OCCASIONAL PAPER NO 164

Governance of Africa's Resources Programme

November 2013

Marikana as a Tipping Point? The Political Economy of Labour Tensions in South Africa's Mining Industry and How Best to Resolve Them

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ABSTRACT

Before 16 August 2012, the platinum-mining South African town of Marikana was still largely unknown outside the mining sector. On that fateful day, everything changed. A toxic cocktail of a brutal police force and grievance-mobilised workers resulted in the death of 34 striking mineworkers.

Tragedies such as Marikana tend to catalyse change – a potential tipping point on the trajectory of South Africa's political economy. Given the salience of labour–employer and inter-union labour tensions as precipitating factors to Marikana, the paper asks what an optimal resolution of these tensions might look like for the sake of the industry and those it employs. It also suggests how such an outcome could plausibly be achieved within the existing parameters of de facto power in South Africa's mining game.

The paper contends that that there is a statistically significant negative relationship between labour tensions and mining investment attractiveness, controlling for commodity price increases and corruption. It also finds that the institutional context in South Africa's mining sector currently creates incentives for unions to value violence and unprotected strikes over co-operation. The incumbent National Union of Mineworkers has a distinct interest in maintaining legislation that effectively crowds out union competition. Negotiations between mining houses and competing unions are characterised by a classic prisoners' dilemma (PD), with players being held hostage by their relative constituents from arriving at a mutually beneficial outcome.

Finally, the paper shows how this PD can be transformed into an assurance game through attaining a focal point such that co-operation is valued over violence. This would undergird sustainable performance in the mining industry in the long run that maximises employment, the benefit of which cannot be overstated in the South African context of poverty and inequality.

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ABBREVIATIONS AND ACRONYMS

AG	assurance game
AMCU	Association of Mineworkers and Construction Union
ANC	African National Congress
AS	annual salary
BG	Bowman Gilfillan
CBF	collective bargaining forum
CCMA	Council for Conciliation, Mediation and Arbitration
COM	Chamber of Mines
COSATU	Congress of South African Trade Unions
DA	Democratic Alliance
DMR	Department of Mineral Resources
FASMI	Framework Agreement for a Sustainable Mining Industry
FDI	foreign direct investment
FIFA	first in, first assessed
GDP	gross domestic product
IMF	International Monetary Fund
LRA	Labour Relations Act
MPRDA	Mineral and Petroleum Resources Development Act
NA	National Assembly
NDP	National Development Plan
NUM	National Union of Mineworkers
PD	prisoners' dilemma
SIMS	State Intervention in the Minerals Sector
UG	ultimatum game
WEF	World Economic Forum

INTRODUCTION

Prior to the arrival of the platinum mines, Marikana was of little significance to the outside world. Before 16 August 2012 it was still largely unknown outside the mining sector. On that fateful day, everything changed. A toxic cocktail of a brutal police force and grievance-mobilised workers – combined with co-ordination failure and information asymmetry on both sides of that divide – resulted in the death of 34 striking mineworkers. A number were shot in the back. Eighteen years into democracy, this tragic event elicited memories of the 1961 Sharpeville massacre, a pivotal event in the fight against apartheid South Africa. Mining sociologist, Philip Frankel, put it this way:[1]

> As at Sharpeville, the Marikana dead consisted not only of those who died in the first volley of gunfire, but also those who were wounded, lay helpless on the ground and were executed in what appear to be coups de grace. […] Much as was the case at Sharpeville, police at Marikana sealed the massacre site and then cleared the fallen. […] Much again like Sharpeville, Marikana represents a watershed with implications that spill far beyond the narrow geography of a mine in an erstwhile unknown town in the North Western veld.

Tragedy tends to catalyse change. Marikana is such a tragedy – a potential tipping point[2] on the trajectory of South Africa's political economy. It stands as an elucidation of South Africa's tectonic fault lines two decades into its democratic dispensation: 'Marikana is less about a single massacre with all its horrible specifics, and more about a fundamental degenerative process in mining and in civil society in general'.[3]

Given the salience of labour–employer and inter-union labour tensions as precipitating factors, the paper seeks to accomplish two things. First, it asks what an optimal resolution of these tensions might look like for the sake of the industry and those it employs. Second, it suggests how such an outcome could plausibly be achieved within the existing parameters of de facto power in South Africa's mining game.[4]

Section one reviews the recent performance of South Africa's mining sector. Over the last decade, although competing mining jurisdictions have grown at rapid rates, South Africa's has contracted despite possessing by far the world's wealthiest proven mineral reserves.

Section two provides a brief quantitative analysis of the relationship between South Africa's declining attractiveness as a mining-exploration investment destination, and labour market inefficiency.

Section three describes the institutional context that sets the mining 'rules of the game'. The Mineral and Petroleum Resources Development Act (MPRDA, No 28 of 2002) and the Labour Relations Act (LRA, No 66 of 1995) – with their respective recently tabled amendments – arguably create policy uncertainty that crowds out responsible players and encourages rent seeking, inducing moral hazard.[5]

Section four argues that wage negotiations between mine unions and employers are best understood as a two-level game framed by the institutional context outlined in section three. Institutional arrangements and their associated payoff structures encourage players to behave in ways that are individually utility maximising (rational) but mutually suboptimal in the final analysis.

Section five summarises the findings of the analysis and their consequent policy implications. Methodologically, the analysis draws on econometric tools and political economy work known as analytic narrative,[6] an iterative process of transitioning from narrative (and empirical data) to formal (game-theoretic) analysis, and back, until a cogent explanation is found. The paper concludes by emphasising the most important observations.

PERFORMANCE OF SOUTH AFRICA'S MINING INDUSTRY

Mining still constitutes up to one-fifth of the South African economy (including indirect effects); contributes ZAR 468 billion to gross domestic product (GDP), more than half of all export earnings; and provides employment to more than 1.3 million people.[7] Mining law expert, Peter Leon, notes that in 2008 South Africa still ranked fifth in the world in terms of mining's contribution to GDP.[8] In 2011 Citigroup valued South Africa's in situ mineral resource wealth at $2.5 trillion, the largest in the world (Russia comes in second with a mere $1.6 trillion).[9] Despite this impressive endowment, the industry stagnated in terms of its contribution to GDP during the longest sustained commodity boom in recent history. Citigroup estimates too that South Africa's rate of new investment growth is the lowest of any significant mining jurisdiction in the world.

South Africa has declined markedly in the Fraser Institute Survey,[10] which ranks the attractiveness[11] of mining exploration investment destinations. From being 14th in the world in 2002 (out of 45), the country is now ranked 63rd (out of 96) overall. Chile, on the other hand, a comparable jurisdiction, ranks 23rd. South Africa ranks 47 places behind Botswana in the 2013 survey and has the dubious distinction of scoring worse than 71 other countries on corruption. It ranks 84th under 'Growing uncertainty in mining policy and implementation'.

The Statistics South Africa mining bulletin of April 2013 reveals that South Africa's volume of mining production index declined 12%, from 108.3 in 2007 to 95.8 in 2012 – using 2010 as a base year index of 100.[12] According to the National Development Plan (NDP), South Africa's mining industry contracted at an average rate of 1% per year between 2001 and 2008, whereas South Africa's top-20 competitors grew at an average rate of 5% per year.[13] Chile experienced 12% growth in value added to GDP during that same time and average investment growth in South Africa was 7%, while in Australia it was 24%. The NDP projects that the creation of 300 000 jobs in the minerals sector by 2030 is possible even though the document acknowledges the challenges facing the sector.

Despite the wealth endowment beneath the soil, the mining industry is not performing. Part of the explanation is that minerals are exhaustible. South Africa has been mining commercially since the late 1800s; the quality of ore is decreasing at the same time as it becomes increasingly difficult and expensive to access. Nonetheless, the policy and political context in which miners operate is increasingly uncertain and complex, not least due to the ruling coalition's perceived penchant for some form of 'resource nationalism'.[14] Members of the ruling African National Congress (ANC) executive have been careful to dispel notions that the government is in favour of outright mine nationalisation. The State Intervention in the Minerals Sector (SIMS) document commissioned by the party in 2012

favours other forms of resource nationalism, however, the exact constituents of which are still being decided.

Policy uncertainty is partly fuelled by this debate over resource nationalism and the extent to which it is reflected in recently tabled amendments to the MPRDA. This uncertainty partly explains South Africa's poor mining performance during a global commodity boom. However, labour market inefficiency, corruption and infrastructure constraints are hypothesised as the other key explanatory variables.

LABOUR MARKET INEFFICIENCY AND MINING INVESTMENT ATTRACTIVENESS

In the latest Fraser Institute Survey referenced above, South Africa ranks 93rd on labour regulation, ahead of only Venezuela, Egypt and Colombia. The proportion of country respondents who said that they would not pursue investment in South Africa at all owing to this factor (as opposed to viewing it as a mild or even significant deterrent) was comparatively higher than in any other country.

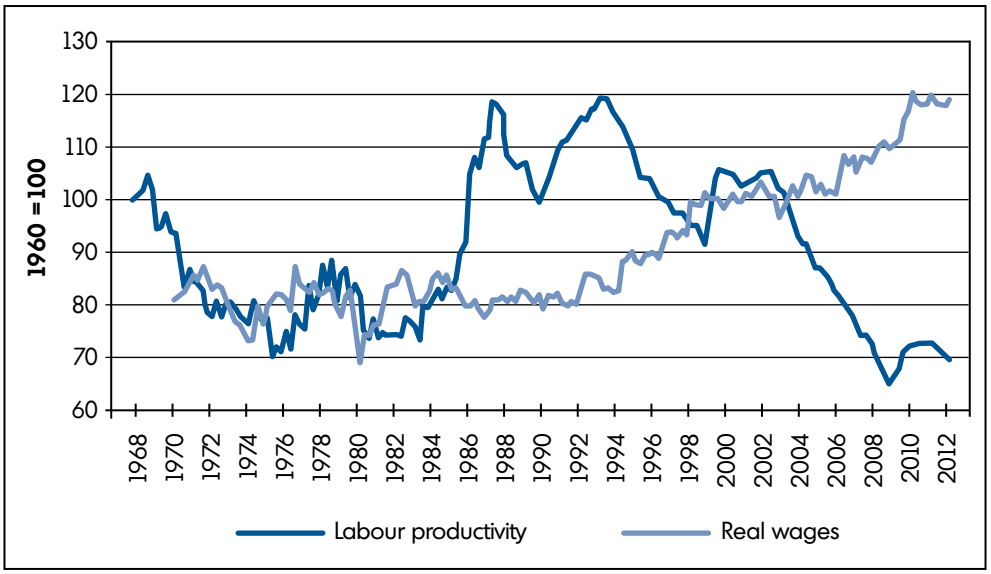
The latest Global Competitiveness Report by the World Economic Forum (WEF),[15] which examines 144 countries, ranks South Africa as the 52nd most-competitive economy overall, but notes that:[16]

> In order to further enhance its competitiveness, the country will need to address some weaknesses. South Africa ranks 113th in labour market efficiency (a drop of 18 places from last year), with rigid hiring and firing practices (143rd), a lack of flexibility in wage determination by companies (140th), and significant tensions in labour-employer relations (144th).

The second-highest proportion of respondents (18.5%) identified restrictive labour regulations as the most significant obstacle to doing business in South Africa, whereas the highest proportion (19.7%) identified an inadequately educated workforce as their primary obstacle. The WEF survey ranks the overall quality of South Africa's infrastructure at 58th in the world, suggesting labour as a more significant concern (in relative global terms) for improving productivity performance than infrastructure per se. However, the World Bank's *Ease of Doing Business Report* (2013) ranks South Africa 150th out of 185 countries surveyed on 'getting electricity' for small and medium-sized businesses. Comparatively, Botswana ranked 90th.[17] Infrastructure constraints are a key component of the composite investor attractiveness index employed as the dependent variable of the quantitative analysis.

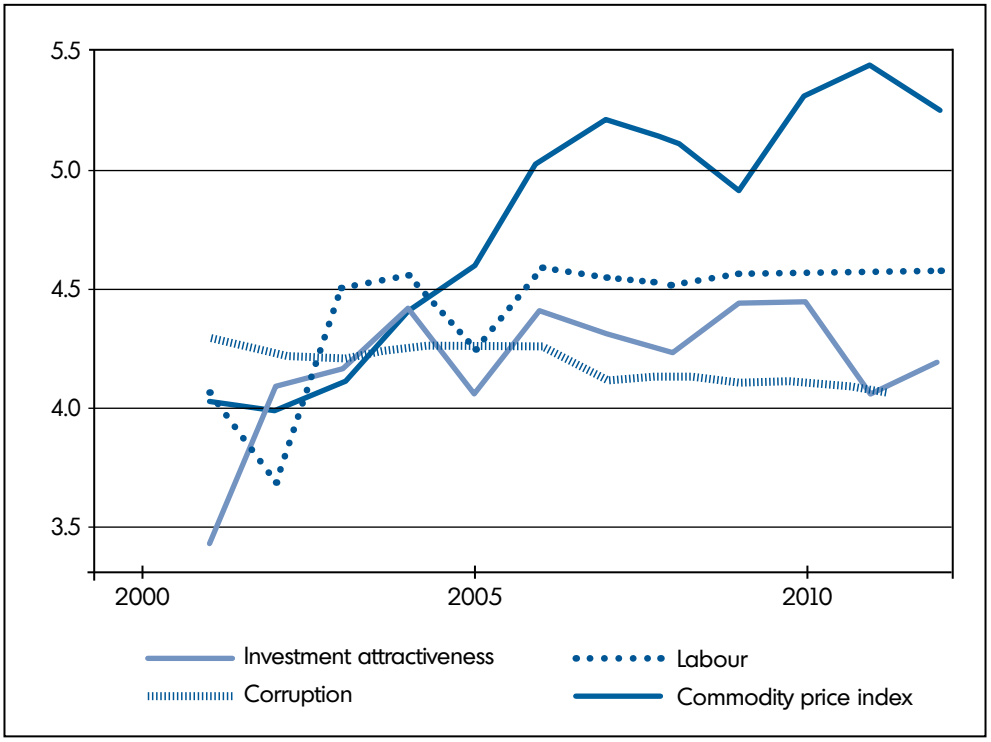
A recent graph in the *Financial Times* (Figure 1) depicts the relationship between worker productivity and the increase in real wages in South Africa since 1968.

Figure 1: Pay versus productivity in the South African economy, 1968–2012



Source: Adcorp, *Adcorp Employment Index*, July 2013, http://www.adcorp.co.za//Documents/Adcorp%20Employment%20Index%20-%20201308%20(2).pdf.

Figure 2: South Africa's labour market inefficiency and mining investment attractiveness, 2002–12



Source: WEF, Global Competitiveness Index. Geneva: WEF, 2012/13; Fraser Institute, *Survey of Mining Companies*. Vancouver: Fraser Institute, 2012/13; IMF (International Monetary Fund), *IMF Commodity Price Index*. Washington, DC: IMF, 2013.

Figure 2 indicates a rapid decline in South Africa's labour market efficiency[18] in the early 2000s and a mixed performance in overall mining attractiveness during the recent commodity boom (depicted by the unprecedented rise in the commodity price index). Mining attractiveness improves when its slope declines,[19] similarly to corruption and labour market efficiency. Worsening labour market efficiency appears to be strongly associated with worsening mining investment attractiveness, especially from 2002–07. Given the importance of labour to the mining sector, the relationship is unsurprising.

The statistical extent to which labour market inefficiency influences mining attractiveness can, however, only be credibly established through a time-series regression analysis that controls for other potentially confounding factors. A Prais-Winsten model[20] is worth considering:

$$\ln(lnvAtt)t = \beta 0 + \beta 1 \ln(LabSco)t + \beta 2 \ln(CommPricelnd)t + \beta 3 \ln(Corr)t + \varepsilon t$$

The dependent variable *InvAtt* captures mining investment attractiveness; *LabSco* is South Africa's labour score index in terms of labour market efficiency; *CommPriceInd* is the commodity price index, *Corr* is corruption; and ε is the error term.[21] The natural log (ln) has been taken for each index. A country's institutional and regulatory framework is an important determinant of foreign direct investment (FDI) in general. Judicial independence and labour market flexibility are significantly associated with FDI inflows, depending on the sector of the investment.[22] The hypothesis in the above model is thus that a declining labour market efficiency score will result in a declining mining investment attractiveness score, holding all other factors constant.[23]

From 2002–12, the model yields the following results (Table 1).

Table 1: Impact of labour market efficiency on mining investment attractiveness

	Corruption control	No corruption control
	Mining investment attractiveness (ln)	Mining investment attractiveness (ln)
Labour market efficiency (ln)	0.808[a]	0.811[a]
	(2.78)	(2.71)
Commodity price index (ln)	-0.0863	-0.0763
	(-0.47)	(-0.55)
Corruption index (ln)	-0.406	
	(-0.39)	
Constant	2.768	0.988
	(0.56)	(1.11)
Observations	11	12

Note: Coefficients in line 1 for each variable; t-statistics in parentheses in line 2.
a = p < 0.05; b = p < 0.01; c = p < 0.001.

Source: compiled by author.

The sign for *LabSco* is in the expected direction, significant at the 5% level. A ceteris parabus one-percentage point decrease in labour market efficiency decreases mining investment attractiveness by 0.808% (controlling for corruption) and 0.811% without the control (though the t-stat is slightly less powerful). Mining attractiveness improved slightly as the commodity price index climbed substantially. Likewise, an improvement in South Africa's corruption index had a slight positive effect on mining attractiveness. Corruption perception is included as an explanatory variable[24] because studies show that it can be a significant deterrent to FDI in general, of similar impact to substantial changes in tax rates applied to foreign firms.[25] However, neither of these last two results is statistically significant. It is also too early to understand the impact of Marikana on this relationship per se. Either way, labour market inefficiency evidently has a destructive effect on mining investment attractiveness.

INSTITUTIONAL CONTEXT AND PLAYERS' INCENTIVE STRUCTURES

Labour unions, workers and firms all operate under the ambit of the country's institutional context. Institutions are best understood as the rules of the game – 'the humanly devised constraints that structure political, economic, and social interactions'.[26] They are distinct from organisations (which are merely one type of decision-making player on the field) and serve to reduce the transaction costs associated with economic exchange by providing credible commitment (often in the form of independent third-party enforcement) that investment contracts will be honoured. Political institutions are especially important for understanding development in a resource-wealthy context. As Robinson, Torvik and Verdier argue, 'the political incentives that resource endowments generate are the key to understanding whether or not they are a curse'.[27]

South Africa's general institutional context is increasingly characterised by 'competitive clientelism',[28] with ruling party elites seeking to both extend their patronage network[29] and to change the de jure rules to reduce the transaction costs of rent extraction. Recent amendments to the MPRDA may provide evidence in respect of the latter. The picture with regard to labour legislation is not as straightforward, though the end result appears to confirm the same. We begin with the latter.

On 17 December 2010 the South African government gazetted the Labour Relations Amendment Bill. The bill sought to increase ministerial discretion to the point where the minister may unilaterally publish changes in regulations and issue codes of good practice. The bill has since traversed the constitutionally mandated processes of public hearings and amendments, arriving back in parliament in June 2013, significantly improved. The preamble's stated intention was that the LRA be amended to facilitate the granting of organisational rights to trade unions that are sufficiently representative and to 'require the holding of ballots by trade unions and employers' organisations prior to calling a strike or lock out'.[30] A number of specific amendments verified this intention, most notably to section 64 of the principal Act. A strike would be legally protected only 30 days after a dispute being declared unresolved by an arbitration committee, and even then only on condition that the union had:[31]

> conducted a ballot of its members in good standing who are entitled to strike or lock-out in terms of this section in respect of the *issue in dispute*; and a majority of the members of the *trade union* or *employers' organisation* who voted in that election have voted in favour of the *strike* or *lock-out*.

The opposition party in parliament, the Democratic Alliance (DA), fought for a repeal of section 18 of the original LRA. This section allowed majority unions and employers to decide on representativeness thresholds for unions to attain organisational rights. Similarly, they proposed that section 26 be repealed, as it fosters a de facto 'closed-shop' arrangement between the officially recognised union and a given firm. Functionally, smaller unions are excluded to the detriment of potential benefits to be derived from more inclusive bargaining. The DA proposed instead a minimum level of threshold representation, though it did not specify a figure.

At the June 11 2013 Labour Portfolio Committee meeting, the ANC majority voted against the introduction of 'balloting', favouring instead union bosses dictating strike action on behalf of workers. Following a failed National Assembly (NA) Rule-254 application to the speaker to have their amendments included in the bill before the house, the DA staged a walkout on 20 June, leaving parliament with too few members to attain quorum for the amendment bill to be voted on.[32]

On 21 August 2013 a refined amendment bill reappeared before the NA, which excluded the 2012 Amendment Bill's references to balloting, and passed. In an attempt to minimise the negative effects of de facto majoritarianism, though, section 21 modified section 18 of the original Act to allow a non-majority union to request the Council for Conciliation, Mediation and Arbitration (CCMA) to grant organisational access to the workplace.[33] Despite the recognised need for reform, the amended section may still constitute a breach of the constitutionally enshrined right to freedom of association.

Balloting (amended sections 64 and 67) and the repeal of sections 18 and 26 of the LRA would have democratised labour relations significantly. John Brand,[34] labour law expert from law firm Bowman Gilfillan (BG), has argued for the introduction of balloting since before 1994, both for the sake of recognising workers' real preferences and for democratising the institutional framework for bargaining. It was originally designed to limit violence and intimidation in labour relations. Voting against balloting represents an about-turn from the ANC, presumably to pacify Tripartite Alliance partner, the Congress of South African Trade Unions (COSATU), in the run-up to 2014 elections.

South Africa's industrial bargaining structures are highly centralised. The original LRA, for instance, removed the legal duty to bargain at enterprise level,[35] though this had been a central imperative of negotiations prior to its enactment in 1995.[36] Bargaining now occurs at industry level, except in the platinum sector where it occurs at company level. Consequently, unionists have metamorphosed into bureaucrats who engage in collective bargaining relatively infrequently. Brand writes that he would be inclined to collapse the centralised bargaining system or institute an absolute rule that only *minimum* wages can be fixed at centralised level and the market should dictate at enterprise level.[37] Despite the strength of his case, the Chamber of Mines (COM) argued at the Mining Lekgotla[38] in August 2013 for a move toward centralised industry-level bargaining in platinum.[39] Economic evidence ubiquitously indicates that this produces adverse effects in the long run. Lars Calmfors and Jon Driffill show that the 'worst outcomes with respect to

employment may well be found in systems with an intermediate degree of centralisation […] in intermediate cases, unions can exert some market power but are led to ignore the macroeconomic implications of their actions'.[40]

In relation to Marikana specifically, labour expert Gavin Hartford opines that even company-level collective bargaining processes failed to detect the signs of discontent at shaft-level and address their causes. Union recognition and bargaining arrangements have, in the absence of enterprise-level bargaining, become increasingly characterised by a practice of a de facto union majoritarianism in which the majority union bargains on behalf of all unionised employees. The practice is undergirded by a high degree of bargaining centralisation at commodity sector or company level, through which companies rely on the majority union to manage employee expectations. In some instances, bargaining units have merged to create a semi-closed shop environment for the majority union. This effectively excludes other legitimate players by raising the recognition thresholds for minority unions to gain entry. Most importantly, this arrangement requires an agency fee to be paid by non-union employees to the coffers of the majority unions pro rata on their membership representation.[41]

Such a prize constitutes a strong incentive for the winning union to eschew attempts to democratise bargaining arrangements. Unions campaigning for membership on a democratisation ticket are therefore likely to reverse their position if they attain incumbency. Centralisation also tends to focus on wages to the exclusion of other concerns such as conditions of employment. The LRA gave statutory legitimacy to this centralisation through sections 26 and 18, which allow firms to set threshold levels for a union to gain official recognition from management to negotiate wage and labour settlements. Anglo American Platinum, for instance, requires a minimum representation of 40% at any particular mine, and an average minimum representation of 30% throughout the group, before it grants bargaining rights to a union. This reduces the transaction costs of bargaining for firms and the majority union, but has created a number of unintended negative consequences. Nicoli Nattrass and Jeremy Seekings put it this way:[42]

> Trade union organisers have an incentive to keep the industrial bargaining system as it allows them to set industry-wide wages by organising in the larger firms which are also more likely to buy into high-wage, high-productivity deals. Big business also has an incentive to participate in the system as it serves to eliminate competition from lower-wage, more labour-intensive enterprises.

According to Hartford, 'the end result [of centralised bargaining] was that after a long process of largely stable collective bargaining institutions, the negotiating parties led themselves into an illusionary co-dependent comfort zone'.[43] The illusion was shattered when unprotected ('wildcat') strikes broke out across the platinum belt in February 2012, largely attributable to the heterogeneous incentive structures that evolved within unions and companies. Labour union representatives were increasingly lured away from shaft-level representation by the attainment of significant material benefits. The upshot was that disenfranchised workers – predominantly the rock drill operators – had an increasingly strong incentive to revolt against the National Union of Mineworkers (NUM) leadership. The Association of Mineworkers and Construction Union (AMCU)[44] could then easily exploit the divergent interests between union elites and unskilled workers by positioning

itself as a credible alternative to NUM. In short, the LRA has fortified this co-dependent relationship between NUM elites and mining houses.

On the mining legislation front, changes to the MPRDA in 2012 may provide evidence that the ascendant faction of the ruling party is attempting to change the de jure rules of the game to reduce the transaction costs associated with rent extraction. Peter Leon argued immediately upon its gazetting in late December 2012 (after the ANC's Mangaung Elective Conference) that the Draft MPRDA Amendment Bill of 2012 would exacerbate rather than reduce uncertainty in the South African mining industry. Ironically, the bill vastly increases the very ministerial discretion that the Minister of Mineral Resources, Susan Shabangu, had publicly identified as problematic in 2010. For instance, it requires the minister to initiate the beneficiation of minerals and petroleum, and grants the minister broad discretionary powers to do so.

Section 9 of the original Act is now deleted, which contained the 'first in, first assessed' (FIFA) principle with regard to the order of processing rights applications. The 2012 SIMS document proposed that the FIFA principle be removed in favour of a rights-auctioning system. Whatever order is now to be followed will be dealt with in regulations to be published by the minister. 'This amendment consequently vests in the Minister a broad discretion to determine the order in which mineral right applications are to be processed, amplifying rather than reducing the uncertainty in the process'.[45] According to a *Mining MX* editorial, 'awarding exploration rights by auction also smacks of rent-seeking, the tax proposal to which SIMS also gives voice'.[46] Among other things, this indicates the extent to which the SIMS document influenced the formation of amendments.

Aside from some of the more obvious problems of the bill pertaining to excessive ministerial discretion and onerous burdens of beneficiation and export restrictions, it also worsens uncertainty over how the rights regime will be administered:[47]

> The Bill allows the primary holder of a mining right to mine and dispose of associated minerals discovered in the mining process. However, the Bill also allows third parties to apply for rights, permits or permissions over associated minerals. The only requirement in this regard is that the third party notifies the primary mineral right holder of the application being made.

This is ambiguous at best, is likely to lead to co-ordination failures, and substantially opens the door to predatory rent-seeking – the likes of which were observed in the Kumba Iron Ore vs Imperial Crown Trading case.[48]

Leon concludes that South Africa falls short on a number of scores compared with international best practice and that the importance of effective regulation of the exploitation of mineral assets cannot be overstated.[49] These amendments to the MPRDA provide a strong indication that predatory rent-seekers may be trying to change the institutional framework in order to reduce the transaction costs of rent acquisition.

This institutional context provides the framework in which labour relations have evolved in the South African mining sector.

ULTIMATUM GAMES AND THE CHAIN-STORE PARADOX ON TWO LEVELS

Current labour instability in the mining sector is best understood through the lens of a two-level game in two distinct time periods (t_1 and t_2) – before and after the 2012 platinum belt strikes. At level I in t1 is an ultimatum game (UG) between the incumbent union and the mining house on any given set of mines. At level II (in t_1) are games between union management and members, and between mining houses and shareholders. Union elites attempt to minimise the cost of representing workers and maximise the benefits of being the officially recognised union. Mining houses attempt to maximise profit and improve shareholder value.

Until the platinum belt strikes of 2012, NUM was the monopoly player in a highly unionised industry. The level II game between union management and members is complicated by the recent ascendancy of AMCU in t_2. Competition between NUM and AMCU is modelled as a chain-store-paradox game, in which a new entrant (AMCU) attempts to capture market share previously dominated by a monopoly (NUM). The subsequent reverberation between the two levels spawns a prisoners' dilemma (PD)[50] at level I in t_2.

Robert Putnam's 1988 paper on the logic of two-level games informs the overarching framework of this analysis. Putnam used the model to elucidate the influence of domestic coalitions on international negotiations. This paper adapts the framework to the intra-domestic level, as the logic remains relevant. Particularly instructive is the observation that moves that are rational for a player at one board (such as agreeing to an inflation-linked wage increase) may be incongruent with the set of political indifference curves at the other game board (where union members will only accept a wage increase of double inflation, for instance). 'Nevertheless, there are powerful incentives for consistency between the two games'.[51] How to achieve such consistency in South Africa is at the heart of the post-Marikana conundrum addressed by this paper.

The logic works as follows: Negotiators for mining firms and unions meet to reach a wage settlement, though they are subject to the constraints of ratification by shareholders and members respectively. These negotiators seek to achieve an agreement attractive to their influential constituents, which raises the empirical question of who NUM's influential constituents actually are. Hartford provides strong evidence that NUM had increasingly neglected the lower-skilled workers in their ranks and bargained selectively in favour of higher-skilled workers:[52]

> One of the most significant changes, in the mining industry in particular, is the collapse of real constituency-based representation of members by shop stewards. Notwithstanding that the shop stewards are elected at shaft level, the practice has become that they no longer account directly to membership constituencies, preferring instead to move across shafts, mines and even into union offices above ground. Accountability to members has weakened as pressure to account to leaders higher up in the echelons has intensified.

This points to the emergence of a union aristocracy within NUM. Moreover, senior employees increasingly dominate the key decision-making structures within union management.

South Africa's labour regime operates according to the Paterson grading system, in which skilled and middle-management employees are graded B and C band respectively.[53] The rank and file (A and O band – semi-skilled and unskilled respectively) employees, who constitute the majority of NUM's membership base, are almost entirely absent from bargaining units. Prior to Marikana, this skewed arrangement meant that bargaining was relatively costless for NUM, as they only truly represented a homogeneous elite constituency.

Level I agreement requires ratification at level II. With the introduction of a ballot into the LRA, ratification would better reflect heterogeneous internal interests in unions than is currently the case. It would make the union's negotiation with the firm more complex, but it would reverse the perverse incentive to value the attainment of union office over real constituency representation.

Central to two-level games is the concept of a win-set. A win-set for a given level II constituency is the set of all possible level I agreements that would gain the necessary support from level II to arrive at a mutually beneficial agreement at level I. Agreement at level I is only possible if the win-sets of unions and firms overlap. Therefore, larger respective win-sets make level I agreement more likely, all else being equal. Conversely, the risk of negotiation breakdown is higher the smaller the win-set. Balloting in the LRA would almost certainly reduce the size of a union's win-set, making agreement at Level I less likely but counter-intuitively strengthening the bargaining position of low-skilled workers. However, the South African context of a largely economically illiterate mining workforce may render the ballot less effective than in comparable contexts.

Bargaining is often modelled as a UG. The firm offers a particular wage increase; the union either rejects or accepts that offer. In the case of the former, the union makes a counter-offer and so forth until agreement is reached. In terms of the game logic, a strike is the result of *involuntary defection*[54] (though for the sake of analytic simplicity it is argued that *protected* strikes still fall within the ambit of 'co-operation' in the South African case).[55]

Armed with ballot preferences, union negotiators at level I would be subject to a *mandate* from their constituents; they will not settle for any offer below that mandate. Absent a ballot, however, and prior to Marikana, NUM elites probably evaluated strike action as less costly to themselves than to the firm. This appears to have been a strategic mistake, as the cost of strikes to union members – combined with a sense of internal alienation among low-skilled workers – gave AMCU the perfect opportunity to leverage support and edge NUM out of its powerful position in the platinum sector.

In summary, 'the relative size of the respective level II win-sets will affect the distribution of the joint gains from the bargain'.[56] A smaller win-set can strengthen the negotiator's bargaining hand: 'I'd like to accept your proposal, but our members would not accept it'. This decreases the probability of overlapping win-sets at level I though. Further, the larger the perceived win-set of a negotiator, the more the negotiator can be manipulated by other negotiators at level I. It remains then to examine the circumstances in South Africa that affect win-set size, particularly for unions. Three sets of factors are important – level II preferences and coalitions; level II institutions; and level I negotiators' strategies.

First, 'the size of the win-set depends on the distribution of power, preferences and possible coalitions among level II constituents'.[57] NUM was until recently the majority

member of COSATU, which in turn is a member of the ruling coalition, the Tripartite Alliance. NUM is therefore in the relatively unique position of being able to influence the institutional rules of the game to suit their perceived interests. AMCU possesses substantially less de facto power in this respect.

Theoretically, the lower the cost of an unprotected strike at level I to level II constituents, the smaller the win-set for negotiators. 'Members of two-wage-earner families should be readier to strike, for example, than sole breadwinners'.[58]

Many mineworkers, especially migrants from the Eastern Cape and outside South Africa, however, are the sole breadwinners supporting two or more families. The average dependency ratio on mineworker jobs is estimated at 10:1.[59] These workers would therefore presumably be worse off by striking, especially through unprotected strikes in which their jobs are at serious risk of forfeit.

An analysis by BG of the payoffs for protected strikes in the mining industry (in the diamond, coal and gold sectors alone) in 2011 reveals the following (Table 2).

Table 2: The real costs of protected strikes in 2011

Strike duration		Diamond	Coal	Gold
Wages lost		2 weeks	1.6 weeks	4 days
Apparent gain		+4% annual salary (AS)	+2.3% AS	+2% AS
Actual gain		-1.5% AS	+0.7% AS	-4% AS
Time to recover actual loss using gain	Low-skilled	41.6 weeks	18.49 weeks	83.2 weeks
	Skilled	208 weeks	27.73 weeks	41.6 weeks

Source: Brand J, 'Marikana and its lessons for corporate South Africa', Presentation, Conflict Dynamics, 10 October 2012, http://www.conflictdynamics.co.za/NewsArticle/Marikana-and-its-lessons-for-corporate-South-Africa.

The destruction from unprotected strikes would be notably worse. According to BG, the maximum wage increase at Lonmin's[60] platinum mines after Marikana was only 7.7% to the lowest grade worker. The actual increase to rock drillers (the source of the initial grievance over pay differentials) was 3%. Lonmin workers lost roughly 12% of annual wages in the strike due to 'no work, no pay' stipulations in the LRA. All workers lost more in lost wages than they received in wage increases. Overall, the 2012 unrest cost ZAR 12.5 billion in export revenues in 2012. Direct losses in gold and platinum amounted to ZAR 10.1 billion in total. Empirically, strikes are mutually destructive for both firms and unions. That they occur with such regularity presents an analytic puzzle.

Much of the literature on wage negotiations assumes that the interests of constituents – both workers and shareholders – are relatively homogeneous. The more homogeneous the level II interests, the more the negotiator can win at level I (the bigger the win-set, the higher the odds of winning ratification). If this were truly the case in South Africa, strikes would ostensibly be less likely. On the contrary, there is marked heterogeneity within union membership in South Africa.[61] Being elected a NUM full-time branch officer, shop steward or mining house co-ordinator carries a highly attractive payoff. The historical

practice is for all top-five union branch office bearers to become full-time shop stewards and be graded and paid C1 or above upon election to NUM office. Mining houses pay their retainers while these workers work in air-conditioned offices, travel freely across operations and receive a range of benefits, including time off for external union duties. 'In an environment of scarce resources, deep inequalities and limited options for BEE empowerment for employees, the office of the union becomes a sought after place to secure and retain'.[62] Shaft-level workers, most in need of genuine representation, are literally shafted by the union to which they belong, creating an internal gulf between workers and elites. Consequently, despite obvious heterogeneity of preferences within their ranks, union negotiators have a strong incentive to represent only the upper echelon of its members. Functionally, they negotiate as if their membership was homogeneous. Strikes become a mere signalling device to create the impression of bargaining on behalf of the worker.

Politicisation of the issue (strong in South Africa as a reflection of NUM's historical role in the struggle against apartheid)[63] often mobilises groups who are less worried about the costs of a strike, which reduces the size of the effective win-set. This dynamic – combined with economic illiteracy among workers – has allowed NUM elites to get away with costly strikes without fear of punishment from their members until now.[64] The absence of a ballot removes the incentive to truly represent heterogeneous interests. However, the sudden rise of AMCU indicates that NUM underestimated the extent to which it should be fearful of punishment from rank and file members who are increasingly unconvinced. As Hartford reports, ordinary workers are expressing the view that:[65]

> The union is not helping us at all and we think most of them are crooks. They are the cause of us not getting an increase because they no longer respect our interests. The ANC and NUM are working together to make sure we don't get what we want.

Rationally, though, the degree of economic interdependence between union and mining house interests is still high,[66] which renders the lack of co-operation between them a continued puzzle.

The size of the win-set also depends on level II institutions. The MPRDA and the LRA are the primary institutional factors influencing the two game boards in play. In most settings, a small degree of endogeneity exists between the construction of the law and the players in the game. The South African case is relatively unique in that institutional context is not at all exogenous to the game boards. NUM has a direct participatory stake in setting the mining policy agenda and the laws that govern the industry (through COSATU). This grants them a high degree of autonomy from their poor constituents while at the same time driving the legislative process, which accounts for why the ANC blocked the introduction of balloting to the Labour Relations Amendment Bill. It also partially explains NUM's immunity from member punishment that game-theoretic logic predicts. Moreover, it accounts for why NUM is relatively less interested in the mutually dependent gains between itself and mining firms that – were they not also part of the governing coalition – would otherwise align their incentives.

Finally, Putnam proposes that the size of the win-set depends on the strategies of the level I negotiators. Negotiators actively try to increase the size of their opponent's win-set at level II to ensure win-set overlap at level I. They do so through the exploitation of side-payments and goodwill.

A recent *Daily Maverick* piece by veteran journalist, Greg Marinovich, revealed that mining houses have been paying top NUM office bearers' salaries. 'Unionists are being paid high salaries by the very people from whom they are supposed to protect their members'.[67] The practice is apparently due to end in the near future. Since the 1980s mining houses have paid the salaries of prominent unionists, including NUM president, Senzeni Zokwana, and deputy president, Piet Mathosa. Zokwana is the chairman of the South African Communist Party – the third member of the Tripartite Alliance – and an ANC National Executive Council member. Substantiating Hartford's assertions, Archie Palane (a former NUM member) explained:[68]

> Once there, they lose touch with the workers. That is why […] union leaders would be moved into management and then management would find a way of getting rid of them because management don't [sic] forget what you cost them, what chaos you caused them.

NUM actually pressurised the mines into making these side payments, even though it drove a wedge through the union's membership, ultimately reducing their bargaining efficacy as far as it pertained to inclusively representing members' interests. Palane argued that the arrangement eroded union values by ensuring that the visible lifestyle change caused shop stewards to lose touch with ordinary members and incentivise material privilege over worker representation. It seemed a typical divide-and-rule strategy adopted by the mining houses, though NUM was also complicit.

Marinovich reports that many of the deaths related to strikes on the platinum belt were a direct result of different factions vying for the full-time shop steward positions. It was this sheer chasm between rank-and-file interests and union aristocrats that fuelled the wildcat strikes on the platinum belt from February 2012 onwards:[69]

> In fact, the chief negotiator for NUM during the Marikana strike at Lonmin that resulted in 45 deaths was Erick Gcilitshana. Gcilitshana is the NUM's health and safety national secretary – a full-time position. His salary is one of those that is also said to be paid for by the mining house he was elected from. The mine workers stated clearly what they thought about that in their rejection of NUM – Lonmin now has a massive AMCU majority.

AMCU does indeed now have a 70% majority across the Lonmin mines, but only among low-skilled workers (Paterson A, bands 4–9). With a loss of over 80 000 members since Marikana,[70] NUM has moved from being the most powerful union within COSATU to fourth position, altering the balance of power within the congress. NUM disputed the validity of AMCU's claims and is appealing to the Labour Court to have it overturn Lonmin's decision to recognise AMCU.[71]

These side payments have increased the discount rate of union members who now fight for elite position but are uncertain about how long they can expect to stay in that privileged position. Shortened time horizons, especially in light of a potential end being brought to these side payments, increase the incentive for predatory rent extraction.

We now have a clear analytical picture of how the UG worked at level I in t_1 because of the payoff structures at level II. AMCU's entrance to the game changes the dynamics; its ascendancy – and the fact that it is not COSATU-affiliated – creates a PD at level I in t_2.

Table 3 represents a simplified version of the payoff structures at level I prior to Marikana and AMCU's ascendancy.

Table 3: Level I game board: Negotiation between union and firm (t_1)

		Player 1: Mining firm	
		Co-operate (offer)	Defect (retract)
Player 2: Union	Co-operate (settle)	(8,8)	(3,~~7~~)
	Defect (wc strike)	(~~7~~,3)	(~~1~~,~~1~~)

Source: compiled by author.

Player 1 makes a wage offer. Player 2 can either accept or reject that offer and make a counter-offer in the case of the latter (or it can strike within the ambit of the law as a threat to ensure that its counter-offer is accepted). If the firm rejects the counter-offer, the union can defect and embark on a wildcat strike (wc), in which case the firm would withdraw its offer and probably dismiss striking workers (a mutually destructive payoff of 1,1). In the above scenario, given NUM's pre-2012 dominance, the incentive structure predicts an outcome[72] of mutual gain (8,8), even if a strike does occur (as the earlier analysis suggests, striking may be a mere show of credibility for NUM or genuine *involuntary* defection). For Players 1 and 2, co-operation trumps defection as 8 > 7 (if the other player co-operates), and 3 > 1 (if the other player defects), therefore their dominant strategy will be to co-operate.[73]

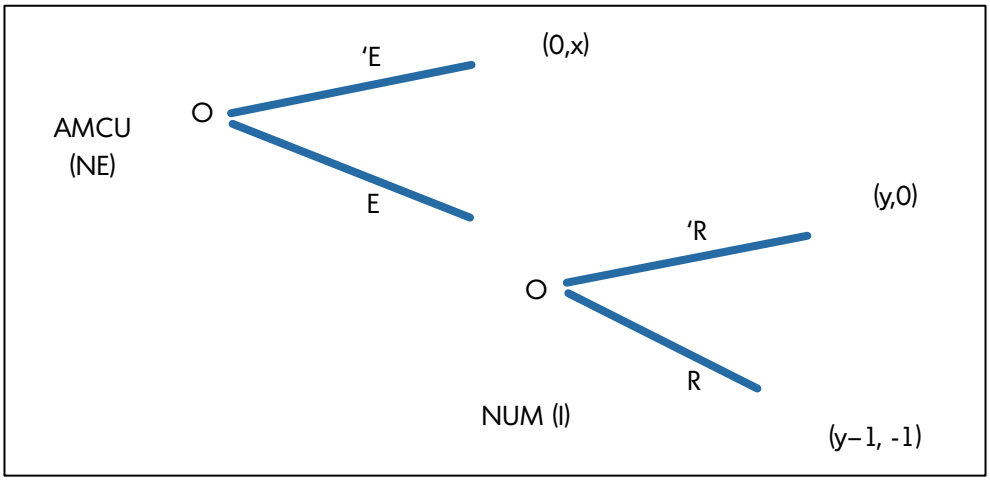
For as long as NUM was able to build a large win-set at level II (by alienating shaft-level low-skilled workers and accepting side payments), the payoff structure at that level was exactly the same as at level I, except that Player 1 is the union elite, and Player 2 is union members.

In the absence of a ballot, and with NUM players safely in the pockets of firms (and able to exploit information asymmetry), the outcome would be for members to accept the final offer from the firm. NUM elites' position was fortified by the lack of serious competition from other unions in the mining game.

However, NUM elites became complacent in their monopoly position. AMCU exploited the resultant feeling of grievance among workers. NUM had the power and the resources to prevent AMCU's rise, though. Why did it not employ these pre-emptively? The entrance of a new player to a game previously dominated by one player is modelled below as a 'chain-store paradox game'.

The paradox canonically refers to competition between an established firm (in this case NUM), a chain store, and a potential entrant (in this case AMCU). In order to retain its monopolistic status, the chain store attempts to deter entry by threatening to fight off any firm attempting market entry. But fighting is costly. The new arrival can then choose whether to enter the market or stay out, while the incumbent can choose whether to incur the costs of fighting (to retain monopoly) or let it enter and share the market. The new firm moves first (see Figure 3).

Figure 3: The chain-store paradox for NUM vs AMCU



Source: Harvey R, adapted from Bates R, *Analytic Narratives*. Princeton: Princeton University Press, 1998.

The new entrant (NE) and the incumbent (I) are the players. NE can either enter (E) or refrain from entering ('E). The incumbent can then choose to retaliate (R) or not ('R). The payoffs to the entrant are listed first and those to the incumbent second. Should the incumbent deter entry, it then reaps monopoly profits (x). But if it fails to do so, the entering firm receives positive profits (1 > y > 0). Fighting is costly for both firms:[74]

> Played once, the game yields a clear outcome: despite the incumbent's threats to retaliate, it will fail to deter entry. The monopolist will gain, should the new firm refrain from entry; but once the new firm has chosen to enter, the monopolist's threats are therefore not credible.

In a finitely repeated game, though, the incumbent is predicted to fight. NUM could be expected to fight AMCU's entrance in the platinum sector in order to render its threats credible in other sectors over which it has dominion. Analysis of the game reveals, though, that this expectation is violated. In the last 'market' (and there are only a finite number of sectors in the mining industry), knowing that the incumbent cannot profit from fighting, the new firm enters. Through backward induction, NUM would allow AMCU to enter the market rather than contesting its entry. 'Knowing that no future periods of monopoly profits await it in other markets, the incumbent will not incur the costs of fighting in the first. The dominant firm is therefore, paradoxically, powerless'.[75]

However, if the game is infinitely repeated, for a sufficiently high discount factor, NUM will fight to deter entry from AMCU. In other words, a future stream of benefits (over a sufficiently long period of time) will compensate the cost of fighting in the short run. NUM would treat the fight as an investment in creating a credible reputation to deter future contesters. The analysis also suggests that the more insecure NUM becomes in its position, the less willing it would be to incur the short-term costs of deterring AMCU's entry. But NUM is not insecure, essentially belonging to the ruling coalition itself. Its pivotal role in the fight against apartheid is immortalised in ANC communication at rallies and it is clear that both the ANC deputy president, Cyril Ramaphosa (himself a founding

member of NUM), and mineral resources minister, Susan Shabangu, are willing to play this card to mobilise workers against AMCU.[76] This induces confidence that the cost of deterring AMCU is worth the expected long-run benefits. The empirical evidence shows that NUM is literally fighting to deter AMCU (though AMCU has clearly responded in kind). Assassinations are now commonplace in news media reports, the most high profile of which was the killing of 'Steve' Khululekile Stevens, a prolific AMCU organiser.[77]

Inter-union competition at level II significantly changes the payoff structure at level I in t_2. Lonmin, for instance, currently has two collective bargaining units. Collective bargaining forum 1 (CBF 1) is for A-band employees, while employees in bands B to C bargain at CBF 2. AMCU wants these collapsed into one unit. Lonmin argued against the proposal, pointing out that AMCU could not now purport to bargain on behalf of those employees whom it did not legitimately represent. The firm offered AMCU the same arrangement as what it had with NUM previously but with one distinction – threshold rights of 35% for basic organisation rights, 45% for collective bargaining, and 50%+1 for the majority union *only* at CBF 1. The prescribed thresholds for CBF 2 would remain as per the existing agreement at 20%.

AMCU rejected the offer, as it wants even higher levels of privileges than NUM enjoyed. Recent mediation at the CCMA failed to yield an agreement. The matter was then referred for arbitration. On 14 August 2013, two days before the anniversary of Marikana, Lonmin announced that it had signed an agreement with AMCU that granted it sole bargaining recognition. Labour union, Solidarity, has since announced that it will launch an official complaint against Lonmin for signing the agreement. The union contends that the move violates clause 5.3 of the Framework Agreement for a Sustainable Mining Industry (FASMI)[78] crafted by the deputy president, Kgalema Motlanthe (examined below), and signed by all relevant stakeholders (including Lonmin) except AMCU. Clause 5.3 aims to ameliorate the destructive effects of majoritarian winner-takes-all bargaining. Lonmin will undoubtedly contend that it had little choice in the matter, given the pressure that AMCU had brought to bear in coercing the company to concede.

In this matter, it would seem that AMCU, ironically, has learned little from NUM's strategic errors. NUM, simultaneously, in an effort to try and improve its credibility among potentially disaffected members – recently made implausible wage demand increases on COM for a 60% increase for entry-level workers in the coal and gold sectors, along with a 300% increase in housing allowances. It also wanted a 15% wage increase for all other categories. Such a move is designed to signal to its members that it can achieve better results for them than AMCU.[79] Not to be outdone, AMCU responded by demanding a 100% increase for entry-level workers in the gold sector, along with a number of other demands[80] that are untenable in a marginal[81] business. A *Business Day* editorial rightly noted that both unions are sowing the seeds of their own destruction: 'The real problem for both unions will come when they report back to their members and explain why they have not lived up to the unrealistic expectations they created'.[82]

Inter-union competition therefore significantly reduces the size of a given union's win-set, counter-intuitively strengthening its bargaining hand at level I but reducing the probability of an overlapping win-set between itself and the firm. This accounts for the increasing number of wildcat strikes over the last 18 months. The game board payoffs at level I now appear as follows (see Table 4).

Table 4: Level I game board: Negotiation between union and firm (t_2)

		Player 1: Mining firm	
		Co-operate (offer)	Defect (retract)
Player 2: Union	Co-operate (settle)	(8,8)	(0,9)
	Defect (wc strike)	(9,0)	(1,1)

Source: compiled by author.

At level II, shareholders are increasingly unlikely to accept the wage demands from NUM. NUM in turn is unlikely to modify its demands in the face of what is increasingly formidable competition. The same is true of AMCU in the same position of dominance on any given mine.[83] The incentive to thus embark on wildcat strikes is of a higher power than to co-operate: 9 > 8 and 1 > 0. The incentive for firms to accept the wildcat strikes is now also a higher power; they value 9 over 8 and 1 over 0. Wildcat strikes often cost workers their jobs, and they have no legal recourse thereafter (though this point is contested.) One commentator has argued that this conforms to firms' interests, especially in the current challenging economic environment of decreased European demand for platinum and a falling gold price.[84]

The equilibrium outcome at level I has therefore shifted from mutual co-operation to mutual defection (1,1) – a classic PD. Each player receives a payoff of 1 instead of 8. Level II constraints tie negotiators' hands, even though they can both predict a mutually destructive outcome.

An obvious way out of this conundrum for NUM would be to accept a democratisation of the current bargaining arrangements (through a ballot mechanism in the LRA and lowering of threshold levels into bargaining units). This would reduce the stakes of competition significantly and reduce the propensity for wildcat strikes. However, NUM elites apparently perceive this move to be more costly than it is in reality, given their continued dominance over other mining sectors. Moreover, exploitation of information asymmetry between union elites and ordinary workers continues to work in their favour. AMCU similarly has no incentive to change the institutional rules of the game (nor would it have any real power to do so), as its elites also stand to benefit from current arrangements.

The only real immediate game changer is for mining houses to stop paying retainers to union elites, which they apparently plan to do anyway. A final puzzle thus remains as to the other possible mechanisms by which the payoff structures at the respective game boards could be changed.

WHERE TO FROM HERE? CHANGING THE DYNAMICS OF THE GAME

As shown above, a PD now persists between firms and unions. Both players know that the outcome of each round of wage bargaining is mutually destructive but are bound to their level II win-sets (characterised by the dominance of short-term shareholder interests and

union elites respectively). Resolving the PD at level I requires sophisticated resolution.[85] There are some obvious answers, such as changing labour legislation to democratise the wage bargaining process, both through balloting and lowering bargaining unit thresholds. That the Labour Relations Amendment Bill of 2014 passed through the NA without explicit progress in this respect is disheartening.

Merely asserting that these institutional changes should be wrought is, however, insufficient. It provides little in the way of how to actually change the immediate incentive structures of the players concerned. The question now is how the PD at level I can be turned into an assurance game (AG), in which the incentive to value unprotected strikes over co-operation is no longer the dominant strategy (see Table 5).

Table 5: Resolving the PD by creating an AG

		Player 1: Mining firm	
		Co-operate (offer)	Defect (retract)
Player 2: Union	Co-operate (settle)	(4,4)	(~~1~~,3)
	Defect (wc strike)	(3,~~1~~)	(2,2)

Source: compiled by author.

In an AG, there is no immediately obvious dominant strategy. For both players, a co-operation strategy indicates that 4 > 3, but a defection strategy indicates that 2 > 1. Thus, co-operation trumps defection if the other player co-operates, but defection trumps co-operation if the other player defects. Mutual co-operation (4,4) is clearly the outcome that both players would prefer; it trumps (2,2). However, they each require assurance that if they co-operate, the other player will not simultaneously defect.

As discussed, a pact (FASMI) was engineered by the deputy president, Kgalema Motlanthe, and ratified at the end of June 2013. It committed all players to non-violence and a consensual assurance that they will co-operate within the current rules of the game. As it stands, the agreement is accurate in its assessment of the challenges confronting the industry and labour relations within the industry. However, it is not binding on actors in any credible way,[86] fuelling cynicism that it is merely a pre-election signalling device to maintain order until inevitable industry restructuring (job losses) occurs next year.[87] The agreement lacks the kind of ingenuity embedded in the 1991 Gold Performance Agreements referenced earlier. Moreover, AMCU has yet to actually sign the agreement, even though it was involved in the ratification process.

The reasons for AMCU's defection from committing to this pact, along with NUM's unwillingness to change legislation, are captured adequately in a recent academic paper that examines the role of commitment problems in failing to resolve conflict:[88]

> Commitment problems arise because shifts in bargaining strength generate incentives in the future to renege on current commitments. For example, if country *i* is increasing in strength relative to country *j*, country *i* will find it difficult to 'credibly commit' to not taking advantage of *j* in the future. With this in mind, the actor whose power is declining prefers

> conflict while they have a bargaining advantage rather than a peaceful resolution that may leave them open to predation in the future. […] This can lead to conflict despite the fact that it is costly.

Country *i* is analogous to AMCU and country *j* is analogous to NUM. All players surely recognise the destruction of playing their dominant strategy in the level I PD. If each union (regardless of whether it holds a majority on any given mine) was, for instance, to be held legally responsible for violence and forced to compensate workers who lost their jobs from unprotected strikes, the PD may evolve into an AG, as the cost of defection would rise significantly. A profit-sharing arrangement would similarly increase the benefits of co-operation. The incentive to defect would change from 9 to 3 (if the other player co-operated), and 1 to 2 (if the other player defected), respectively. Mutual co-operation would still not be guaranteed, though, as one union might still justify the cost of defection for the sake of perceived greater market share in the future (as indicated in the above quote).

In order for (4,4) to become a focal point[89] that all players choose, each player must be assured that the other is rationally bound to play the co-operative strategy. This requires credible third-party intervention, agreed to by all parties, which punishes defection sufficiently to provide assurance. If the CCMA, for instance, were mandated to remove a union's bargaining rights for embarking on or allowing a wildcat strike, the focal point may be attained. The NDP unfortunately recommends only a vague strengthening of capacity for the CCMA, an independent institution it nonetheless promotes as vital.[90]

Such a solution would be optimal; players would have a higher-powered incentive in the new level I UG to arrive at a solution to that game within the parameters of the law that was mutually beneficial.

CONCLUSION

Marikana and its precursors have changed the labour game in South Africa's mining industry. Lived reality is permeated by the aftermath and continued trauma of a socio-economically devastating migrant labour system, born out of the economy's dependence on the minerals and energy complex. However, with $2.5 trillion worth of proven mineral reserves, South Africa simply has to improve its mining industry performance. The paper has shown that there is a statistically significant negative relationship between labour tensions and mining investment attractiveness. It has also shown that these labour tensions are not only a function of history but rather of a matrix of factors, many of which are not determinative and can in fact be changed.

The institutional context in South Africa's mining sector currently creates incentives for unions to value violence and unprotected strikes over co-operation. Incumbent NUM also has a distinct interest in maintaining legislation that effectively crowds out union competition and avoids balloting requirements. Even though the union may have a long-run interest in changing legislation to favour balloting and lower bargaining threshold levels (given their rapidly declining membership), its short-run interests and perceived long-run security in the Tripartite Alliance prevent it from doing so. These dynamics are complicated by the fact that the merits of balloting are possibly difficult to communicate

and 'sell' to constituents, especially when it may be perceived as weak in the face of AMCU, whose militant rhetoric[91] may be more compelling to workers steeped in grievance.

The paper has also shown, though, how the PD described above can be averted and transformed into an AG. Imposing credible, significant costs on unruly behaviour changes the players' incentive structures and consequently shifts their strategies. If a focal point is attained successfully, mutual destruction is avoided and mutual benefit secured. Co-operation is valued over violence.

Tragic as Marikana was, the hope is that it may yet stand as the critical historical juncture that transforms the labour landscape in the mining industry. This would undergird sustainable performance in the long run that maximises employment, the benefit of which cannot be overstated in the South African context of poverty and inequality.

ENDNOTES

1 Frankel P, *Between the Rainbows and the Rain: Marikana, Mining, Migration and the Crisis of Modern South Africa*. Bryanston: Agency for Social Reconstruction, 2013, pp. 342–43.

2 See Dixit A & S Skeath, Games of Strategy, New York: WW Norton & Company, 1999; for the definition of a 'tipping point' in the context of Schelling's initial work on the subject: 'A small change in preferences or a small exogenous disturbance to the composition can set in motion a process of "tipping" into segregation. And once a segregated outcome is reached, it can be very hard to halt and harder to reverse', p. 11.

3 Frankel P, *op. cit*., p. 98.

4 See Nattrass N & J Seekings, *State, Business and Growth in Post-Apartheid South Africa,* Discussion Paper Series, 34. Manchester: IPPG (Institutions for Pro-Poor Growth, 2010): 'Obviously institutional design needs to resonate with, and be accepted by, established economic and political interests – and in this sense is profoundly situation-dependent. But even so, institutional change – especially at historical junctures where change is widely understood to be necessary – can have profoundly transformative implications. Designed well, they can change the dynamics between political and economic elites and facilitate more co-ordinated (and hopefully egalitarian) outcomes', p. 23.

5 See Hillman R, 'Rent seeking', in Reksulak M, Razzolini L & WF Shughart II (eds), *The Elgar Companion to Public Choice* (Cheltenham: Edward Elgar Publications, 2010): 'The theory of rent seeking recognizes that redistribution through government provides rents and that there are incentives for rent seeking if people believe that they can influence whether they will be recipients of the rents. There are further incentives for rent seeking if the prospective beneficiaries also believe that they can influence the value of benefits. Moral hazard on the part of beneficiaries of redistribution, in the decision to work less or not to work at all in order to obtain benefits from government, is a form of rent-seeking behaviour; the social loss from the rent seeking is in the reduced productive effort in order to qualify for entitlements from government', p. 7.

6 Bates R *et al., Analytic Narratives*. Princeton: Princeton University Press, 1998.

7 Baxter R, 'Mining in Africa is not a "sunset industry"', *Business Day*, 9 May 2013, http://www.bdlive.co.za/opinion/2013/05/09/mining-in-africa-is-not-a-sunset-industry.

8 Leon P, 'Whither the South African mining industry?', *Journal of Energy and Natural Resources Law*, 30, 1, 2012, pp. 1–24.

9 Knight Frank & Citi Private Bank, *The Wealth Report: A Global Perspective on Prime Property and Wealth*. London: Think, 2011.

10 Wilson A, McMahon F & K Green, *Survey of Mining Companies 2012/2013*. Vancouver: Fraser Institute, 2013.

11 The Fraser Institute Study uses a 'policy potential index' as a composite that captures the opinions of managers and executives on the effects of policies in jurisdictions with which they are familiar. All survey policy questions (ie uncertainty concerning the administration, interpretation, and enforcement of existing regulations, environmental regulations, regulatory duplication and inconsistencies, taxation, uncertainty concerning disputed land claims and protected areas, infrastructure, socio-economic agreements, political stability, labour issues, geological database, and security) are included with the exception of corruption and growing or lessening uncertainty. It is precisely because these variables are included in the composite index that they are not explicitly controlled for in the quantitative analysis (corruption being the exception). Where mining attractiveness is regressed on labour market efficiency, the analysis utilises the World Economic Forum (WEF) dataset for labour scores to ameliorate any potential endogeneity problems.

12 Stats SA (Statistics South Africa), *Statistical Release Mining: Production and Sales*, Technical Report. Pretoria: Stats SA, 2013.

13 NPC (National Planning Commission), *National Development Plan: Vision 2030*, 2012, http://www.npconline.co.za/MediaLib/Downloads/Downloads/NDP%202030%20-%20Our%20future%20-%20make%20it%20work.pdf, p. 146.

14 Historically, mining has epitomised some of the worst of the historical colonial and apartheid legacy, especially through the social divisions wrought by migrant labour. No shortage of empathy therefore exists for the notion that South Africa's mineral wealth belongs to all her people, not merely a select few. It is partly in this context that increased calls for mine nationalisation have reared their head. It was also an expedient ticket through which certain factions of the ruling coalition could mobilise support. According to Anthony Butler: 'The African National Congress Youth League (ANCYL's) initial mine nationalization proposals appear to have been primarily symbolic or instrumental. They were motivated by ANC factional politics and by the desire of various interests within and outside the ANC to secure "compromise" alternatives such as corporate welfare and an expanded DMR empire. They may also have been introduced in order to justify the accessing of public sector assets for "developmental" and other purposes'. Butler A, 'Resource nationalism and the African National Congress', *Journal of the Southern African Institute of Mining and Metallurgy*, 113, 2012, pp. 11–20.

15 WEF, *Global Competitiveness Report*, 2013, http://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2012-13.pdf.

16 *Ibid*.

17 World Bank, *Ease of Doing Business Report 2013*, South Africa profile, http://www.doingbusiness.org/~/media/giawb/doing%20business/documents/profiles/country/ZAF.pdf.

18 Scores are indexed as a percentage. For instance, if South Africa scored 113/144, its index would be 78.4.

19 For mining attractiveness, a higher score indicates a worse rank. For instance, coming 63rd out of 96 jurisdictions yields a score of 65%. Similarly, a higher corruption and labour efficiency

score also indicate worse ranks. So essentially we observe an average decline in attractiveness even as commodity prices soar.

20 See Stata Technical Bulletin, 'A publication to promote communication among Stata users' 1995, http://www.stata.com/products/stb/journals/stb25.pdf: 'The Prais Winsten estimator is a generalized least squares (GLS) estimator'. It is a useful tool if one suspects serial correlation in error terms. In addition, 'where the Cochrane–Orcutt method uses a lag definition and loses the first observation in the iterative method, the Prais–Winsten method preserves that first observation. In small samples, this can be a significant advantage'.

21 Containing unobservable variables that may have an impact on *InvAtt* – the analysis assumes that these variables have a constant impact on the Betas over time. This is the standard assumption of homoscedasticity – constant variance in the errors over time.

22 Walsh, J & Y Jiangyan, 'Determinants of foreign direct investment: A sectoral and institutional approach', IMF Working Paper, WP/10/87, 2010. Washington, DC: IMF (International Monetary Fund).

23 The assumption of strict exogeneity in the model's regressors is likely to be violated – labour market inefficiency is captured to a small degree by the dependent variable, which includes labour difficulties as one component of its measure of 'policy attractiveness'. Unfortunately in the social sciences, many explanatory variables violate the strict exogeneity assumption. As mentioned, however, labour difficulties are a minor component of the composite index, and the WEF database is used for the labour market efficiency figures of the explanatory variable.

24 Corruption is also not included in the Fraser Institute's composite attractiveness index.

25 Wei SJ, 'How taxing is corruption on international investors?', *Review of Economics and Statistics*, 82, 1, 2000, pp. 1–11.

26 North D, *Institutions, Institutional Change and Economic Performance*. Cambridge: Harvard University Press, 1990.

27 Robinson JA, Torvik R & T Verdier, 'Political foundations of the resource curse', *Journal of Development Economics*, 79, 2, 2006, pp. 447–468.

28 See Levy B, *At the Edge of Chaos*, forthcoming 2013. Problems pertaining to credible commitment are prominent in a competitive clientelist setting, 'where politics is competitive, but the rules of the game governing both the polity and the economy remain personalised' – the incentives to defect are strong. Not only is it difficult to define the rules in an impersonal manner and align incentives accordingly, it is almost impossible to define exactly what 'unauthorised private gain' now means exactly. Competitive clientelism embodies very particular incentives for the participants, different constraints and risks, and unique developmental challenges. Levy writes: 'Careful attention to these incentives and constraints provides a way of identifying specific policy actions which are both worthwhile and feasible, given country-specific institutional realities' (p. 14).

29 See De Waal M, 'The ANC's deadly trinity: Politics, power, patronage', *Daily Maverick*, 5 December 2012, http://www.dailymaverick.co.za/article/2012-12-05-the-ancs-deadly-trinity-politics-power-patronage/#.UbcrVRYrzww.

30 South Africa, Labour Relations Amendment Bill, 2012, http://us-cdn.creamermedia.co.za/assets/articles/attachments/38409_210312_labour_relations_amendment_bill_(final).pdf.

31 *Ibid.*

32 Makinana A, 'Truant MPs leave controversial labour bill hanging', *Mail & Guardian*, 21 June 2013, http://mg.co.za/article/2013-06-21-truant-mps-leave-controversial-labour-bill-hanging.

33 Kolver L, 'Winner takes all principle significant challenge facing labour relations sector', *Mining Weekly*, 28 August 2013, http://www.miningweekly.com/article/winner-takes-all-principle-significant-challenge-facing-labour-relations-sector-2013-08-28.

34 For a profile of John Brand, see BG (Bowman Gilfillan), 'Lawyer profiles', http://www.bowman.co.za/Directors/Partner-profile/199.

35 Enterprise level is an even more localised level than company level – for instance, a bargaining council could be formed for workers at a particular shaft or plant.

36 For further details on the formation of Nedlac (National Economic Development and Labour Council) and the construction of the LRA, see Nattrass N & J Seekings, *op. cit.*: 'The LRA, which was negotiated successfully at Nedlac, was done so before the Labour Market Commission had considered the overall impact on the labour market. Whereas the LRA endorsed the existing system of industrial level bargaining which required the Minister of Labour to extend collective agreements to non-parties, the Labour Market Commission recommended that this be made more discretionary. This recommendation, however, went nowhere as a result of fierce opposition to it from organized labour', p. 42.

37 Creamer M, 'One Marikana after the other unless underlying causes tackled, says labour doyen', *Mining Weekly*, 19 October 2012, http://www.miningweekly.com/article/one-marikana-after-the-other-unless-underlying-causes-tackled-says-labour-doyen-2012-10-19. For a video interview with John Brand, in which he argues that the LRA needs radical reform, not 'tinkering', see Creamer M, *Mining Weekly*, 10 October 2012, http://www.miningweekly.com/article/south-africas-labour-relations-act-needs-radical-reform-john-brand-2012-10-10.

38 A 'lekgotla' is a Tswana word indicating a type of conference, the cultural implication of the event being that in which grievances are aired in a straightforward but constructive manner. See Mining Lekgotla, http://www.mininglekgotla.co.za, for details of the event hosted in Johannesburg from 27–29 August 2013.

39 Kolver L, *op. cit.*

40 Calmfors L & J Driffill, 'Bargaining structure, corporatism and macroeconomic performance', Economic Policy, 3, 6, 1988, pp. 14–61.

41 Hartford G, 'The mining industry strike wave: What are the causes and what are the solutions?', Unpublished paper, 2012, Employee Share Ownership Scheme Shop, p. 7.

42 Nattrass N & Seekings J, *op. cit.*, p. 12.

43 Hartford G, *op. cit.*, p. 7.

44 AMCU was established in 1997, according to its national organiser, Dumisani Nkalitshana, and now boasts approximately 140 000 members (prior to Marikana it only had 60 000). It is headed by Joseph Mathunjwa, a former NUM supervisor at BHP Billiton's Douglas colliery, who reportedly formed AMCU after a serious dispute with NUM. AMCU is the recognised union at the Two Rivers platinum mine on the eastern limb of the Bushveld Complex owned by Impala Platinum and Patrice Motsepe's African Rainbow Minerals (ARM), and has also been active on chrome mines in Mpumalanga province. It is making significant inroads into the gold sector too.

45 Leon P, 'MPRDA amendments may further damage investor confidence', *Politicsweb*, 16 January 2013a, http://www.politicsweb.co.za/politicsweb/view/politicsweb/en/page72308?oid=350853&sn=Marketingweb+detail&pid=90389.

46 McKay D, 'Three "bones of contention" in MPRDA changes', *Mining MX*, 31 January 2013, http://www.miningmx.com/page/opinion/columnists/1509454-Three-bones-of-contention-in-MPRDA-changes#.UcQcTxYrzww.

47 Leon P, 2013a, *op. cit.*

48 For further details, see the *Mail & Guardian*, 'Shock and ore: Dirt flies in Sishen battle', 10 February 2012, http://mg.co.za/article/2012-02-10-shock-and-ore-dirt-flies-in-sishen-battle; along with Leon P, 2012, *op. cit.* For a fascinating analysis of the web of political connections and business deals under president Jacob Zuma, see Southall R, 'Family and favour at the court of Jacob Zuma', *Review of African Political Economy*, 38, 130, 2011, pp. 617–26.

49 Leon P, 'SA's mineral regulatory regime vs international best practice', *Politicsweb*, 16 April 2013b, http://www.politicsweb.co.za/politicsweb/view/politicsweb/en/page71619?oid=370269&sn=Detail.

50 The PD is a game in which each player has a dominant strategy, but the equilibrium that arises when all players use their dominant strategy provides a worse outcome for every player than would arise if they all used their dominated strategy instead. The problem is that players have no means of insuring that their opponent will actually use their dominant strategy, hence the dilemma. A classic example of the dilemma is portrayed in the movie (of a true story), *In the Name of the Father*, in which two Irish friends are captured by British police and wrongly accused of the Guildford bombing, which had in fact been committed by the IRA. The police detain them separately and tell them that if they confess, they will go free, whereas if they both stay silent they will go to jail. In the end, they both confess, as they have no means of co-ordinating their strategies. However, the upshot is that they go to prison for much longer than they otherwise would have if they had both stayed silent.

51 Putnam R, 'Diplomacy and domestic politics: The logic of two-level games', *International Organisation*, 42, 3, 1988, p. 434.

52 Hartford G, *op. cit.*, p. 8.

53 For further details, see Tremendis, 'Paterson job grading', http://www.patersongrading.co.za/about.html.

54 Involuntary defection reflects the behaviour of an agent who is unable to deliver on a promise because of failed ratification, whereas *voluntary defection* refers to reneging on a promise in the absence of credible third-party enforcement of a contract. Protected strikes are costly to both firms and unions (but less so than *unprotected* strikes, which in the South African case is voluntary defection).

55 Strikes come in two varieties – protected and unprotected. Protected strikes are legal and occur when employees follow all the procedures laid out in the LRA to have their demands met. Employees who take part in protected strikes may not be dismissed, sued or considered to be in breach of their employee contracts. Unprotected strikes are those that occur when employees do not follow the procedures of the LRA, and employees who participate in them are not protected from dismissal. See also Israelstam I, 'Protesting could mean the end of your career', The South African Labour Guide, http://www.labourguide.co.za/general/protesting-could-mean-the-end-of-your-career-538.

56 Putnam R, *op. cit.*, p. 440.

57 *Ibid.*, p. 442.

58 *Ibid.*

59 The Chamber of Mines of South Africa, Submission to the National Energy Regulator of South Africa (Nersa), 31 January 2013, http://www.bullion.org.za/documents/Submission%20to%20NERSA_280113.pdf.

60 The Marikana mine is one of three platinum mines that belongs to Lonmin in South Africa. See https://www.lonmin.com for further information about the company.

61 Contrary to a view expressed in a *Business Day* editorial, 'A case for central bargaining', 14 June 2013, http://www.bdlive.co.za/opinion/editorials/2013/06/14/editorial-a-case-for-central-bargaining. For a response to this view, see Harvey R, 'Real decentralized bargaining needed in the platinum sector', http://www.saiia.org.za/opinion-analysis/real-decentralised-bargaining-needed-in-the-platinum-sector, originally published in *Business Report*, 10 July 2013.

62 Hartford G, *op. cit.*, p. 8.

63 See Butler A for a history of NUM in his biography of Cyril Ramaphosa: Butler A, *Cyril Ramaphosa* (*Revised*). Johannesburg: Jacana, 2011.

64 Information asymmetry tends to produce moral hazard. The insurance industry is typically referred to as an instructive example. Because free-riders can defraud insurance schemes through concocting false claims, insurance companies charge a premium to compensate for the losses that accrue from free-riding. They do not have perfect information as to who will cheat. The upshot is moral hazard – ordinary consumers end up subsidising the fraudulent free-riders. In the same way, economically illiterate workers do not have complete and perfect information at their disposal regarding whether their union bosses are truly acting in their interests. Union bosses exploit this asymmetry, with the consequent moral hazard that workers forfeit real benefits while union elites entrench both their wealth and power. The presence of a rival union undermines this moral hazard to some degree, though information asymmetry still plays in elites' favour, as they can spur their illiterate members to unprotected strikes to compete against the rival. These unprotected strikes are disproportionally costly to low-skilled workers, especially if they end up losing their jobs as a result.

65 Hartford G, *op. cit.*, p. 9.

66 See Nattrass N & J Seekings, *op. cit.*: 'Is organized labour really so uncompromising? A brief incursion into history suggests otherwise. The wage agreements in 1992 and 1993 in the gold industry demonstrate that organised labour in South Africa is more than capable of concluding agreements which restrain wage increases in order to protect jobs and profits', p. 64.

67 Marinovich G, 'Conflict of Interest, Inc: Mining unions' leaders were representing their members while in corporations' pay', *Daily Maverick*, 24 April 2013, http://www.dailymaverick.co.za/article/2013-04-24-conflict-of-interest-inc-mining-unions-leaders-were-representing-their-members-while-in-corporations-pay/#.Ubm0YhYrzwx. NUM responded scathingly to the article, questioning Marinovich's credentials as a journalist and disputing the article. However, the union did not tackle any of the substantive points raised, and the *Daily Maverick* stood by Marinovich's story (http://www.dailymaverick.co.za/article/2013-04-25-num-reacts-angrily-to-marinovichs-expos-daily-maverick-stands-by-its-story).

68 *Ibid.*

69 *Ibid.*

70 Jones G, 'Mining: Starting again', *Financial Mail*, 23 May 2103, http://www.fm.co.za/fm/Features/2013/05/23/starting-again.

71 Marrian N, 'NUM to fight AMCU's status at Lonmin', *Business Day*, 26 June 2013, http://www.bdlive.co.za/national/labour/2013/06/26/num-to-fight-amcus-status-at-lonmin.

72 When both players play their dominant strategy in this particular game, there is a unique equilibrium outcome known as the Nash Equilibrium (NE) outcome – the mathematically derived position originally discovered by the mathematician John Nash.

73 The numbers are arbitrary in themselves; they merely depict relative payoff size, and the mutually co-operative outcome is clearly superior to all other outcomes.

74 Bates R, 'The international coffee organisation: An international institution', in Bates R *et al.*, *op. cit.*, p. 203.

75 *Ibid.*, p. 204.

76 See Marinovich G, 'NUM, AMCU, Marikana: 'Tis the season to be bloody' (*Daily Maverick*, 4 June 2013, http://www.dailymaverick.co.za/article/2013-06-04-num-amcu-marikana-tis-the-season-to-be-bloody/#.UbrJyxYrzww): 'ANC deputy president Cyril Ramaphosa, one of the NUM's founders, told a May Day rally in Rustenburg, "We must stand firm and united and defend this union. We must declare Rustenburg alliance territory because this is the home of the ANC".It was a call for militancy that has been echoed by various NUM officials and, disturbingly, by cabinet ministers. The Minister of Mineral Resources, Susan Shabangu, told a gathering of NUM shop stewards and officials last week: "We are very much aware that you are effectively under siege by forces that are determined to use every trick in the book permanently to defeat you and remove you literally from the face of the earth. This is being done with the ultimate goal of ensuring that no progressive trade union will be present in the mining sector that shares the same ideological orientation as the congress movement. That would be betrayal of the proud history of struggle of the NUM. Comrades, it is only those who are wilfully blind who will not see that these forces, by extension, want to realise one major objective: ultimately to defeat and dislodge the ANC from power and reverse the gains of the national democratic revolution that we scored as a result of the democratic breakthrough of 1994"'.

77 *Ibid*: 'A NUM shop steward was shot dead and another man critically wounded at the NUM office at Lonmin's Western Platinum mine, at Wonderkop, Marikana on Monday June 3 [2013]. Monday's attack on the NUM office follows a campaign by both AMCU and the miners' strike committee to have the office closed. They say that since AMCU has officially recruited 70% of the workers at Lonmin, the NUM has lost its threshold representational rights and should go. […] The miners also want the NUM out of Lonmin, demonstrating that with a two-day stay-away in the wake of "Steve" Khululekile Steven's assassination. Stevens was a kingpin unionist who had galvanised the Platinum Belt against the NUM. […] In this atmosphere of violent competition, Lonmin last week suspended eight NUM officials who had tried to fraudulently boost the union's membership numbers at the mine. This is part of a desperate attempt by the union to avoid losing even its rights to access the 28,000-strong workforce at Lonmin. AMCU had claimed that there were some 800 fraudulent stop orders submitted by the NUM. Lonmin appears to confirm at least 200 such orders as the reason for the shop stewards' suspension. […] The NUM has told of its overt plans to again take control of the prized platinum belt, where it is losing members hand over fist. NUM president Frans Baleni told the SABC that his union was in danger of losing 60% of its members. He claims that many of the people who abandoned the NUM had done so under threats of violence and "some of those members who left are now finding their way home". […] One AMCU loyalist said that NUM members have been accompanying police through Nkaneng shantytown, pointing out where AMCU members live, and where they are said to be harbouring their own firearms. He further claimed that policed opened fire on him with rubber bullets on Monday, for no apparent reason. […] The killing of "Steve" also sparked a spasm of violence that saw twin brothers killed when unknown men were searching for an NUM official, hours after AMCU's power player in the Rustenburg area was gunned down. Another key AMCU organiser narrowly avoided attackers searching for him in the middle of that same night'.

78 An electronic copy of the agreement is available at http://cdn.bdlive.co.za/images/pdf/MiningDraft_140613.pdf or http://www.thepresidency.gov.za/pebble.asp?relid=15671.

Clause 5.3 reads: '5.3. The principle of majoritarianism remains one of the main pillars in the construct of our labour market regulatory system. The stakeholders in the labour market have lived with this principle for many years. While it has served the system of our industrial relations very well, some have raised concerns of its unintended consequences including but limited to the possibility that it may infringe on the constitutional rights of other organisations and individuals' freedom of association. These concerns warrant a need for evaluation'.

79 Stoddard E, 'Strike fears as NUM demands 60% increases', *Business Day*, 20 May 2013, http://www.bdlive.co.za/national/labour/2013/05/20/strike-fears-as-num-demands-60-increases.

80 For a full list of AMCU demands, see AMCU, 'Wages and other conditions of employment for 2013/2014 review period', 24 June 2013, http://cdn.bdlive.co.za/images/pdf/GoldWageDemandsPDF.pdf.

81 See Mahlangu A, 'Falling gold price raises red flag for SA miners', *Business Day*, 27 June 2013, http://www.bdlive.co.za/markets/2013/06/27/falling-gold-price-raises-red-flag-for-sa-miners. Consensus seems to exist that the break-even point for gold mining in South Africa is around $1,300/ounce, all else (labour costs, currency value and exogenous demand) being equal. The price was $1,239/ounce on the day, with analysts predicting a short-term decline to roughly $1,000/ounce. This was also likely to have a negative impact on the rand (though this is a double-edged sword for gold mining). For a view on how labour relations could be restored to order in the gold sector, see Harvey R, 'SA's gold miners, bosses, on path to mutual destruction', 1 August 2013, http://www.saiia.org.za/opinion-analysis/sas-gold-miners-bosses-on-path-to-mutual-destruction, originally published in *Business Report*, 31 July 2013.

82 *Business Day*, 'Editorial: Unreasonable wage demands', 27 June 2013, http://www.bdlive.co.za/opinion/editorials/2013/06/27/editorial-unreasonable-wage-demands.

83 See Minto R, 'Lonmin: Union talks falter', *Financial Times*, 13 June 2013, http://blogs.ft.com/beyond-brics/2013/06/13/lonmin-union-talks-falter/#axzz2WqRgE55Y: 'The NUM is losing a violent turf war with the AMCU, depriving the government of its traditional influence over workers and stoking more militant demands. The AMCU distrusts government mediators and will take hardline positions with management designed to consolidate its power among platinum and gold miners and expand its presence in coal and chromium miners. At the same time, NUM-AMCU violence will continue to foment work stoppages and will make any strikes more difficult to resolve'.

84 See Terazono M, 'South African platinum output falls to 11 year low' (*Financial Times*, 13 May 2013, http://www.ft.com/intl/cms/s/0/b1f711ba-bbae-11e2-82df-00144feab7de.html): 'The annual supply fall in the platinum sector came as demand remained sluggish because of the popularity of tablet devices, which do not use hard disks, and weaker European car purchases. Overall demand fell 0.6 per cent to 8.1m ounces, while recycled platinum totalled 2m ounces, bringing the supply-demand balance to a deficit of 375,000 ounces in 2012'.

85 History does record one such instance of sophisticated solution. See Nattrass N & J Seekings, *op. cit.*: 'Commenting on the 1991 gold performance agreements (where workers agreed to a real wage decline plus productivity and price-related bonuses) Marcel Golding, the then acting general secretary of NUM, noted: "The choice we had to make was whether to drive a higher wage increase with less employment in the industry as a real prospect – or whether we try to achieve maximum employment, and at the same time augment wages and win social rights". […] In 1992 and 1993 NUM concluded profit sharing agreements with gold mines. […] By tying wage increases to profitability, workers were able to ensure that their wages rose as fast as possible – and with a minimal impact on employment. […] [This] demonstrates that

even South Africa's most militant trade unions are capable of concluding agreements which recognise the trade-offs between wages, employment and profitability. The challenge today is to re-create that sense of partnership in a time of crisis, and for all parties to look beyond their own narrow interests and help chart a way forward which creates more jobs (rather than just protecting the jobs that already exist', pp. 64–65.

86 A mere signature unfortunately does not constitute credibility.

87 McKay D, 'Labour pact just a pre-election palliative?', *Mining MX*, 24 June 2013, http://www.miningmx.com/page/news/platinum_group_metals/1630399-Labour-pact-just-a-pre-election-palliative#.Ucq05RYrzww.

88 Tingley D, Lee JJ, & J Renshon, 'Physiological responses to shifting bargaining power: Micro-foundations of commitment problems in international politics', Working Paper, 2013, http://www.jonathanrenshon.com/Site/CurrentResearch_files/BargainingAnxietyAPSA.pdf, p. 1.

89 See Dixit A, 'Thomas Schelling's contributions to game theory', (*Scandinavian Journal of Economics*, 108, 2, 2006, pp. 213–29): 'In situations like bargaining, where conflict of interests is more important, focal points can help the parties avoid the mutually bad outcome of no agreement. That may be why 50:50 division is observed so often in situations ranging from the ultimatum game to sharecropping, and similar conventions apparently override explicit rational calculation to determine the outcomes of many social interactions'.

90 NPC, *op. cit.*, p. 136.

91 See De Lange J, 'AMCU as a force for violence is a misconception', *Mining MX*, 24 May 2013, http://www.miningmx.com/page/opinion/columnists/1626222-Amcu-as-force-for-violence-is-a-misconception#.UcQC6xYrzww: 'To expect a swing in union membership in these communities without intimidation and often violence would be naïve.'

SAIIA'S FUNDING PROFILE

SAIIA raises funds from governments, charitable foundations, companies and individual donors. Our work is currently being funded by, among others, the Bradlow Foundation, the UK's Department for International Development, the European Commission, the British High Commission of South Africa, the Finnish Ministry for Foreign Affairs, the International Institute for Sustainable Development, INWENT, the Konrad Adenauer Foundation, the Royal Norwegian Ministry of Foreign Affairs, the Royal Danish Ministry of Foreign Affairs, the Royal Netherlands Ministry of Foreign Affairs, the Swedish International Development Cooperation Agency, the Canadian International Development Agency, the Organisation for Economic Co-operation and Development, the United Nations Conference on Trade and Development, the UN Economic Commission for Africa, the African Development Bank, and the Open Society Foundation for South Africa. SAIIA's corporate membership is drawn from the South African private sector and international businesses with an interest in Africa. In addition, SAIIA has a substantial number of international diplomatic and mainly South African institutional members.

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