisingly, con-arbs grew at a much faster rate than total employment.

Below we compare the growth in employment with the change in the average internal inefficiency measure of industrial disputes between 2000 and 2007. Between 2000 and 2003 there is no clear relationship between the changes in the IIM and employment.

However, after 2003, there appears to be a strong and negative relationship between the two variables, suggesting more efficient dispute resolution during a time of steady, positive growth in employment. This result holds true for both male and female employment. The assumed positive relationship between more efficient dispute resolution and job creation could, of course, be both strongly spurious as well as subject to significant endogeneity.

Figure 1: Mean Internal Inefficiency and Employment Levels, 2000-2007

Sources: Statistics South Africa: Labour Force Survey (September 2000-2007)—Own Calculations; CMS (2000-2007)—Own Calculations.

IV. ECONOMETRIC APPROACH

One of the difficulties when attempting to investigate the effect of industrial disputes on employment is the possibility of simultaneity between employment and industrial disputes. Industrial disputes are measured both in quantity and efficiency terms. Efficiency levels are assumed to be exogenous as the efficiency of the CCMA almost certainly depends on regional office characteristics such as staff and equipment resources. However, the number of industrial dispute-related cases is likely to be endogenous. On the one hand, higher caseloads may result in lower employment levels as high levels of disputes may be an indicator of an economic downturn. Alternatively, declining employment levels may result in more industrial and workplace disputes as the probability of disputes (particularly unfair dismissal disputes) increases. Therefore in our model here, our industrial dispute variables are potentially correlated with the error term. In this case of course, OLS would become inconsistent.

One identification strategy is to find an appropriate instrument for the endogenous regressor. We propose here to utilize the expenditure by the CCMA on each industrial dispute case as an instrumental variable. This variable measures the total costs associated with cases such as commissioner fees, venue hire, transport and telecommunication costs and so on. Our reasoning here is that we expect the expenditure on resolving disputes to be strongly correlated with the quantity of disputes, but not with the dependent variable. We utilize the method of two-stage least squares estimation with the instrumental variable to obtain consistent variables across all specifications. The model to be estimated is:

$$Employment_{i,t} = \alpha + \beta_1 A_{i,t} + \beta_2 X_{i,t} + \beta_3 S_{i,t} + \beta_4 M_{i,t} + \beta_5 P_{i,t} + u_{i,t}$$

where $Employment_{i,t}$ denotes the level of employment within district i in year t and represents the dependent variable. $A_{i,t}$ denotes the economic activity of region i in time period t through quantifying the real GDP growth rate and real wage change (both in 2005 prices) within the labor force by region i in time period t. Individual characteristics of those employed are represented by $X_{i,t}$ through detailing race, gender, age and education levels of those employed. $S_{i,t}$ denotes the nature of employment (sector, firm size and so on) by region i in time period t. The variable $M_{i,t}$ is a dummy variable representing the amendment to the Labour Relations Act in 2002. Finally, $P_{i,t}$ represents a vector of our different industrial dispute variables including total caseload, caseload by determinative process, mean time taken to complete cases by determinative process as well as an internal inefficiency measure.

The parameter of interest is the industrial disputes variable, specifically the total caseload within the CCMA. Using the two-stage least square approach to IV estimation, we regress all the exogenous variables as well as the instrumental variable on total caseloads. Thus,

$$P_{i,t} = \gamma + \beta_1 A_{i,t} + \beta_2 X_{i,t} + \beta_3 S_{i,t} + \beta_4 M_{i,t} + \beta_5 C_{i,t} + v_{i,t}$$

The parameters are estimated by utilizing Ordinary Least Squares (OLS) and the fitted value of $P_{i,t}$ from the first stage replaces the actual value of $P_{i,t}$ in the original equation. The second stage is therefore:

$$Employment_{i,t} = \alpha + \beta_1 A_{i,t} + \beta_2 X_{i,t} + \beta_3 S_{i,t} + \beta_4 M_{i,t} + \beta_5 \hat{P}_{i,t} + \varepsilon_{i,t}$$

where $\hat{P}_{i,t}$ denotes the fitted value given by the first stage regression and the error term now replaced by $\varepsilon_{i,t}$. The second stage is also calculated using OLS estimation.

The disturbance term and the constant are captured by $\varepsilon_{i,t}$ and α respectively. We assume $\varepsilon_{i,t}$ is an i.i.d. error term. Since workers in the same district council have the same spatial measures, we cluster the standard errors at the district council level to control for the potential presence of an unobserved effect on the error term. However, according to Cameron, Gelbach and Miller (2006), when data is in a region-year setting, we may want to cluster at a year level as well. This is to correct for within-year cross-regional autocorrelation in the errors. We therefore follow their approach and cluster at the year level and regional level. Finally, we also correct for small sample size as each dimension (region and year) has a small number of clusters.

V. RESULTS

The econometric results of the proposed model are presented below. Before analyzing the effect of the incidence of industrial disputes on the South African working force, we test for the robustness of our model. Stock and Yogo (2005) developed an approach to test for the presence of weak instruments reporting the Cragg-Donald F-statistic together with critical values. However, due to the use of clusters, the analog of the Cragg-Donald F-statistic, the Kleibergen-Paap Wald rk F-statistic is reported to provide a more sensible and superior estimate in the face of heteroskedasticity, autocorrelation or clustering.[8] The results of this test as well as the correlation between the regressor and instrumental variable are reported in Table 3.

It is evident that the weak identification test can be rejected as the F-statistic exceeds the critical value. This suggests that the instrumental variable satisfies the properties of being a robust instrument and is suitable for the analysis. The correlation between the independent variable (case expenditure) and the suspected endogenous variables corroborates this finding.

Table 4 presents the results of the second stage of the two-stage least square estimation. Specification III represents the full model (with all controls applied) whereas specifications I and II present the results for the model with only particular controls limiting the analysis. Specification IV, on the other hand, denotes the full model, with the industrial disputes variables lagged by one year. Specification III (the preferred specification) shows that higher levels of industrial disputes (i.e., total caseloads, total arbitration caseloads and total con-arb caseloads) are associated with lower absolute levels of employment in the South African labor market. However, total conciliation caseloads do not have

Table 3: First-stage OLS Estimates				
		Dependent	**Variables**	
Independent Variables	**First-stage OLS Total Caseload**	**First-stage OLS Total Arbitration**	**First-stage OLS Total Conciliation**	**First-stage OLS Total Con-arb**
Case Expenditure	-0.0005***	-0.0002***	-0.0002***	-8.8e-05***
	(7.18e-05)	(3.44e-05)	(4.08e-05)	(2.56e-05)
Constant	1,200*	311.8	1,096***	-203.6
	(637.9)	(297.8)	(379.3)	(412.5)
Observations	90	90	90	78
R-squared	0.944	0.936	0.858	0.898
Weak Identification test				
Kleibergen-Paap rk Wald F-statistic	45.295	42.134	21.191	.
Stock-Yogo weak ID test critical values: 10% maximal IV size	16.38	16.38	16.38	16.38

Notes: Robust standard errors in parentheses (***p<0.01; **p<0.05; *p<0.1).

Sources: Statistics South Africa: Labour Force Survey (September 2000-2007)—Own Calculations; CMS (2000-2007)—Own Calculations.

a statistically significant impact on employment. These results suggest that when examining industrial disputes in levels, over 2000-2007, they remain a significant and negative determinant of the region-specific variation in employment over this eight-year period. More specifically, if a dispute between an employer and an employee is resolved in a con-arb or arbitration, employment over time declines. However, notably, conciliation cases are not a significant determinant of employment changes over time. As discussed earlier, if a case has been scheduled for a pure conciliation hearing but not resolved during the conciliation, it proceeds to arbitration. While conciliation is an informal process where the

commissioner meets with the parties to explore ways to settle the dispute by agreement, arbitration is more formal. Both parties are provided with an opportunity to formally present their cases and can be represented by a trade union or employer organization. Witnesses can be called and in some cases legal representation is allowed. Pure arbitrations can also be heard in more than one session. It is therefore not surprising that higher levels of the longer, more complex process are associated with lower levels of employment.

The con-arb process combines the first hearing into both a conciliation and an arbitration. The statu-

Table 4: Two-stage Least Square Estimation Results				
		Dependent	Variables	
Independent Variables	I	II	III	IV
	Number of Employed by District and Time	Number of Employed by District and Time	Number of Employed by District and Time	Number of Employed by District and Time
Total Cases	-1.52**	-1.05*	-1.05*	-0.71*
Arbitration Total Caseload	-3.14**	-2.12*	-2.11*	-1.55*
Conciliation Total Caseload	-4.62**	-3.0	-2.95	-1.46*
Con-arb Total Caseload	-5.97**	-4.72***	-5.35**	-6.76
Conciliation mean time	-130.2	-86.2	-71.5	-71.5
Arbitration mean time	-43.01	-20.6	-21.2	-21.2
Con-arb mean time	-7.32	-33.0	-57.0	-57.0
IIM	-5.1**	-2.8***	-2.7**	-8.0
Economic Activity Controls	Yes	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes	Yes
Employment Type Controls	No	Yes	Yes	Yes
Other Controls	No	No	Yes	Yes
Industrial Disputes Variables Lagged	No	No	No	Yes
Prob (F)-statistic	0.0255	0.0021	0.0121	0.0111

Sources: Statistics South Africa: Labour Force Survey (September 2000-2007)—Own Calculations; CMS (2000-2007)—Own Calculations.

Notes: Robust standard errors in parentheses (***p<0.01; **p<0.05; *p<0.1) In terms of validity of the model, the F-statistic estimates indicate that the null hypothesis[9] cannot be rejected and thus that the regression have validity in the fitting of the data. The R-squared is not presented as Wooldridge (2008) states that this measure in the IV context does not explain the "percentage of variation" and thus makes the analysis of the R^2 statistics difficult to interpret.

tory maximum time to complete a con-arb is only 30 days, meaning that if a case is set down for a con-arb, and it proceeds to the arbitration phase, the arbitration process has to be completed in a significantly shorter timeframe than a "pure" arbitration. Previous work by Goga and Van der Westhuizen (2010) suggests that some stakeholders (particularly employers) are not supportive of the con-arb process. Employers have to prepare for both the conciliation and arbitration phases of the con-arb process since they cannot *a priori* tell whether a matter will be resolved by conciliation. They also have to prepare for the more complex arbitration phase of the con-arb, committing both human and financial resources to the process. Employers' perceived resistance against the con-arb process might explain part of the relatively large negative relationship between con-arb caseloads and employment levels.

The second telling result is that the internal inefficiency measure—a measure of the inefficiency of dispute resolution—likewise reduces employment within the South African labor market. The results indicate that if the IIM increases by 1 percent, employment will decrease by 2,702 workers. In other words, the regression estimates of the IIM indicate that if the dispute resolution body of South Africa becomes less effective in dealing with industrial action disputes, employment losses potentially follow. The IIM is important in that it is an indicator of the speed of dispute resolution. A high quantity of industrial dispute cases may not matter for employment levels, if they are all speedily resolved. The results here suggest that the efficient resolution of industrial dispute cases matter significantly for employment creation. Even conditional on the number of these disputes then, efficiency parameters do matter. In a more generic sense, this result reinforces the importance

of efficient and effective labor market institutions in reducing undue rigidities in the labor market.

Finally, the results of lagging the industrial dispute variables by one year (specification IV) mirror those of specification III. This negative relationship between lagged caseloads and employment levels indicates that employment in year *t+1* is still affected by the caseloads in year *t.* This is an indication that sticky contracts in the labor market engender labor market rigidities. These rigidities create a labor market characterized by sluggish adjustments from employers in reaction to intractable industrial disputes. Put differently, employment adjustments on account of increased levels of industrial disputes are delayed due to labor market rigidities within the South African labor market.

The regression estimates therefore suggest that different measures of industrial disputes in terms of the number of cases brought to the CCMA and the efficiency levels of the CCMA significantly decrease district-level employment in the South African labor market. As reported by Autor et al. (2007), this decrease in employment is not unusual. The increase in industrial dispute cases results in a rise in short-run adjustment costs for firms. This change in adjustment costs impacts the firm's choice of capital and labor inputs, thus forcing productivity optimization with a different technology mix. In other words, firms increase capital investments and raise skilled worker employment to achieve optimal factor productivity.

Given the above, our analysis suggests that employers in the South African labor market may view the high volumes of arbitrations and con-arbs as a signal for potentially higher short-run adjustment costs. Employers may therefore substitute labor for capital investment to evade the higher costs associated with attempting to fire or retrench workers.

VI. CONCLUSION

This article makes two contributions. The first is to exploit an unusual dispute resolution database to provide a more nuanced and empirically based measure of industrial disputes for the labor market in South Africa. This was done by suggesting that industrial disputes can be measured by the number of cases brought to the CCMA as well as the efficiency of the CCMA's dispute resolution processes. Efficiency was measured not only by mean turnaround times, but also through an internal inefficiency measure. The second contribution was to consider the effect of the quantity of industrial disputes as well as the efficiency of the CCMA on employment levels of South Africa.

The findings of the employment estimates are twofold: Firstly, that the number of cases brought to the dispute resolution body on aggregate has a detrimental impact on employment—although this result holds only for arbitrations and con-arb cases. Pure conciliation cases do not appear to have any impact on employment levels. This finding suggests that employers reacted negatively to more advanced dispute resolution processes as well as more complex processes, while simple conciliation cases brought no adjustment at the extensive margin. Likewise, the estimates suggest that the labor market is characterized by sticky contracts causing lagged adjustments within the domestic labor market. Secondly, efficiency levels of the dispute resolution body within the South African labor market are imperative to job creation and job destruction. It needs to be stressed that an efficient labor market dispute resolution organization does have significant impacts on employment and must therefore be monitored in order to minimize employment losses.

There exists empirical and theoretical evidence that a rise in industrial disputes court cases is associated with a decrease in employment levels and the evidence here suggests that the South African labor market is no different. Ultimately then, this paper suggests that the degree, level and efficiency of resolution of labor disputes in South Africa matter significantly for employment creation. For an economy as starved of jobs as South Africa is, this finding does suggest the need for at least an improved and more efficient dispute resolution body to minimize the policy risk to employment generation.

VII. ENDNOTES

1. The CCMA attempts to reduce cases falling under the major processes of conciliation and arbitration by engaging in pre-conciliation, which is a telephonic attempt to resolve a given case. If pre-conciliation fails, conciliation will be conducted by the CCMA.

2. Before the introduction of the con-arb, a new date had to be set for the arbitration process if a matter was not resolved during the conciliation. Parties have 90 days to apply for arbitration.

3. Appendix A1 provides more details on the data adjustments that were made, for example, the CMS data does not capture skills or occupation types of workers.

4. We utilize the actual time period (number of days) it takes to complete a case, and divide it by the maximum prescribed time to obtain an internal inefficiency measure. Thus if the IIM estimate is higher than one, it indicates that the actual time period or number of days it took to complete the case was longer than that of the maximum prescribed time. The statutory maximum time prescribed by the CCMA for the determinative processes is 30 days for conciliations and con-arbs and 60 days for arbitrations.

5. In 2000/1, the Tshwane regional office was omitted from the analysis due to lack of data.

6. Information regarding the regional Gross Domestic Product was obtained from the Provincial Accounts for each region.

7. Grade 0 to Grade 8 = Up to 8 years of schooling
Completed GET = Completed Grade 9, 10 or 11
Completed FET = 12 years or completed secondary schooling
Diploma/Certificate = Any post-secondary diploma or certificate

8. The null hypothesis being tested is that the estimator is weakly identified.

9. The null hypothesis is that the full model is true—that all of the regression coefficients are zero.

10. The starting date of a case refers to the date that the case proceedings started, the activation date refers to the date that the case was activated on the CMS, and the end date captures the date of finalization of the proceedings.

11. The activation date on the CMS will therefore be after the start date (which captures the start of the proceedings) or end date (which captures the date of finalization of the proceedings).

12. The Ekurhuleni office had too small a sample size to include in the analysis. Cases from the CCMA head office were excluded on the basis that the head office mostly deals with difficult and problematic cases, which are often also high-profile cases. These cases are frequently time-consuming, which distorts the outcome of efficiency analysis.

13. For example, a case in Gauteng was activated on the October 23, 2000 but proof of service was only received on the January 25, 2001. The case was hence started on the of January 25, 2001. Outstanding documents and nonattendance caused the case to carry on until August 2007, where it was dismissed due to nonattendance by both parties.

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VIX. APPENDIX

A1: Data Adjustments

We received the CMS data in its raw form, without any aggregation. In other words, all case details between 2000 and 2007 were given to us by the CCMA. However, as we only needed aggregated (by region and year) data, we had to make some data adjustments to the raw dataset before aggregating the data accordingly.

There were 57 entries which had incomplete data. These entries were omitted as they had missing information that is vital to the analysis. Also, starting, activation and end dates have to be captured on the CMS database.[10] Unfortunately, this is not always the case. The database is designed to record a default date in case of missing entries. This default date corresponds to 1970. It was decided to omit all default date entries, as they will provide a distorted view with the efficiency measure analysis. Likewise, occasionally a case is activated on the CMS database after the process has begun or has been finalized.[11] If this occurs, a case can have a negative start to completion time (measured in days) which interferes with efficiency analysis. In the event of negative efficiency time, it was decided to replace the activation date with the start date. What this essentially means is that if a case is activated after its starting date (as stated on the CMS database), the activation date is ignored and the starting date is used as a point of reference for efficiency measures.

The CMS also captures sectoral and regional data. With regards to sectoral data, if no sector is recorded on the CMS, a default sector named "other" is recorded automatically by the system. The decision was made to omit all cases with "other" as a sectoral segregation. Data from the head office as well as the Ekurhuleni office were also dropped for the analysis.[12]

Likewise, 0.3 percent of the data displayed an internal inefficiency measure of 10 or more. Upon investigation, it was found that a miniscule percentage of cases recorded a starting and end date that differs immensely. However, these time differences are due to extraordinary circumstances.[13] The decision was taken to eliminate all cases with an inefficiency measure of 10 or more—therefore all cases that took ten times longer than the prescribed time to complete. Lastly, it needs to be emphasized that the con-arb process was introduced in 2002, and therefore there is no data for 2000 and 2001. There are only a small number of entries for 2002, but as the years proceed, the number of cases increased.

After the adjustments, we aggregate the data by region and year to generate a new dataset consisting of total number of cases and mean efficiency statistics for each regional office across the time period for final use in the analysis.