

UC Berkeley

Law and Economics Workshop

Title

Federal Institutions and the Democratic Transition: Lessons From South Africa

Permalink

<https://escholarship.org/uc/item/6g09713w>

Author

Rubinfeld, Daniel

Publication Date

2006-01-13

Supplemental Material

<https://escholarship.org/uc/item/6g09713w#supplemental>

FEDERAL INSTITUTIONS AND THE DEMOCRATIC TRANSITION:

Lessons from South Africa

by

Robert P. Inman and Daniel L. Rubinfeld

Draft, December 2, 2005

ABSTRACT

We present a political economy model of a peaceful transition from autocracy to democracy, motivated by, and calibrated to, South Africa at the time of its own successful transition from white, elite rule under apartheid to today's multi-racial democracy. The primary barrier faced by South Africa in its transition is symptomatic of a central difficulty to peaceful transitions generally: How can the emerging majority credibly promise not to economically exploit the once ruling elite? South Africa found its answer in a form of governance we call democratic federalism. The central feature of such a constitution is to create an annual policy game – we study fiscal policy – where the new majority and the old elite each credibly control one policy instrument of central importance to the other party. In our version, the majority run central government decides all tax policy while provinces, at least one of which is politically controlled by the old elite, are assigned responsibility for providing important redistributive services. In effect, the federal constitution creates a policy “hostage game” between the new majority and the old elite in which each can check policy abuses by the other. We show that for plausible specifications of the political economy, this annual policy game has a stable, less-than-fully exploitative stationary equilibrium that the elite may prefer to current autocratic rule. Our model “predicts” the current federal fiscal system of South Africa and then shows that under this system – which has proven stable at least over the past 12 years – the old economic elite will prefer democracy to apartheid provided their rate of time preference is less than the internal rate of return ($= .128$) from South Africa's transition from autocracy to democratic federalism.

Robert P. Inman is the Richard K. Mellon Professor, Finance and Economics, the Wharton School, University of Pennsylvania, Philadelphia, PA 19104, inman@wharton.upenn.edu

Daniel L. Rubinfeld is the Robert L. Bridges Professor of Law and Professor of Economics, University of California, Berkeley, CA 94720, rubinfeld@law.berkeley.edu

I. Introduction

Democratic governance is clearly preferable to its alternative, autocratic rule. While the importance of democracy as a pre-condition for improved economic growth remains an open research question, there is little doubt that stable democratic institutions provide basic protections for essential human and economic rights and valued opportunities to participate, both directly and indirectly, in the management of societal affairs.¹ There appear to be significant international advantages to stable democracies as well. Democracies are less likely to initiate international aggressions and more likely to support free trade agreements.² Given the case for democratic rule, the issue then becomes how best to facilitate the transition from autocracy to democracy.

The paper presents a model of the political economy of democratic transition. The motivation is drawn from the recent history of South Africa's successful (to this point) transition from a white, elite autocracy to a multi-racial, majority-rule democracy, as described very briefly in Section II. The barriers faced by South Africa in its move to democracy are, to a large extent, symptomatic of transitions barriers generally. The barriers arise because the once oppressed majority that is destined to dominate democratic national politics may not be able to credibly promise the current ruling elites that they will not be economically exploited in the new regime. If there are not sufficient guarantees and the current elites have military power, they may opt to block rather than support the transition.

¹ On democracy and economic growth see the debate between Acemoglu, Johnson, and Robinson (2001) and Glaeser, et. al. (2004). On democracy as an institution to promote economic fairness and personal liberties, see Dreze and Sen (1989), Rodrik (1999), and Shleifer et. al. (2004). For evidence on democracy and political participation, see Verba and Nie (1972), Frey and Stutzer (2000).

² On democracy and war, see Bueno de Mesquita, et. al. (1999). On democracy and trade, see Mansfield, Milner, and Rosendorff (2002).

The challenge is to find a democratic constitution that can credibly offers such protections. Section III responds to this challenge by showing that under well-defined conditions a federal constitution – defined as system of government in which a nationally elected central government and locally elected provincial governments each hold significant fiscal powers for the financing and provision of essential public services – can credibly provide the needed economic protections. With a federal constitution in place, the transition to democracy can work, even when the unitary form of governance – rule by a single national majority – might fail to facilitate the transition.

Section IV “tests” our analysis against the economic and political realities of South Africa at the time of its own transition to democracy. We find democratic federalism is sustainable and does protect to an important degree the economic interests of South Africa’s once ruling elites. Section V then shows that federalism is the economically preferred democratic constitution and for plausible rates of time preference ($< .128$) South Africa’s elite prefers democracy to continuing autocratic rule. Section VI offers a few concluding comments. All proofs are in Appendix A.

II. South Africa’s Transition: A Brief History

The more than forty years of apartheid rule in South Africa began in 1948 with the election of the white National Party (NP) to run the national government. In August, 1962 Nelson Mandela and other opposition African National Congress (ANC) leaders were arrested and in 1963 sentenced to life imprisonment. By the fall of 1986, it was apparent to the moderate leadership in both the National Party and the ANC that, after years of violent conflicts, negotiations towards full South African democracy was the only way forward. In September 1989, having to choose among the alternatives of renewed repression and possible war *or* the status quo *or* a move towards compromise

and a democratic South Africa, NP leader F.W. De Klerk found the latter alternative the most attractive.³ As a condition for majority Black rule, de Klerk and the National Party insisted on constitutional protections for the civil liberties and property of the white minority.

Following negotiations that began in earnest in 1990 the ANC accepted in principle a constitutional bill of rights that protected individual civil and property rights. Lacking a sufficient number of adequately trained Black civil servants, the ANC also accepted the National Party's demand to employ current white bureaucrats.⁴ More problematic was the need to ensure private ownership of firms and to prevent excessively high redistributive taxes.

The National Party proposed the devolution of taxing and spending powers to nine provincial governments, at least two of which would be controlled by the NP. The ANC in turn proposed four provinces, with all taxing powers centralized and all provinces effectively controlled by an ANC majority.⁵ At this point a third party entered the constitutional negotiations: the Inkata Freedom Party (IFP) representing the Zulu nation, led by Chief Mangosuthu Buthelezi. Chief Buthelezi demanded an Inkata-controlled province containing the historic lands of the Zulu nation to be called KwaZulu-Natal, and the devolution of significant spending powers to the provinces.⁶ The commitment of significant governmental transfers to the provinces was crucial for Buthelezi, since this would maintain the lucrative homeland payments he had enjoyed as under apartheid. Given the NP's ability to sustain apartheid and Inkata's threat to boycott the planned 1994 elections, the ANC

³ Waldmeir (1997, p. 137).

⁴ Waldmeir (1997, p. 228).

⁵ Muthien and Khosa (1998).

⁶ Waldmeir (1997, pp. 242-250).

agreed in principle to the NP's and the IFP's demands for nine provinces with significant spending responsibilities and sizeable central government transfers.

The interim constitution signed in the winter of 1994 codified this *in principle* agreement, but the details as to how to actually assign taxing and spending powers and the level of intergovernmental transfers were postponed until after the 1994 election. By any measure, the election was a success. Voting was completed without incident. Nelson Mandela was elected President and the ANC won 62.7 percent of the national vote. The National Party polled 20.4 percent nationally, but as planned, the NP won a majority of provincial legislative seats in the new province of the Western Cape with 53 percent of the provincial vote. Similarly, and as planned, Chief Buthelezi and the Inkata Freedom Party won 51 percent of the provincial vote in KwaZulu-Natal. Unexpectedly, however, the rural (white farmer) Northern Cape fell to the ANC in a close election. The six remaining provinces went decisively to the ANC.

With elections completed, attention turned to drafting a final constitution, using the interim constitution as a template. The interim constitution created a Financial and Fiscal Commission (FFC) charged with the task of assigning tax and spending responsibilities to the national and provincial governments and designing a formula for intergovernmental transfers capable of ensuring adequate funding for provincial government services. The composition of the Commission was equally divided between ANC and NP representation, with two additional representatives from the Inkata province of KwaZulu-Natal. The Commission proposed an assignment of all important taxing powers to the central government, but delivery and spending responsibility for important redistributive services – K-12 education, primary health care, and social security (welfare) – became the responsibility of the new provinces. Without taxing powers, however, funding for these

redistributive services required centrally decided intergovernmental transfers. The Commission's recommendations were incorporated into the final constitution, which was unanimously approved on October 11, 1996.

Though the exact details of the final constitution – namely the size of provinces, their exact responsibilities, and the final level of intergovernmental transfers – apply only to South Africa, we argue that the constitution's fundamental features – provinces, shared responsibilities, and transfers – apply more broadly. Section III offers a general argument for federalism as a constitutional form to facilitate the democratic transition. Sections IV and V then show how the South African constitution stands as an application of our central proposition.

III. Federal Institutions and the Democratic Transition

A. Overview: This section specifies the conditions under which an appropriately designed federal constitution might facilitate the transition from autocracy to democracy. The underlying model is a sequential game with two stages. In the first *constitutional* stage, a constitution is chosen requiring the approval of both the elite minority and the poor majority delineating provincial boundaries. The constitution can specify either a *unitary*, or fully centralized, democracy with a single national democratic government setting all policies, or a *federal*, or partially decentralized, democracy where policy responsibilities are shared between the national government and constitutionally created provinces. In the case of a federal democracy, the constitution will also assign tax, spending, and regulatory responsibilities to the provinces and mandate a minimal level of service provision (possibly zero) that each province must provide. If no, or minimal, taxing powers are given to the provinces, then the constitution must allow for intergovernmental transfers

from central government revenues to the provinces. Both unitary and federal constitutions will allow amendments, subject to approval by a constitutionally required (possibly, super-) majority.

In the second *policy* stage, the parties play an annual policy game in which the central government controlled by the poor majority chooses tax rates, spending, and regulations and, in a federal democracy, a level of intergovernmental transfers (possibly zero) to the provinces. Provincial governments are elected by the residents of the provinces, where in the new democracy, some provinces may be politically controlled by the once ruling elite. Provinces then allocate their resources to their constitutionally-assigned responsibilities. Elite-run provinces may choose to meet, or not, their constitutional responsibilities. In particular, the elite may allocate some of their assigned intergovernmental transfers or provincial tax revenues to elite-only services or to elite tax relief, allocations we call “elite capture.” Elite capture is not possible in unitary democracies.

The sequential game is solved through backward induction. The second-stage game is specified for fiscal policies, in particular, the financing and provision of redistributive (targeted) goods and services – for example, education, health care, housing, land reform, and income transfers. When solving the game under *unitary democracy*, policies will be set a nationally elected poor majority so as to maximize the welfare of a typical majority citizen. The majority will impose a national tax on the once ruling minority elite, the proceeds of which will be allocated to provide redistributive services and transfers to the poor majority through a national bureaucracy. The tax on the elite can be interpreted broadly as a tax on labor income, capital, firm profits (in the extreme, nationalization), or land (in the extreme, land expropriation). In response to national taxation, the elite are free to leave the country and take all their human capital with them and any of their capital

income or land rents the constitution allows. Given elite mobility, there will be a an elite tax rate which maximizes redistributive revenues. We assume that the majority will choose this revenue maximizing, fully exploitative, tax rate under unitary democracy. It is this possibility that discourages the elite from embracing unitary democracy.

In the case of a federal constitution, the second stage policy game has the central government, again controlled by the poor majority, setting the national tax rate with the proceeds allocated in whole or in part to intergovernmental transfers to the provinces. Provincial governments, some of which are politically controlled by the old elite, will then allocate their revenues to constitutionally assigned redistributive services or to elite-only services via elite capture. Given the fact of elite capture, the poor majority will prefer unitary democracy unless there is some compensating reason to use provinces as providers of redistributive services. In our model there is. Elite residents are the efficient providers of such services, but will only offer those services in elite-run provinces; in majority-run provinces or under unitary democracy, elite providers take their talents as teachers, doctors, nurses, and contractors to the private sector – or they leave the country.

It is useful to distinguish two versions of democratic federalism. The first, *democratic federalism*, has the central government set its national tax rate at less than a fully exploitative, revenue-maximizing tax rate. The second, *administrative federalism*, has the central government set the national tax rate at the revenue-maximizing tax rate, but continue to allocate the proceeds of that tax to provinces as intergovernmental transfers. Under administrative federalism, provinces are still valuable to the ruling poor majority as low cost providers of redistributive services, at least in the elite-run provinces. Even though not a political majority, poor residents do live in elite run

provinces. Even though national redistributive tax rates are maximal, elite residents prefer administrative federalism to unitary democracy since elite capture is still possible. Of course, the elite's first choice would be democratic federalism. Which form of federalism actually obtains is in the hands of the poor majority and is an endogenous outcome of the second tax policy game. In the case of South Africa, we will see that administrative federalism is not a sustainable outcome; our analysis in section IV and V therefore focuses on democratic federalism as the relevant federal alternative.

Only constitutions which are self-enforcing or sustainable in the second-stage, annual policy game will be considered by the ruling elite and the future poor majority as credible constitutions when playing the first-stage constitutional game. (Outside enforcement of the constitution, say by a "morally persuasive" court or a powerful international watchdog, is not considered.) Given our assumption (see below) that the elite loses control of the army with the transition, the unitary constitution is always sustainable. We therefore focus our attention on specifying the conditions under which democratic or administrative federal constitutions will be sustainable in an infinitely repeated, second-stage policy game. The first-stage game then selects a preferred constitution from among the set of sustainable constitutions. We emphasize the most interesting case (see below) in which the poor majority cannot militarily impose a new constitution on the current ruling elite. Then, only an *actual* Pareto-improving constitution from among the set of sustainable constitutions can be chosen in the first stage. Using our model, we specify that constitution for South Africa, and find it to be reassuringly close to the constitution actually chosen in 1996 and in place today.

Six assumptions underlie our analysis. *First*, the poor majority bears sufficiently large costs in lost economic and democratic rights under autocracy that it prefers any democratic constitution,

whether unitary or federal, to autocracy. *Second*, the oppressed majority does not have sufficient military strength to defeat the current autocratic regime and to then unilaterally impose a constitution. Thus, the majority and the ruling elite must both agree to a new democratic constitution; otherwise the autocratic regime and all associated conflicts and costs will remain. *Third*, once a democratic constitution is in place, the current ruling elite turns over control of its military to the new majority. As a result, neither elite secession nor a military coup d'état restoring the elite to power is possible.⁷ *Fourth*, the civil and political rights of the elite will be protected in the democratic regime; those not convicted of crimes against humanity will be able to exit the country if they so choose. *Fifth*, the majority and the elite are fully informed as they negotiate the transition to democracy. *Sixth*, negotiators for the elite and the majority wish to negotiate a constitution which best protects the long-run (dynastic) interests of their average constituents.

We begin by specifying the necessary and sufficient conditions for sustainable federal democracies in a second-stage fiscal policy game.

B. *The Annual Policy Game:* In a democratic economy, each of the M “poor” majority residents earn W a year, while each of the N “elite” residents earn $Y > W$. Initially, there are N_0 elite residents who are free to leave the country, and may choose to do so depending on the tax rate imposed by the ruling majority. Elite residents pay a nationally chosen per-capita tax, τ , with the proceeds redistributed to *majority residents only* as a per capita grant, b , and/or as government provided redistributive public goods and services, q .⁸ Given the possibility of exit, the equilibrium

⁷ For a model of secession, see Bolton and Roland (1997). Acemoglu and Robinson (2001) provide an analysis of coup d'état's.

⁸ Provinces do not engage in redistributive taxation; if they are given taxing powers, provincial tax revenues must be targeted to the provision of uniformly consumed (pure public) provincial public goods such as provincial roads, sanitation treatment, and parks. Local public goods such as township roads, electrical and water connections, sanitation

number of elite taxpaying residents depends not only the initial elite population, but also the redistributive tax burden per elite resident. To simplify, we will assume a linear exit function: $N(\tau) = N_0 - \beta\tau$, where aggregate tax revenues are given by $\tau N(\tau) = N_0\tau - \beta\tau^2$, implying a revenue maximizing tax rate of $\tau_U = N_0/2\beta$.⁹ This is the rate that will be chosen under unitary democracies.

Revenues raised from redistributive taxation will be allocated to provide the majority (centrally) chosen provision of redistributive public services and the per-capita basic grant. The mandated standard service output q is provided by a linear private goods technology. of the general form¹⁰ There are three classes of public employees, distinguished by their level of professional training, as reflected in the productivity parameter: elite providers, a_e ; trained majority providers, a_m ; and untrained majority providers, a_u , where, $a_e > a_m > a_u$.

The central government is assumed to mandate a common civil service wage to be paid equally to all providers. The cost per majority resident of meeting a mandated public service standard q is $s(q)$, which is inversely related to the training of the workers, i.e., $s_e(q) < s_m(q) < s_u(q)$.¹¹

The central government's redistributive budget constraint is specified generally as:

$$s(q) + b = g(\tau) = [\tau N(\tau) - Z]/M,$$

where $g(\tau)$ is aggregate redistributive spending available for each majority resident, and Z is a

collection, and police and fire protection are assumed to be provided by local governments from local resident incomes. Where elite and majority residents reside in the same province, we assume segregation (by income) into separate local jurisdictions. Thus local public goods are private goods, paid for from after tax and transfer incomes, respectively.

⁹ This tax rate should be interpreted as the incremental, or "last," tax rate used to fund redistributive services, paid on top of all other taxes used to fund such pure public goods as national defense, public infrastructure, and domestic security.

¹⁰ $q = a(X/M)$, where X/M represents the number of public employees (X) per majority resident (M), and ' a ' reflects worker productivity. X/M might be the teacher-student or nurse-resident ratio.

¹¹ $s_e(q) = S(q/a_e)$ using elite providers; $s_m(q) = S(q/a_m)$ using majority providers; and $s_u(q) = S(q/a_u)$ using untrained providers, where S is the civil service wage.

payment to any special interest groups initially capable of blocking the transition. $Z < 0$ can be interpreted as international aid, where such assistance allows higher grants and services for the new majority and lower taxes on the elite, both of which facilitate transition.

Under unitary democracies, redistributive taxes are raised centrally, the special interest payment is made, and funds are then distributed by a central government bureaucracy directly to the majority citizens, first through the central government's provision of services and then via the per-capita grant. The cost of providing the mandated level of redistributive services using a single unitary government, $s_U(q)$, is a weighted average of the cost associated with trained and untrained providers.¹² The redistributive grant to each majority resident under unitary democracy will be $b = g(\tau) - s_U(q)$.

Under federal democracies, redistributive taxes are raised centrally, the special interest payment is made, and all remaining funds are distributed as a uniform per-majority person intergovernmental transfer of $g(\tau)$ from the central government to the provinces. From this uniform grant, provinces must provide the mandated service levels, after which all remaining funds are distributed by the province as a per-majority person grant. The majority controlled provinces are assumed to allocate resources as would a majority controlled central government. Residents in majority provinces receive their public services at a cost of $s_m(q)$ and a basic grant $b = g(\tau) - s_m(q)$.

Majority residents residing in an elite controlled province will be given the mandated service level by elite providers, at a cost of $s_e(q)$. As a result, the remaining available basic grant in the elite province is $b = g(\tau) - s_e(q)$. However, not all of the fiscal surplus from having low cost, elite

¹² Specifically, $s_U(q) = ms_m(q) + (1 - m)s_u(q)$, where m is the share of majority residents serviced by trained majority providers. We are assuming either that well-trained, elite public providers choose not to provide redistributive services under a majority-run unitary democracy, or if they do, they are no more productive than the average majority provider, perhaps allocating a portion of their work day to private clinics and schools for elite residents.

providers goes to majority residents in elite-run provinces. The elite leadership in these provinces has an incentive to “capture” some of the basic grant for elite residents, most likely through the provision of provincial services (roads, parks, street lighting) to elite residential neighborhoods. Capture is limited to the basic grant after redistributive public services have been provided; the assumption here is that redistributive service provision can be easily audited by observing the training and number of employees providing services. The level of the basic grant actually received by majority (low-income) residents in elite provinces will therefore be $(1 - \varphi)[g(\tau) - s_e(q)]$, where φ is the rate of capture by the elite. We assume that φ is common knowledge but not contractible; in particular, the outcome $\varphi = 0$ is not legally enforceable.¹³

The rate of capture will be one of two values: φ^L and φ^H . The lower value (φ^L) is set by the ability of the majority residents in the elite province to organize costly protests when capture is observed, perhaps by imposing service inequities between elite and majority neighborhoods. Once organized, these protests are assumed to impose a cost ρ on each elite resident. The elite provincial leadership will at a minimum push φ to the point where capture is just observed, which defines φ^L . The upper value φ^H is set by the willingness of majority residents to exit the elite province for a majority run province.¹⁴ In the analysis that follows we assume that some capture is always possible

¹³ There is an extensive literature on the “fungibility” ($\varphi > 0$) of intergovernmental transfers where money intended for lower income recipients is channeled into middle class services, even in the United States where one might expect effective enforcement. With respect to education, see, for example, Gordon (2004).

¹⁴ The upper bound on φ is set by the exit options of majority residents in the elite province. Majority residents will receive $W + (g - s_m(q)) + v(q)$ in a majority run province, where $v(q)$ is the utility value of the mandated services. Majority residents in an elite province will receive $W + (1 - \varphi)[g - s_e(q)] + v(q) + E$, where E is the saved costs of exit associated with remaining in the elite province. The value of φ which leaves the majority resident just indifferent between staying or leaving will define φ^H :

$$\varphi \leq \varphi^H = ([E + (s_m(q) - s_e(q))]/[g - s_e(q)]) \leq 1.$$

The maximum rate of capture is 1. Elite provinces with high exit costs – areas with strong personal attachment for the majority residents – and efficient public service provision can permit high rates of elite capture.

before local protests occur, so that $0 < \varphi^L < \varphi^H \leq 1$.¹⁵

We can now detail the incidence of redistributive public budgets for majority and elite residents in unitary and federal democracies. This final allocation of public budgets defines the payoffs of the annual policy game, shown in Table 1.

Under *democratic federalism*, F , there are two cases to consider, one in which the elite leadership of the elite-run province captures only the lower value φ^L of the basic grant, and a second case where the elite leadership chooses to capture the upper value, φ^H . The welfare of a majority resident in an elite province will be:

$$\omega_e(F; \varphi^{L \text{ or } H}) = W + (1 - \varphi^{L \text{ or } H})[g_F - s_e(q)] + v(q),$$

depending on whether the elite chooses low or high capture, where $g_F - s_e(q)$ is the basic grant received by a majority resident, and $v(q)$ is the typical majority resident's utility from mandated services. Similarly, for majority residents in a majority-controlled province:

$$\omega_m(F) = W + [g_F - s_m(q)] + v(q).$$

The average majority resident's welfare is a weighted average of the welfare of majority residents residing in elite province(s) and the welfare of majority residents residing in majority province(s), where the weights are the share of all majority residents residing in the elite province, $\mu_e = (M_e/M)$, and the majority province(s), $(1 - \mu_e) = [1 - (M_e/M)]$:

$$\omega(F; \varphi^{L \text{ or } H}) = \mu_e \omega_e(F; \varphi^{L \text{ or } H}) + (1 - \mu_e) \omega_m(F).$$

The shares are exogenous to the policy game, set by provincial boundaries and decided at the first

¹⁵ Recent work by Reinikka and Svensson (2003) studying the allocation of education grants in Uganda finds rates of capture near .80 when citizens cannot monitor their public officials (φ^H), but when monitoring is possible through public disclosure and an activist free press the rate of capture falls to .20(φ^L).

constitutional stage.¹⁶ Welfare is given by:

$$\omega(F; \varphi^{L \text{ or } H}) = W + g_F[1 - \varphi^{L \text{ or } H} \mu_e] - s_F(q) + \varphi^{L \text{ or } H} \mu_e s_e(q) + v(q), \quad (1L, 1H)$$

where $s_F(q)$ is the cost of public service provision.¹⁷ Clearly the majority prefers low capture.

Under *administrative federalism*, A , the central government's poor majority selects an equilibrium tax rate of τ_U and a redistributive grant equal to g_U , just as they would under a unitary system. However, because redistributive services and the basic grant are still administered by the provinces, elite capture is possible. The weighted average welfare for the typical majority resident under administrative federalism becomes:

$$\omega(A; \varphi^{L \text{ or } H}) = W + g_U[1 - \varphi^{L \text{ or } H} \mu_e] - s_F(q) + \varphi^{L \text{ or } H} \mu_e s_e(q) + v(q), \quad (2L, 2H)$$

Here too, low capture is preferred.¹⁸

Under *unitary democracy*, U , simple majority rule will ensure the national redistributive tax rate will be set at its maximal rate (τ^U), given the possibility of elite mobility. In unitary democracy there are no provinces, no elite capture, and no elite providers of mandated services. The average majority resident's utility (i.e., welfare) is therefore given by:

$$\omega(U) = W + [g_U - s_U(q)] + v(q), \quad (3)$$

where W is the majority resident's market wage, $[g_U - s_U(q)]$ is the basic grant received by the majority resident, and $v(q)$ is the typical majority resident's utility from mandated services.

¹⁶ Majority residents living in the elite province will only leave that province if φ chosen by the elite provincial leadership exceeds the upper bound, φ^H , in which case all of M_e residents exit. Since this will mean no grants to the elite province and thus no capture, the elite leadership will keep $\varphi \leq \varphi^H$ and the majority population stays at M_e . Thus we assume $\mu_e = (M_e/M)$ is given in the policy stage, having been set at the constitutional stage by the drawing of provincial lines.

¹⁷ $s_F(q) = \mu_e s_e(q) + (1 - \mu_e) s_m(q)$.

¹⁸ Whatever rate of capture is chosen by the elite provincial leadership, the central government will always prefer to set $\tau = \tau_U$ in any budget period, since this gives $g_U > g_F$; thus $\omega(A; \varphi^L) > \omega(F; \varphi^L)$ and $\omega(A; \varphi^H) > \omega(F; \varphi^H)$.

In any single budget period of the policy game, the central government majority has a dominant strategy: to maximize revenues from redistributive taxation and to turn provinces into administrative agencies of the center’s fully redistributive fiscal policies. If democratic federalism is to be sustainable in the policy game, however, the majority’s temptation to “defect” to administrative federalism must be checked. Elite provinces will therefore need a credible “punishment” strategy, when and if a defection occurs. Punishment will take the form of high capture. To determine if high capture is a credible punishment, we must specify the after-tax, after-capture incomes of the elite residents in the elite provinces.

Under democratic federalism, the elite residents are assumed to reside only in elite-run provinces. They continue to pay redistributive taxes to the central government, but receive from their elite-run provincial governments a proportional share of captured intergovernmental transfers not allocated to mandated redistributive services for the poor (national) majority residents that reside in their province. Elite residents are assumed not to qualify for redistributive public services.¹⁹

Ultimately, fiscal incidence depends on the central government’s choice of τ . If $\tau_F < \tau_U$, then democratic federalism holds, and:

$$y(F; \varphi^L) = Y - \tau_F + \varphi^L [g_F - s_e(q)] \cdot [M_e / N(\tau_F)], \quad (4L)$$

for low capture, but:

$$y(F; \varphi^H) = [Y - \rho] - \tau_F + \varphi^H [g_F - s_e(q)] \cdot [M_e / N(\tau_F)], \quad (4H)$$

for maximal capture, when the elite provincial leadership adopts φ^H , but the majority then imposes protest costs ρ .

¹⁹ Elite residents in elite provinces receive their services either as separately financed provincial services or from private providers. The services provided to majority residents can be thought of as “compensatory” services in those instances where elite and majority residents share a provider.

Under administrative federalism, if the central government sets $\tau = \tau_U$, then:

$$y(A; \varphi^L) = Y - \tau_U + \varphi^L[g_U - s_e(q)] \cdot [M_e/N(\tau_U)], \text{ and,} \quad (5L)$$

$$y(A; \varphi^H) = [Y - \rho] - \tau_U + \varphi^H[g_U - s_e(q)] \cdot [M_e/N(\tau_U)], \quad (5H)$$

for the elite resident's incomes under low and high capture, respectively.

Finally, the average elite resident's welfare is simply his or her after-tax income,

$$y(U) = Y - \tau_U. \quad (6)$$

Clearly, for any rate of capture, elite residents prefer democratic federalism to administrative federalism. Further, because both democratic and administrative federalism permit capture, democratic and administrative federalism are preferred to a unitary democracy: $y(F; \varphi^L) > y(A; \varphi^L) > y(U)$ and $y(F; \varphi^H) > y(A; \varphi^H) > y(U)$. Whether the elite prefers low or high capture will depend upon the net gain per elite resident of moving from low to high capture, compared to the “protest penalty” ρ imposed when the high capture strategy is adopted. Having high capture be a preferred strategy for the elite when the majority defects from democratic to administrative federalism will be a necessary condition for sustainable democratic federalism; see Proposition 1 below.

Table 1 summarizes the pay-offs in any single year of the fiscal policy game for typical majority and elite residents, given the strategies of the majority-run central government and the elite-run provincial governments. Fiscal strategies in any given year are assumed to be chosen simultaneously. The central government can use provinces and set $\tau = \tau_F < \tau_U$ (Strategy, F) or use provinces but set $\tau = \tau_U$ (Strategy, A), or ignore provinces, create a unitary democracy, and set $\tau = \tau_U$ (Strategy, U). The elite run provinces, if they exist, can adopt either a low (Strategy, φ^L) or high (Strategy, φ^H) rate of capture. Cells (1) and (4) define pay-offs under democratic federalism, cells (2) and (5) under administrative federalism, and cells (3) and (6) under unitary governance.

C. Sustainable Democratic Federalism: For democratic federalism to be sustainable, it must provide Pareto superior allocations to those available under either administrative federalism or unitary democracy. This is indeed the case in our specification of the fiscal policy game, since democratic federalism ensures greater potential private goods consumption for majority and elite residents than is possible under either administrative federalism (Cell (1) > Cell (2); Cell (4) > Cell (5) for both low and high capture) or under unitary democracy (Cell (1) > Cell (3), Cell (4) > Cell (6), again for both low and high capture)). Because $\tau_F < \tau_U$, democratic federalism has more elite residents contributing to national income and lower per (elite) person fixed costs in providing redistributive public services to majority residents and a payment to the special interests. In addition, there are no potentially wasted protest costs (as with administrative federalism) nor is there a need to use less efficient untrained providers to supply (as with unitary democracy).

Whether democratic federalism will be realized depends on the constitutional ground rules that dictate the play of the annual policy game. Were the fiscal policy game to be played only once, or with a sufficiently high discount rate so that future payoffs became unimportant, democratic federalism would be a dominated strategy for the majority, always less preferred than administrative federalism.²⁰ Further, if the lower cost of providing distributional services is sufficiently low under unitary governance, unitary federalism may dominate administrative federalism and democratic federalism as well.

Fortunately, the policy game is played repeatedly. Under appropriately designed constitutional rules, unending repeat play will allow the elite to punish the majority whenever the majority defects from democratic federalism, either to administrative federalism or to unitary

²⁰ For common values of Z , M , q , and μ_e , $\tau_U > \tau_F$ implies $g_U > g_F$, and therefore $\omega(A; \varphi^L) > \omega(F; \varphi^L)$ and $\omega(A; \varphi^H) > \omega(F; \varphi^H)$.

governance. For the policy game in Table 1, the elite's punishment strategy will be to increase capture from φ^L to φ^H .

To effectively deter majority defection from democratic federalism, however, the elite's threat to adopt the high capture strategy must be credible. For high capture to be a credible threat, (i) provinces must remain as viable fiscal jurisdictions, even when the majority defects from democratic federalism; (ii) the elite must be a political majority in at least one province; and (iii) the elite majority must prefer φ^H to φ^L when the majority defects. The necessary conditions are given formally below.

DEFINITION: CREDIBLE PUNISHMENT. *The high capture strategy will be a credible punishment strategy when:*

(i) *The poor majority prefers provinces and administrative federalism as their defection alternative, i.e., $\omega(A; \varphi^L) > \omega(U)$;*

(ii) *The elite is a political majority in at least one province, i.e., $N(\tau_U) \geq M_e$; and,*

(iii) *The elite prefers the high capture strategy to low capture when the poor majority defects to administrative federalism, i.e., $y(A; \varphi^H) > y(A; \varphi^L)$.*

The three constraints will be met when the fiscal constitution creates an elite province of sufficient size for the high capture strategy to be an effective threat (as indicated by the fraction of majority residents who reside in the elite province, $\mu_e = M_e/M$) and the constitution selects appropriate bounds for a constitutionally mandated level of redistributive services. We call the population constraint the constitutional *Border Constraint* and the constraint on services the constitutional *Assignment Constraint*. When the elite has a credible punishment, Proposition 1 will show that for at least one set of Nash strategies – the grim trigger strategies – democratic federalism is sustainable.

1. *The Border Constraint:* For elite punishment to be credible, the elite-run province must

willingly adopt the high capture strategy when the majority defects from F to A .²¹ This will be case when the net gain to an elite resident from increasing capture exceeds the costs the resident bears from provincial unrest when capture is large:

$$(\varphi^H - \varphi^L)[g_U - s_e(q)][M_e/N(\tau_U)] > \rho,$$

or when:

$$\mu_e > \mu^{\min}(q) = \{\rho(N(\tau_U)/M_e)\}/\{(\varphi^H - \varphi^L)[g_U - s_e(q)]\}.$$

The intuition is as follows. If φ^H is to be credible, the additional resources captured must be greater than the costs imposed by local political protests when capture is high. The more majority residents “assigned” to the elite province the greater the revenues per elite resident from high capture. In effect, the majority residents assigned to the elite province act as “hostages” in a “tax deterrence” game. Further, large protest costs and a greater elite population or small net gains from maximal capture means that the number of hostages must be increased.

But μ_e cannot be too large. For the high capture threat to be credible, the elite must still be a political majority in their province. Thus $N(\tau_U) \geq M_e$, or:

$$N(\tau_U)/M = \mu^{\max} \geq \mu_e = (M_e/M).$$

For high capture to be a credible punishment strategy, therefore, the constitutionally mandated population size of the elite province must satisfy the *border constraint*:

$$\mu^{\max} \geq \mu_e > \mu^{\min}(q). \tag{7}$$

The border constraint defines the population size of the elite province as $N(\tau) + M_e$.²²

²¹ $y(A; \varphi^H) > y(A; \varphi^L)$. We require strict inequality because the elite are assumed to prefer to cooperate rather than defect, all else equal.

²² Federal constitutions, including the South African Constitution, typically include such constraints, either stated explicitly or implicitly by the country map at the time of the adoption of the constitution; for South Africa, see Muthien and Khosa (1998).

2. *The Assignment Constraint:* The elite can only punish through high capture if they control a political jurisdiction with budgetary responsibilities for redistributive services and basic grants. Provinces must be assigned these responsibilities by the constitution, and the majority controlled central government must respect that constitutional assignment. If the central government defects from democratic federalism, therefore, it must defect to the alternative where provinces still have fiscal responsibilities – that is, to administrative federalism and not to unitary governance.²³

If the average cost savings for the majority from using elite provinces is larger than what elite leaders capture per average majority resident, then administrative federalism will be preferred to a unitary system when $[s_U(q) - s_A(q)] > \phi^L \mu_e [g_U - s_e(q)]$.²⁴ The intuition is clear. Unitary democracy will be an attractive alternative to administrative federalism for the ruling majority when elite provinces can capture a lot ($g_U \cdot \phi^L \uparrow$) and when the cost disadvantage of giving up administrative federalism is low ($[s_U(q) - s_A(q)] \downarrow$).²⁵ Though the elite might promise not to capture too much, to do so by promising to set $\phi < \phi^L$ is not legally enforceable and thus not credible. However, a constitutional constraint requiring a minimum level of distributional services, q^{\min} , makes a low capture promise credible, since raising q reduces the basic grant, $b = g_U - s_e(q)$, available for capture. With $q > q^{\min}$, the majority will only defect as far as administrative federalism.

But q cannot be too large. Since we assume q can be costlessly monitored – teachers and

²³ Thus $\omega(A; \phi^L) > \omega(U)$ must hold. A strict inequality is required since we assume, all else equal, the majority prefers unitary democracy.

²⁴ When the average service costs are specified as $s(q) = S(q/a)$, the constraint becomes $q > q^{\min}(\mu_e) = (g_U \cdot \phi^L) / [S \cdot \hat{a}(\mu_e)]$, where $\hat{a}(\mu_e) = [(1/a_m) - (1/a_e)] + [(1 - m)/\mu_e] \cdot [(1/a_u) - (1/a_m)] + (\phi^L/a_e)$. All elements defining q^{\min} are exogenous; q^{\min} increases as $(g_U \cdot \phi^L)$ increases and as $(S \cdot \hat{a})$ declines.

²⁵ $S \cdot \hat{a}$ gets smaller and thus q must rise, when: (i) the average cost differences between majority and elite providers ($[(S/a_m) - (S/a_e)]$) declines; (ii) the number of untrained providers needed to replace elite providers ($[(1 - m)/\mu_e]$) falls; or (iii) the efficiency of untrained providers improves and ($[(S/a_u) - (S/a_m)]$) falls. In addition, $S \cdot \hat{a}$ falls and q must rise, the smaller are the foregone savings per unit q the majority had enjoyed under administrative federalism.

nurses are easy to count – and since spending on q reduces the basic grant available for elite capture, the majority can limit elite revenues from capture by increasing q . As q increases, the net returns to capture may fall below the amount needed for the elite to find the high capture punishment strategy a preferred response to a majority defection from F to A (from the border constraint). The maximum q ($= q^{\max}$) that protects high capture as a credible punishment strategy will be that q for which the border constraint just holds – that is, at $\mu^{\max} = \mu^{\min}(q^{\max})$ or:

$$q^{\max} = [g_U - \rho/(\varphi^H - \varphi^L)]/s_e(q),$$

where $[g_U - \rho/(\varphi^H - \varphi^L)]$ is the maximal amount of money the elite can spend on q and still prefer to punish if the majority defects and $s_e(q)$ is the average cost of providing q in the elite province. Given the constitution's choice of redistributive services, all elements defining q^{\max} are exogenous in the second-stage of the policy game.²⁶ Together the lower and upper bounds on q define the constitutional *assignment constraint* for redistributive services:

$$q^{\max} \geq q > q^{\min}(\mu_e). \quad (8)$$

3. *Ensuring Credible Punishments*: If both the border and assignment constraints are met, then the elite will be in a position, under democratic federalism, to credibly punish the majority for any deviations from τ_F to τ_U . The result is summarized in Lemma 1.

LEMMA 1: CREDIBLE PUNISHMENTS. *For political economies satisfying the Border and Assignment Constraints, the high capture strategy will be a credible punishment strategy whenever the majority adopts a revenue-maximizing (centralizing) redistributive tax rate.*

Together the two constraints define a set of possible constitutional values of μ_e and q where the elite can credibly threaten to punish the majority when they deviate from the preferred tax rates chosen under democratic federalism: $\tau_F < \tau_U$. The border constraint requires values of μ that lie

²⁶ Further, for all $q \leq q^{\max}$, $\mu^{\max} \geq \mu^{\min}$ as required for the Border Constraint.

above the $\mu^{\min}(q)$ curve and below the μ^{\max} line in Figure 1. The constitutional constraint requires values of q that lie to the right of the q^{\min} curve. The entire shaded area shows all values of μ_e and q where the border and assignment constraints are jointly satisfied.

[INSERT FIGURE 1 HERE]

There is no guarantee that both constraints can be met. First, while the constitution sets a level of redistributive services mandated of the provinces, there is no assurance that the central government majority will enforce that mandate. To ensure enforcement, it must be true that the elite's preferred level of q in democratic federalism, denoted $q^*(F)$, must be greater than q^{\min} . If assigned services are unimportant to the majority and $q^{\min} \geq q^*(F)$ then any provincial cost advantages in their provision will be insufficient to prevent the majority from simply shutting down provinces, setting $\tau = \tau_U$, and providing the constitutionally required services centrally. Constitutionally assigned redistributive services must be important to majority citizens.²⁷

Second, if μ^{\max} falls below $\mu^{\min}(q^{\min})$, then the feasible set for credible elite punishments disappears, and without elite punishments, democratic federalism is not sustainable. This may occur either because the initial, pre-democracy ratio of elite to majority residents is small or because the elite population has a high propensity to exit as tax rates rise. Either way, $N(\tau_U)$ is small relative to M , and the shaded area in Figure 1 disappears. This illustrates Hirschman's important insight: When

²⁷ In the South African constitution, for example, provinces are assigned responsibility for providing K-12 education, preventive health services, and social security grants to the elderly, disabled, and children in poverty. It is also necessary that $q^{\max} \geq q^*(F)$. If $q^*(F)$ exceeds q^{\max} , then ϕ^H is no longer a credible punishment. Without a credible elite punishment strategy, democratic federalism cannot be sustained as a subgame perfect Nash equilibrium of the repeat play, constitutional game. To prevent this outcome, it must be true that $\omega(q^*; F, \phi^L) > \omega(q > q^{\max}; A, \phi^L)$. In the proof of Proposition 1, we show that when the majority selects both g and q in the budget game, this condition in fact holds.

exit is possible, *loyalty* is essential for *voice* to work.²⁸

It is also necessary that the constitutional requirements for democratic federalism be resistant to amendments by the majority. Since the elite prefers democratic federalism to either administrative federalism or unitary democracy, if the elite population is sufficient to block amendments:

$$[N(\tau_U)/(M + N(\tau_U))] > (1 - \alpha) \quad (9)$$

where α is the vote share needed for amendment approval (e.g., 2/3), then Lemma 1's border and assignment constraints are protected, and Lemma 1 applies. In many emerging democracies, however, the elite fraction of the population is likely to be small, perhaps no more than 15 or 20 percent. If so, then constitutional constraints will only survive if the constraints are incentive compatible for the majority.

Incentive compatibility requires that the majority must always prefer to use provinces for the delivery of redistributive services ($\mu_e > 0$) even though elite capture is possible.²⁹ A sufficient condition is:

$$[s_m(q) - s_e(q)] - \phi^L[g_F - s_e(q)] > 0, \text{ or:}$$

or when:

$$q > q^{\min}(\mu > 0) = (g_U \cdot \phi^L) / s_e(q). \quad (10)$$

²⁸ Hirschman (1970). In the linear exit relationship $N(\tau) = N_0 - \beta \cdot \tau$, $N(\tau_U) = .5N_0$. Thus only the ratio of the initial elite to majority population $-N_0/M-$ matters for the final value of μ^{\max} . However, in our specification, a high exit parameter value lowers g_U which raises μ^{\min} , with the same consequences for the shaded area of credible elite punishments and sustainable federal democracies. For details, see Appendix B. Finally, N_0/M might also be low because the elite cannot easily be placed in a spatially plausible province, for example, if the elite are primarily landed aristocracy spread uniformly throughout the country. An attractive and productive urban center may therefore be an essential precondition for democratic federalism.

²⁹ To ensure the majority will prefer provinces as providers of redistributive services we require $\partial\omega(F, \varphi)/\partial\mu > 0$; if $\partial\omega(F, \varphi)/\partial\mu \leq 0$, then $\mu_e = 0$ is preferred and unitary democracy applies.

The amendment-proof $q > q^{\min}(\mu > 0)$ constraint is shown in Figure 1 as the vertical line at $q^{\min}(\mu > 0)$, and is everywhere a tighter constraint than the “unprotected” q^{\min} constraint of Lemma 1.³⁰ Higher values of q help to control elite capture thereby ensuring the cost advantages of elite provinces are sufficient to make those provinces preferred means of service delivery *in* the federal regime. If so, the majority has no incentive in any budget period to close down provinces and exit to unitary governance. For amendment-proof punishments, we require a stronger a stronger version of the assignment constraint specified as (10). We formalize this as Lemma 2.

LEMMA 2: AMENDMENT-PROOF CREDIBLE PUNISHMENTS. *For political economies where the elite population is insufficient to block constitutional amendments, but where the original Border Constraint and a now-stronger Amendment-proof Assignment Constraint are satisfied, the high capture strategy will be an amendment-proof, credible punishment strategy when the majority adopts the revenue-maximizing (centralizing) redistributive tax rate.*

4. *Sustainable Democratic Federalism:* Democratic federalism, and the Pareto gains this constitutional regime promises, can be sustained as a long-run equilibrium of the annual policy game if both the poor majority and the elite can be discouraged from defecting from (F, ϕ^L) . Formally:

DEFINITION: SUSTAINABLE DEMOCRATIC FEDERALISM. *Democratic federalism will be a sustainable constitutional regime for the infinitely repeated policy game if the strategy pair (F, ϕ^L) is a subgame-perfect Nash equilibrium.*

For the majority, the strategy F requires a choice of the central government’s tax rate $\tau_F < \tau_U$, or equivalently given Z , the aggregate level of redistributive transfers g_F to the provinces. For subgame perfection, this strategy choice (τ_F, g_F) must allocate the surplus available under democratic federalism to the poor majority and the current elite in such a way that both prefer democratic federalism to either administrative federalism or unitary democracy. To ensure the elite are better off under democratic federalism taxes cannot be too high; the majority’s fiscal choices must satisfy

³⁰ In the linear cost function case, $s_e(q) = (S \cdot \hat{a})$ where: $\hat{a} = [(1/a_m) - (1/a_e)] + (\phi^L/a_e) = [(1/a_m) - (1 - \phi^L)/a_e]$.

$\tau_U > \tau_F^{\max} \geq \tau_F$ or equivalently, $g_U > g^{\max} \geq g_F$, where τ_F^{\max} is just sufficient to ensure the elite will continue to play φ^L under democratic federalism. To ensure that the poor majority are better off under democratic federalism redistributive spending cannot be too low; the majority's fiscal choices must satisfy $g_F > g^{\min}$ or equivalently, $\tau_F > \tau^{\min}$, where g^{\min} is the intergovernmental transfer just sufficient to ensure the majority prefers democratic federalism to a maximal tax regime. For subgame perfection, therefore, the majority chosen tax rate and intergovernmental transfer must satisfy $\tau_U > \tau_F^{\max} \geq \tau_F > \tau^{\min}$, or equivalently, $g_U > g^{\max} \geq g_F > g^{\min}$. In the analysis that follows, we focus on the bounds $g_U > g^{\max} \geq g_F > g^{\min}$.

Proposition 1 specifies g^{\max} and g^{\min} for one pair of subgame perfect strategies and then proves that there exists a majority preferred fiscal choice (τ_F, g_F) and an elite capture decision (φ^L) satisfying those bounds. The strategy choices considered here are grim trigger strategies defined as:

DEFINITION: GRIM TRIGGER STRATEGIES. *The poor majority and the elite are said to play grim trigger strategies at each stage of the policy game if:*

- (i) *along the equilibrium path, the majority-run central government selects (τ_F, g_F) and the elite-run province selects φ^L ; and,*
- (ii) *off the equilibrium path, were the majority central government to have selected (τ_U, g_U) the elite would play φ^H in all subsequent budget periods, and where, were the elite province to have selected φ^H , the majority would play either administrative federalism (A) selecting (τ_U, g_U) , or unitary democracy (U) selecting τ_U in subsequent budget periods.*

These grim trigger strategies are the most extreme form of punishment one player can impose on the other for defection; if democratic federalism cannot be sustained under these strategies, it cannot be sustainable under any feasible strategies.³¹ Were the majority to defect and select τ_U , the

³¹ See Gibbons (1992), pp. 122-129.

elite would punish by selecting the high capture strategy forever. Were the elite to defect and adopt a high capture strategy, then the majority-run central government would punish by selecting τ_U and using administrative federalism forever, or by selecting τ_U , and using unitary democracy forever.

For any provincial size (μ_e) and assignment (q) satisfying the border and assignment constraints, the majority prefers to punish using unitary democracy when:

$$\mu_e \varphi^H \cdot [g_U - s_e(q)] \geq [s_U(q) - s_F(q)].$$

Punishment by administrative federalism is preferred when the inequality is reversed.

$\mu_e \varphi^H \cdot [g_U - s_e(q)]$ is the money saved from bypassing provinces and avoiding high capture, while $[s_U(q) - s_F(q)]$ are the added costs needed to provide q services centrally, without using the elite province. A corollary to Proposition 1 shows the majority will be able to capture a larger share of the democratic federalism's surplus when U is their preferred punishment strategy.

We can now state the main result; for a complete specification of the theorem and its proof, see Appendix A.

PROPOSITION 1: SUSTAINABLE DEMOCRATIC FEDERALISM: *For elite provincial size and redistributive assignment satisfying the Border and Assignment Constraints, there exists a grim trigger strategy equilibrium where democratic federalism is sustainable. For majority and elite residents with discount factor $0 < \delta \leq 1$, that equilibrium is characterized by:*

(1) *For majority punishment strategy U , the majority chooses g_F within the bounds:*

$$g_U > g^{max}(U) \geq g_F > g^{min}(U);$$

(2) *For majority punishment strategy A , the majority chooses g_F within the bounds:*

$$g_U > g^{max}(A) \geq g_F > g^{min}(A)$$

(3) *The elite province adopts φ^L .*

The discount factor δ , which differ for the two groups, measures the rate of impatience of majority and elite citizens for receiving the economic benefits of democracy. Lower values of δ

represent greater impatience. The maximum difference in the achievable net income between democratic federalism and the unitary government alternative increases as the elite becomes more impatient and δ declines in value. Furthermore, a more impatient elite implies correspondingly smaller values for $g^{\max}(U)$ and $g^{\max}(A)$, respectively.

Correspondingly, as the majority becomes more impatient, the difference in net income between unitary government and administrative federalism increases.³² A more impatient majority implies correspondingly larger values for $g^{\min}(U)$ and $g^{\min}(A)$, respectively.

A credible announcement of high impatience by the elite acts to check their maximal tax payments, while a similar credible announcement from the majority increases the minimal equilibrium transfer. If both parties are very impatient, however, we cannot rule out the possibility that $g^{\min}(U) > g^{\max}(U)$ or $g^{\min}(A) > g^{\max}(A)$ and that there will be no equilibrium transfer capable of sustaining democratic federalism. Successful democratic constitution writing therefore requires at least some commitment to the long-run by the residents of the new democracy.³³

Any value of g_F satisfying Proposition 1 will be consistent with a sustainable federal democracy. Constitutional negotiators might choose to divide the surplus equitably between the majority and the elite by setting an indexed value of g_F midway between g^{\min} and g^{\max} . But again, such a constitutional constraint will not be amendment-proof if the elite's share of the population is too small to block amendments. In this case, the central government's majority will be free to set

³² For the majority, as $[\omega(A, \varphi^L) - \omega(U)] > 0$ (from the assignment constraint) and $[\omega(A, \varphi^L) - \omega(A, \varphi^H)] > 0$, the welfare difference between administrative federalism and unitary government, and the welfare difference between low and high capture under administrative federalism increase as the majority's δ declines in value.

³³ The risk of no equilibrium is greatest when majority residents prefer punishment, that is, when the majority is negotiating from strength and in a position to impose a large penalty on the elite. In this case we can show that a minimal requirement to ensure $g^{\max}(U) \geq g^{\min}(U)$ is that $\delta > 1 - \mu_e$. The lowest possible δ still consistent with our border constraint is when $\delta > 1 - \mu^{\max} = 1 - N(\tau_c)/M$. It is worth stressing here that it is the residents' discount factor that matters, not the discount factor of the constitutional negotiators.

the size of the redistribution budget as part of the new democracy's budget game subject to the constraints of Proposition 1. Thus, $\tau_F = \tau^{\max}$ and $g_F = g^{\max}$ will be chosen. Since small elite populations are likely, it is instructive to explore the likely determinants of g^{\max} .

First, when democratic federalism is sustainable:

COROLLARY 1: $g^{\max}(U) > g^{\max}(A)$: For elite provincial size and assignment satisfying the Border and Assignment Constraints, there exists Grim Trigger Strategy Equilibria for majority punishment strategies of either unitary democracy or administrative federalism forever, where (i) democratic federalism is sustainable, and (ii) $g^{\max}(U) > g^{\max}(A)$.

Given Corollary 1, the poor majority will prefer to select g_F in a political economy where unitary democracy (U) is their credible punishment strategy. This will be so when $\omega(U) > \omega(A, \varphi^H)$, or equivalently:

$$\mu_e \varphi^H [g_U - s_e(q)] \geq [s_U(q) - s_F(q)] = (1 - m)[s_U(q) - s_m(q)] + \mu_e [s_m(q) - s_e(q)],$$

where m is the share of majority residents serviced by trained majority providers.

When (i) φ^H is high because majority residents are reluctant to exit the elite province, or when (ii) the need for untrained public employees ($1 - m$) is low, or when (iii) untrained workers are almost as efficient as trained majority employees ($s_U(q) \approx s_m(q)$) who in turn are almost as efficient as elite providers ($s_m(q) \approx s_e(q)$), the majority is more likely to have as its credible punishment the threat to “go unitary.”³⁴ In this case, g_F will equal $g^{\max}(U)$. Over time it is reasonable to expect the number of trained majority public employees to increase, thereby lowering $(1 - m)$ and increasing the attractiveness of unitary democracy as the majority's credible punishment. The maximal redistributive grant increases accordingly, perhaps in a discrete jump from $g^{\max}(A)$ to $g^{\max}(U)$ at the point where unitary governance becomes a credible punishment strategy.

³⁴ We assume that $\mu_e \geq (1 - m)$, that is, under democratic federalism there may be some trained majority public employees working in the private (non-redistributive) sector. When the elite providers exit to the private sector with centralization, those trained majority employees will return to work in the public (redistributive) sector.

There are further comparative static results with respect to both $g^{\max}(U)$ and $g^{\max}(A)$. Assuming that the conditions of Proposition 1 hold, we can show generally that $g^{\max}(U \text{ or } A)$ will increase as elite exit from the country becomes less likely or as the majority's protest costs born by the elite increase. General results are not available for other key parameters, but numerical simulations (Appendix B) show that for a plausible specification of the political economy, $g^{\max}(U \text{ or } A)$ will increase as Z and φ^H decline or as φ^L increases.

We offer four summary comments. First, democratic federalism can be a Pareto superior democratic constitution; our annual fiscal policy game offers one plausible example. Second, when constitutional border and assignment constraints are met, democratic federalism is sustainable for reasonably far-sighted majority and elite residents. Third, when the elite is a small share of the final population, the poor majority will capture almost all of the surplus generated by democratic federalism by its political choice of a high maximum redistributive grant to the provinces. Finally, lower special interest obligations, or equivalently, higher permanent outside fiscal assistance helps democratic federalism to succeed by allowing greater redistributive spending on the new poor majority without increasing the tax burden on the elite.

IV. Democratic Federalism and South Africa's Transition

There is little doubt that South Africa's transition from autocracy to democracy would not have occurred were the majority ANC and the minority NP and IFP negotiators not willing to accept an interim federal constitution with at least one politically protected province for each minority party, and with each province promised significant, but not fully autonomous, fiscal powers. It was

only after this agreement was reached on April 19, 1994 that democratic elections went forward.³⁵

The 1994 Interim Constitution left many details unspecified; what was specified were the ground rules under which the final federal constitution would be fashioned and then approved.³⁶ The FFC unanimously recommended a fiscal assignment that allocated all important taxing powers – personal income, corporate income, and the VAT – to the central government, and three important spending powers – K-12 education, primary health care, and social security (welfare) grants – to the provinces. Without significant taxing powers, however, the provinces required centrally funded intergovernmental transfers. The grant formulas that allocated funds across the provinces were set by the FFC, while the aggregate level of grants was chosen centrally by the Ministry of Finance, in consultation with the FFC.

The FFC's recommended allocation of fiscal powers and its continued role in setting grants policies were unanimously approved as part of the final 1996 Constitution. In the resulting system of democratic federalism the central government sets a redistributive tax rate (τ_F) to fund a redistributive intergovernmental transfer (g_F) paid to the provinces, where the total transfer must be sufficient to cover the costs of both the centrally mandated level of provincial redistributive services

³⁵ Waldmeir (1997, Chapter 13).

³⁶ The FFC was composed of one representative appointed by the executive committees of each of the nine provinces and nine at-large representatives appointed by Nelson Mandela. As required by the Interim Constitution, no members of the FFC held party office or were candidates for public office and all were recognized experts in either economics, accounting, public administration, or taxation.

and a basic grant.^{37, 38} The FFC also specifies the basic service grant to fund discretionary provincial services. The portion of the grant allocated by the elite (Western Cape) province to services for elite residents should be seen as the model's "captured revenues."

The democratic federal structure just described has now been in place for ten fiscal years and appears to be well accepted.³⁹ Table 2 provides estimates for each fiscal year of total central government tax revenue and the total tax rate on personal income, the national average level of redistributive grants (g_F) for each fiscal year, along with the grants' implied tax rate on personal income (τ_F). The table also shows the allocations of aggregate grants to mandated provincial services grants ($s(q)$) and basic grants (b) for the Western Cape ("elite" province) and an average of all other ("majority") provinces.

Three conclusions are evident from Table 2. First, provincial governments have been given a significant role for the provision of government services in South Africa, with almost all provincial revenues provided by central government transfers. The aggregate central government tax burden on personal income has grown from 29 percent in the first democratic (FY1995/96) budget to

³⁷ The FFC sets $s(q)$ as $s_i(q) = \sum_q S_q \cdot (X/M)_{iq}$ for each province, where S_q is the nationally uniform (largely, salary) costs of providing a mandated service input and $(X/M)_{iq}$ are the nationally uniform target ratio of inputs per recipient adjusted for the unique service "needs" of recipients in each province. In the model, these are determined based on the productivity parameters a_e and a_m .

³⁸ The FFC-set national input targets are one qualified teacher per 38 students ages 5-17, 3.5 health annual clinic visits per income eligible resident, and an average social security grant of 4500 Rand (2000 Rands, or about \$600) per eligible elderly, disabled, or lower income child. The national education and health care targets were first set by the FFC in their original budget proposal, *The Allocation of Financial Resources Between the National and Provincial Governments, FY 1996/97*, September 8, 1995, pp. 13, 14. The FFC's target welfare grant is from their second budget proposal, *The Allocation of Financial Resources Between the National and Provincial Governments, FY 1997/98*, No Date, p. 22, of 2816 Rand per eligible recipient, measured in year 2000 Rand. The FFC's target population is to include all elderly (over 65), children (under 15 years of age), and disabled in the lowest two quintiles of the income distribution; see, Minister of Finance, Division of Revenue Bill, 2004, p. 59.

³⁹ The FFC recently held a 10th anniversary conference reviewing the overall structure of federal finance and the details of the intergovernmental transfer formulae. For details, see their web site at www.ffc.co.za.

approximately 45 percent in recent years, with slightly less than half of this aggregate burden earmarked to provincial governments. Provincial governments and provincial service bureaucracies are now well established fiscal institutions.

Second, roughly 75 percent of the allocated grant monies are targeted towards achieving centrally-decided service mandates, shown as $s_e(q)$ for the elite province of Western Cape and as $s_m(q)$ as the average for the other eight “majority” provinces.⁴⁰ The basic grant from which the elite in the Western Cape might reasonably expect to “capture” resources has been kept at modest levels.

Third, the allocation of transfers has been moving away from the Western Cape over time towards the majority populated provinces. This was the result of an explicit decision by the FFC at the time of the democratic transition not to immediately implement the full structure of redistributive transfers, but to move to the desired allocation gradually over seven years; FY 2002/03 grants can be viewed as the FFC’s equilibrium grant structure.⁴¹ The residents of the Western Cape had enjoyed privileged funding of public services under the old apartheid regime, and it was feared that dramatic cuts in central government support for the province would threaten existing public employee labor contracts. The public employees of the Western Cape were an important political ally of the National Party at the time of democratic negotiations.⁴²

The phase-in of the Western Cape’s transfers is seen most clearly with the more than 50

⁴⁰ KwaZulu-Natal, though still politically controlled by the IFP, is considered a majority province for the purposes of specifying grants funding, since most citizens in Natal are lower income and have similar education, health care, and welfare needs as the other majority provinces.

⁴¹ FFC, *The Allocation of Financial Resources Between the National and Provincial Governments, FY 1996/97*, September 8, 1995, p. 11. The FFC’s 1997/98 allocation report sets the target date for full implementation of the grants formula as FY 2002/03; FFC, *The Allocation of Financial Resources Between the National and Provincial Governments, FY 1997/98*, No Date, p. 23.

⁴² Waldmeir (1997, p. 228).

percent cut in the province's unconstrained basic grant, b_e , which is most susceptible to elite capture, from FY 1995/96 to FY 2002/03. In addition, in the equilibrium grant structure, the Western Cape and the majority provinces receive approximately the same levels of basic grants, whereas the Western Cape receives approximately 20 percent less in mandated services grants ($= .818 = s_e(q)/s_m(q)$) as required by the relative differences in public employee productivity, or equivalently resident "needs."

Though the actual grant allocations and the analysis of Section III are qualitatively consistent, it is also important to ask how well the model of democratic federalism predicts grants spending when calibrated to the South African political economy in equilibrium. Choosing as a target grants spending in FY 2002/03 and beyond, we find that the model captures both the order of magnitude and the important patterns in South African provincial transfers. The tabulations in Table 3 show that the model predicts slightly more spending than is observed, but there is a clear upward trend in actual spending towards the predicted equilibrium values of provincial aid. The predicted values are reported in year 2000 Rand to be comparable to the actual grants reported in Table 2.

Our preferred calibration estimates the pre-democracy elite and current majority voting age populations at $N_0 = 9.6$ million and $M = 25$ million residents, as reported in the South Africa Census of Population for 1991 and 2001. The exit elasticity for the elite population in response to national taxes – whether by leaving the country or from dropping out of the economy – is set at $-.10$, implying a value of $\beta = -.00015$.⁴³ We are assuming that primary health care providers have

⁴³ The public service technology parameters ($a_e = 17$, $a_m = 14$, $a_u = 10$) were chosen to match the years of education of elite (white), majority (certified Black and Colored employees), and untrained (not certified) teachers in South Africa in 2001; Fiske and Ladd (2004), Tables 6.6 and 6.7.

comparable levels of education and that provider productivity is proportional to training. The uniform annual salary of public employees S is set at 80,000 (real 2000) Rand per year, whereas the average salary for teachers in the Western Cape (elite) and the Eastern Cape (majority) provinces in 2001.⁴⁴ The fraction of the majority population that can be serviced by trained majority public employees under a unitary democracy was estimated as $m = .85$ from data on trained teachers and primary care medical providers in South Africa over the decade 1991 to 2001.⁴⁵

The bounds on the elite's rate of capture are from Reinikka and Svensson's studies of capture in Ugandan local schools; $\varphi^L = .20$ and $\varphi^H = .85$. The costs of majority political protest on an elite resident when the elite exceeds the lower threshold for fiscal capture is an inflation adjusted estimate of comparable costs imposed by COSATU, the activist worker union, on white incomes during the latter stages of apartheid; $\rho = 1720$ (real 2000) Rand per elite resident (see section V).

Special interest payments made to the KwaZulu-Natal province are set equal to the 1985 decentralization grant made to the KwaZulu homeland under apartheid, generally viewed as a transfer paid to homeland chiefs for domestic peace; $Z = 600$ million (real 2000) Rand.⁴⁶ The discount factor δ was set at .97, consistent with an annual real rate of time preference of .03 equal to the real interest rate on South African government bonds issued in 2003 (see Appendix B).

Figure 1 above shows the exact locations of the border and assignment constraints corresponding to the calibration parameters specified above. The upper bound for the border constraint is $\mu^{\max} = N(\tau_U)/M = 4.8m./25m. = .192$ while the line $\mu^{\min}(q)$ defines the lower bound: μ^{\max}

⁴⁴ Fiske and Ladd (2004), Tables 6.5 and 6.6.

⁴⁵ Fiske and Ladd (2004), Table 6.7 for teachers, and the Development Bank of South Africa (1995), Table 26 for health care professionals.

⁴⁶ Lewis (1990), p. 51.

$= .192 \geq \mu_e > \mu^{\min}(q)$. The upper bound for the assignment constraint is $q^{\max} = [g_U - \rho/(\varphi^H - \varphi^L)]/(s_e(q)) = .74$, while the line $q^{\min}(\mu_e)$ defines the lower bound: $q^{\max} = .74 \geq q > q^{\min}(\mu_e)$.⁴⁷

Consistent with Lemma 1, the shaded areas in Figure 1 shows all the values of μ_e and q that satisfy the border and assignment constraints for the calibrated South African political economy. Because the South African constitution permits amendments with a 2/3 majority, and since the elite is at most 27 percent of the voting population ($= 9.6m/[9.6m + 25 m]$), the lower bound constraint on q must be strengthened to make the constitution amendment proof. The amendment-proof constraint is specified as $q > q^{\min}(\mu_e > 0) = (g_U \cdot \varphi^L)/(s_e(q)) = .63$.⁴⁸ The corresponding bounds on assignment are therefore $.74 \geq q > .63$. The cross-hatched area in Figure 1 shows the values of μ_e and q which satisfy both the border and now stronger amendment-proof assignment constraints, and which together define the set of amendment-proof, potentially sustainable federal constitutions. The 1996 South African Constitution's specified values of μ_e and q are within this set, shown as $\mu_e^* = .19$ and $q^* = .68$ in See Figure 1.⁴⁹

⁴⁷ q^{\max} is computed for the calibrated values of $g_U = 6120R$ (Table 3), $\rho = 1720R$, $\varphi^H = .85$, $\varphi^L = .20$, $S = 80,000R$, and $a_e = 17$.

⁴⁸ $q^{\min}(\mu > 0)$ is computed for the calibrated values of $g_U = 6120R$ (Table 3), $\varphi^L = .20$, $S = 80,000R$, and $\dot{a} = [(1/a_m) - (1 - \varphi^L)/a_e] = .0244$ for $a_m = 14$ and $a_e = 17$.

⁴⁹ See Appendix B. The borders of the Western Cape were drawn so that μ_e was close to μ^{\max} ; see Muthien and Khosa (1998). Here the elite barely wins the province, which has been the case since the provincial elections in 1994 (when the NP won 53 percent of the Western Cape vote and the ANC 33 percent.) In the 1999 Western Cape elections, the New National Party received 38 percent and a newly formed Democratic Party 12 percent to retain an elite majority; the ANC got 42 percent. In the 2004 Western Cape elections, the ANC won 45 percent of the vote, with a four-party coalition of the Democratic Alliance (28%), the New National Party (11%), the Independent Democrats Party (8%), and the African Christian Democratic Party (4%) controlling the province. See www.elections.org.za.

The FFC set q through its service targets of 1 teacher for each 38 school-aged children for education, 3.5 preventive health care clinic visits a year for each majority adult and child for health care, and 4500 (real 2000) Rand for each eligible (elderly, disabled, child in poverty) majority resident for social security transfers. FFC, *The Allocation of Financial Resources Between National and Provincial Governments, FY 1996/97* (1995), pp. 13,14. We estimate that meeting these service standards will require .045 public employees per majority resident; see Appendix B. Setting the average productivity parameter at 15 (years) implies an FFC set constitutional target of $q^* = (15) \cdot (.045) = .68$. The FFC targets have remained in place in all subsequent budgeting for mandated grants.

Given μ_e^* and q^* , South Africa's annual budget game must then choose an aggregate intergovernmental transfer, g_F , sufficient to pay for q^* in the elite and majority provinces and within the feasible range for sustainable democratic federalism as specified by Proposition 1: $g^{\max}(U) \geq g_F > g^{\min}(U)$ or $g^{\max}(A) \geq g_F > g^{\min}(A)$ conditional upon the majority's preferred punishment strategy as either unitary governance or administrative federalism. For our preferred calibration, the majority's punishment strategy will be unitary governance, achieved by setting $g_F \approx 0$ and providing q^* centrally; see Table 3.⁵⁰ Table 3 details our calibration-based estimates of g_U , $g^{\max}(U)$, $g^{\min}(U)$, $s_e(q^*)$ and b_e , and $s_m(q^*)$ and b_m , measured first as real Rand per majority adult, and then as real Rand per capita (italics) for comparisons to the actual grant payments reported in Table 2.

Proposition 1 predicts that for democratic federalism to be sustainable, g_F must lie between the elite's maximal willingness to pay (g_F^{\max}) and the majority's minimal willingness to accept (g_F^{\min}). For the calibrated South African economy we predict that g_F should be bounded between 3365 and 3263 Rand per capita; see Table 3. Since the ANC majority controls the central government and can select any grant within the range of federally sustainable grants, we assume that g_F will be chosen close to g_F^{\max} , about 3365 Rand per capita. From Table 2, the actual value of g_F is approximately 3000 Rand per capita, but the data show a strong upward trend in aggregate taxation and grants spending. For $q^* = .68$, the model predicts a mandated standards grant to the elite (Western Cape) and majority provinces of $s_e(q^*) = 1760$ Rand and $s_m(q^*) = 2137$ Rand, respectively. Actual mandated grants are $s_e(q) \approx 1900$ Rand and $s_m(q) \approx 2300$ Rand. Because we

⁵⁰ From Proposition 1, unitary governance is the majority's preferred punishment if: $\mu_e \phi^H \cdot [g_U - s_e(q)] \geq [s_U(q) - s_F(q)]$. For our the constitutional values of $\mu_e^* = .19$ and $q^* = .68$ and for our preferred calibration this condition becomes: $(.19)(.85) \cdot [6120 - 3200] = 472 > 344 = [4119 - 3755]$. When implementing the unitary punishment, provinces still exist as governments but the central government takes over all important fiscal choices and provides q through parallel administrative units of the central government.

over predict g_F but under predict $s_e(q)$ and $s_m(q)$, the estimates of the basic grants b_e and b_m are both too large. For both actual and predicted grants, however, $s_e(q) > b_e$ and $s_m(q) > b_m$, as would be expected when the majority seeks to control elite capture.

South Africa seems to have found a stable fiscal policy structure for sustainable democratic federalism. Table 4 examines how sensitive this favorable outcome is to changes in the country's underlying political economy. From Proposition 1, a self-enforcing federal constitution must select values of μ_e and q that meet the border and amendment-proof assignment constraints shown as the heavily shaded area of Figure 1, and there must be a range of aggregate intergovernmental transfers where $g^{\max} \geq g_F > g^{\min}$. There are four reasons why these conditions might be violated. First, given μ_e , the majority's preferred value of q^* ($= .68$ in Figure 1) $> q^{\max}$.⁵¹ In this case ϕ^H is no longer a credible threat by the elite when the majority centralizes and chooses τ_U . Second, again given μ_e , now $q^* < q^{\min}(\mu_e > 0)$; here the majority cannot credibly promise not to amend the constitution to remove provinces. Third, for μ_e and q^* that fall within the shaded area of Figure 1, $g^{\min} \geq g^{\max}$, and there are no values of g_F that can satisfy the minimal bargaining demands of both the majority and the elite. Finally, there may be no q^* that meets both the q^{\max} and $q^{\min}(\mu_e > 0)$ constraints because $q^{\min}(\mu_e > 0) \geq q^{\max}$. The first three violations depend upon the preferences of the majority for q ; in these cases, democratic federalism can be said to be *conditionally unsustainable*. Under the last violation, democratic federalism is *structurally unsustainable*, since there are no values of the constitutional parameters μ_e and q^* where democratic federalism can be sustained in the annual policy game.

⁵¹ From the majority's pay-offs under federalism specified in Cell (1) of Table 1, we can specify the majority preferred value of q as that q^* where marginal benefits are equal to the marginal costs of providing q under democratic federalism: $v'(q^*) = (1 - \mu_e)s_m'(q^*) + \mu_e s_e'(q^*)[1 - \phi^L]$.

Table 4 reports the individual parameter values for which South Africa's currently sustainable federal constitution becomes unsustainable. Comparing the value of each parameter just sufficient to cause a violation of Proposition 1 to the political economy's baseline value for that parameter gives a sense of the fragility of South Africa's federal constitutional agreement. There seems little risk of a full structural breakdown of the current agreement. The majority adult population (M) would have to increase by 25 percent to 30 million or the initial elite adult population (N_0) would need to decline *exogenously* (i.e., holding β fixed) by 800,000 residents (= 9.6 m. - 8.8 m.). Neither change seems likely, particularly as economic growth moves low-income majority residents into the economic elite. Since the elite residents least committed to South Africa were the first to leave, the exit propensity of the remaining elite (β) is likely to have declined since the original agreement, contrary to the results in Table 4. Changes in the model's other parameters necessary to threaten the permanent feasibility of the current constitution are either implausibly large (denoted as *n.b.* in Table 4) or place the parameters near the far tails of their range of plausible values (see Appendix B). The one possible exception to this pattern is the average level of training of majority public employees, where an increase in a_m from its baseline value of 14 years to 14.8 years sufficiently erodes the relative productivity advantage of elite providers that the ANC prefers unitary governance to federalism.

Far more likely is a *conditional* violation, where the FFC's constitutional target $q^* = .68$ fails to meet either the q^{\max} or $q^{\min}(\mu_e > 0)$ constraint. The most plausible violations involve either a 6 percent increase (= 26.5 m./25 m.) in the lower-income majority population relative to the elite population or a modest improvement in a_m from 14 years to 14.5 years; see Table 4. Of the two, continued progress in the training of majority teachers and health professionals seems the more

immediate threat to the current constitutional agreement.⁵² In this case, $q^{\min}(\mu_e > 0) > q^*$ and the majority no longer has an incentive to use provinces for the provision of redistributive public services; a constitutional amendment to centralize all public service provision would be approved.

There are three ways such a constitutional “crisis” might be avoided. Each strategy, however, lies outside the formal structure given here. First, the majority’s demand for redistributive services might change, so that as majority productivity rises, so too might q^* so that $q^* \geq q^{\min}(\mu_e > 0)$ continues to hold. Income growth is a likely cause for a higher value of q^* .⁵³ Second, the FFC might set a high target for q^* anticipating a future conditional violation of the $q^{\min}(\mu_e > 0)$ constraint, but that target would need to be enforced by an independent court with a credible enforcement mechanism. The failure of U.S. state supreme courts to force full legislative compliance with their state constitutions’ “equal opportunity” requirements illustrates the difficulty of this strategy.

Finally, and most generally, political allegiances to fiscally responsible provinces might arise within the majority party itself. There is now evidence that provincially loyal factions in the majority provinces are emerging within the ANC, factions that need provincial fiscal powers for their political survival.⁵⁴ William Riker was the first to stress the importance of locally motivated political parties

V. Governance and the Economic Value of the Democratic Transition

⁵² Since 1991, the rates of population growth for African, white, and Asian populations have been nearly identical; see www.statssa.gov.za/census01.

⁵³ However, our specification of majority welfare, includes a constant marginal utility of income (and a zero income effect) in the majority’s demand for q .

⁵⁴ See, for example, David Christianson, “The Provinces Strike Back,” *Finance Week*, March 12-18, 1998, pp. 46-47, “Patrick Lekota emerges as a champion of the provinces. His action enhances political pluralism but the struggle against central domination is only starting.” Mr. Lekota was the first premier (governor) of the Free State (1994-1996), and was Chairperson of the National Council of Provinces *and* the National Chairperson of the ANC. He continues to serve as National ANC Chair, and has, since 1999, served as the Minister of Defense in the national government.”

Perhaps the fundamental challenge facing the transition from autocracy to democracy is the need to provide protections for the personal and property rights of the once ruling elite. As argued in III, democratic federalism can provide such protections. Even under democratic federalism, however, the elite may still pay significant taxes to support redistribution to the ruling majority, and this fact raises a final and important question: Might the elite still prefer, at least economically, the autocratic status quo to a new democratic order, even one providing credible protections against the full exploitation of elite property? If so, a peaceful transition may not be possible.

Table 5 provides one answer for South Africa's elite, comparing their predicted economic gains under unitary and federal democracies to their status quo economic prospects under apartheid.⁵⁵ Elite economic welfare is measured as the present value of after-tax incomes over two generations (70 years) from 1996, the date of the adoption of the new South African constitution, to 2066. Table 5 reports the difference between the net present values of elite after-tax incomes under apartheid and the two democratic regimes (ΔNPV), first by a "break-even" year where the ΔNPV between regimes just becomes positive, and then as the final value of ΔNPV computed over the full 70 year horizon. The analysis assumes a real rate of interest of .03 or equivalently a discount factor $\delta = .97$. The table also provides an estimate of the internal rate of return to the elite

⁵⁵ There is a third possible democratic regime, one in which an initial federal democracy is replaced by an unitary democracy at some point. In South Africa, pressure for a change from federal to unitary governance is most likely to occur when the percent of majority residents who can be serviced by majority public service providers (m) gets close to 1, significantly lowering the cost of providing redistributive services centrally and making unitary governance attractive to the ruling majority. We have estimated that when $m \approx .99$, $g^{\min} \geq g^{\max}$ and a federal democracy is no longer a sustainable constitutional contract; see Table 4. This will only occur, however, if the majority finds it profitable to invest in a higher m . We estimate that even if a credible threat to "go unitary" can be achieved by the year 2011, the year when $m \approx .99$ along current trends, the increase in discounted majority resident wealth is only 311 Rand per resident. The resulting increase in aggregate majority wealth will be 7.775 B. Rand (= 311 Rand/resident x 25 m. Residents). To increase m from its current value of .85 to .99, 160,000 untrained (10 years of education) employees must each receive 5 years of additional education. The majority will find investing in this training a breakeven strategy only if each untrained employee's five years of training can be purchased for less than 48,500 Rand (= 7,775 m. Rand/.160 m. employees), or about 10,000 Rand per year. To be profitable, public employee training will have to cost less than 10,000 Rand per year (= \$1,667). This seems unlikely.

from “investing” in democracy, where the elite’s opportunity cost of democracy is the income lost from abandoning apartheid. For comparison purposes, Table 5 also reports the break-even year, the full 70-year Δ NPV, and the implied internal rate of return to democracy for majority residents. The details of the computation of the NPV’s for each regime are given in Appendix D.

Five conclusions are evident from Table 5. First, as is obvious, the ANC majority is unambiguously better off economically under democracy than apartheid; the majority’s Δ NPV for the 70 year horizon is positive and it becomes positive in the very first year of democracy. As a consequence, the internal rate of return is large. As the decisive political coalition, the majority enjoys significant income and service redistribution from the elite beginning with the first year of democracy.

Second, but less obvious: Democracy benefits the elite residents of South Africa economically as well. The single most important source of gain is the 3.6 percent higher growth rate under democracy (2.4) than apartheid (-1.2), an advantage that over time (see below) more than offsets the elite’s higher annual fiscal costs under democracy. The low growth rate under apartheid was due first to the adverse effect of international sanctions on South African trade and the importance of trade to South African growth, and second, to the adverse effect of politically and economically powerful black worker unionization on domestic investment and the importance of investment to growth.

Third, for both majority and elite residents, economic gains are greatest under the federal regime. The sources of the aggregate surplus under federal as compared to unitary governance are the lower costs from using elite providers for mandated services and the slightly smaller efficiency loss from the federal regime’s lower elite tax rate. The surplus is shared between majority and elite

residents through mandated services and elite capture. Democratic federalism is the economically preferred constitution for both parties, though the difference in the economic gains between unitary and federal democracies is small.

Fourth, for the democratic transition to be approved, elite residents cannot be too impatient. At the time of the constitutional agreement, apartheid imposed an annual tax burden equal to 2,684 Rand/elite resident for homeland transfers and 3,436 Rand/elite resident for military, justice, and police spending to enforce apartheid. Under a federal democracy, each elite resident could expect to pay in equilibrium taxes of 31,285 Rand per year, net of capture, to support fiscal transfers to the majority plus 3,986 Rand per year to support military, justice, and police spending for protection of person and property. The anticipated added fiscal costs of moving from apartheid to democracy for each elite resident will be therefore be 29,151 Rand per year ($= [31,285 R + 3,986 R] - [2,684 R + 3,436 R]$). Offsetting these added annual fiscal costs, however, is the sizeable growth dividend of in moving from apartheid to democracy. It takes approximately ten years for a typical elite resident's annual after-tax income under federal democracy to begin to overtake that resident's annual after-tax income under apartheid, and then another ten years for the discounted stream of after-tax incomes under federal democracy to just equal the discounted stream of after-tax incomes under apartheid. At this point, as shown in Table 5, twenty years after signing the constitution, the typical elite resident finally breaks even in a present value sense: $\Delta NPV = 0$. Impatient elite residents with a shorter time horizon, or alternatively, with a rate of time preference greater than (discount factor less than) federal democracy's internal rate of return of .128 ($\delta < .89$), would reject the transition from apartheid to a federal democracy on economic grounds.

Fifth, it is clear that the primary economic advantage of democracy over apartheid is from

removing international sanctions and politically active Black unions as impediments to economic growth. Two counterfactuals are worth considering. Absent international sanctions but assuming continued domestic political resistance by COSATU, elite net economic returns from the transition would have only become positive in a present value sense ($\Delta NPV = 0$) after 32 years from the start of democracy. The implied internal rate of return for accepting democracy over apartheid falls to .086. Absent domestic political resistance but assuming continued international sanctions, the elite breaks even ($\Delta NPV = 0$) following the transition only after 43 years from the start of democracy, and the internal rate of return of the transition falls further to .063. These calculations suggest international sanctions along might not have been enough to push white South Africa to accept an ANC majority-run democracy.⁵⁶

VI. Concluding Remarks

To ensure the peaceful transition from autocracy to democracy both the current ruling elite and the new democratic majority must agree to the new democratic constitution. This agreement requires credible assurances by the majority that they will not so exploit the once ruling elite that the elite will prefer to remain in the status quo, autocratic regime. The challenge is to find a democratic constitution that can credibly offer such protections and do so in a way that is self-enforcing, without reliance upon outside military intervention or unspecified moral suasion. We have offered arguments for one such constitution which we call democratic federalism. Under democratic federalism, the central government sets a national tax rate for the provision of

⁵⁶ Indeed, comments by the NP leadership at the time of the transition suggest they saw international sanctions more as a nuisance than a significant economic hardship; see Waldmeir (1997; p. 134). For a similar conclusion, see Irvin (199X).

redistributive services, but provinces, at least one of which is politically controlled by the once ruling elite, are given constitutional responsibility for providing those services. Under democratic federalism, each party to the constitutional agreement retains control over one policy of central interest to the other party. It is this “check and balance” which ensures the majority’s promised constitutional protections are self-enforcing and allows the transition to move forward, peacefully. We offer South Africa as our motivating example for such a constitution.

Strikingly, perhaps, the recommended federal constitutional for a democratic transition stands in contrast to the constitution usually recommended for fiscal-policy making in a mature democracy. To ensure that the elite cannot fully undo redistributive financing, all important taxing powers are centralized. To give the elite the ability to punish abusive central taxation, responsibility for providing redistributive services are fully allocated to the provinces. The usual tenets of fiscal policy-making would be more flexible, allocating some taxing authority to the provinces and centrally providing some redistributive services. At some point in the transitional process, when the redistributive system is in place and political system is stabilized, it will be appropriate for the fiscal rules of governance to be altered to allow for greater flexibility and improved economic efficiency. When such flexibility should be added to the constitution is an important but still an open question.

Questions also remains with respect to the generality of our fiscal approach to constitution writing and its applicability to other barriers to a successful democratic transition. Where, for example, might religion play an important role? We suspect that our approach to constitution writing will generalize as long as economic welfare has some importance to majority and elite residents.

Another possible extension involves the game-theoretic structure. First, we have assumed

full information about types and their preferences. One might consider dropping the full information assumption and replacing it with a framework in which the payoffs are not known with certainty; we suspect that the results will generalize, since repeated games with discounting and repeated games with uncertainty have similar pay-off structures. Second, to stabilize the constitutional system and ensure its self-enforcement, we have used very harsh grim trigger strategies as punishment threats. Other, more forgiving punishment strategies such as tit-for-tat might be considered as well.

Finally, we view our efforts here to learn from the South African case study as complementary to the many recent cross-country econometric studies of democratic transitions. The advantage of formally modeling the transition is that we can see clearly why some transitions are successful and others not, and in particular, how the details of institutional design not available in most econometric studies might facilitate or impede the move to a stable democracy. The disadvantage of our approach is that our conclusions are limited to particular political economies, though sensitivity analysis for plausible changes in important economic and institutional parameters, as we do here, helps to overcome this limitation.

REFERENCES

- Acemoglu, D. and J. Robinson (2001), "Theory of Political Transitions, *American Economic Review*, Vol. 91, September, 938-963.
- Acemoglu, D., S. Johnson, and J. Robinson (2001), "The Colonial Origins of Comparative Development," *American Economic Review*, Vol. 91, December, 1369-1401.
- Bolton, P. and G. Roland (1997), "The Breakup of Nations: A Political Economy Analysis," *Quarterly Journal of Economics*, Vol. 112, 1057-1090.
- Bueno de Mesquita, B., J. Morrow, R. Silverson, and A. Smith (1999), "An Institutional Explanation of the Democratic Peace," *American Political Science Review*, Vol. 93, December, 791-807.
- Development Bank of Southern Africa (1995), *South Africa's Nine Provinces: A Human Development Profile*, South Africa: Development Bank of Southern Africa.
- Dreze, J. and A. Sen (1989), *Hunger and Public Action*, Oxford: Oxford University Press.
- Financial and Fiscal Commission (1995), "The Allocation of Financial Resources Between the National and Provincial Governments," September 8.
- Fiske, E. and H. Ladd (2004), *Elusive Equity*, Washington, D.C.: Brookings Institution Press.
- Frey, B. and A. Stutzer (2000), "Happiness, Economy, and Institutions," *Economic Journal*, Vol. 110, October, 918-938.
- Gibbons, R. (1992), *Game Theory for Applied Economists*, Princeton, N.J.: Princeton University Press.
- Glaeser, E., R. LaPorta, F. Lopez-de-Silanes, A. Shleifer (2004), "Do Institutions Cause Growth?" *Journal of Economic Growth*, Vol. 9, September, 271-303.
- Gordon, N. (2004), "Do Federal Funds Boost School Spending? Evidence from Title I," *Journal of Public Economics*, Vol. 88, August, 1771-1792.
- Gruber, J. and E. Saez (2002), "The Elasticity of Taxable Income: Evidence and Implications," *Journal of Public Economics*, Vol. 84, April, 1-32.
- Haughwout, A., R. Inman, S. Craig, and T. Luce (2004), "Revenue Hills: Evidence from Four U.S. Cities," *Review of Economics and Statistics*, Vol. 86, May, 570-585.
- Hirschman, A. (1970), *Exit, Voice, and Loyalty*, Cambridge, MA: Harvard University Press, 1970.

- Leibbrandt, M., J. Levinsohn, and J. McCrary (2005), "Income in South Africa Since the Fall of Apartheid," NBER Working Paper 11384, May.
- Lewis, S. R. (1990), *The Economics of Apartheid*, New York: Council on Foreign Relations Press.
- Mansfield, E., H. Milner, and B. P. Rosendorff (2002), "Why Democracies Cooperate More: Electoral Control and International Trade Agreements," *International Organization*, Vol. 56, Summer, 477-513.
- Muthien, Y. and M. Khosa, (1998), "Demarcating the New Provinces: A Critical Reflection on the Process," in Y. Muthien and M. Khosa (eds.), *Regionalism in the New South Africa*, Brookfield, U.S.: Ashgate, 23-56.
- Reinikka, R. and J. Svensson (2003), "The Power of Information: Evidence From a Newspaper Campaign to Reduce Capture," Mimeo. World Bank, December.
- Reinikka, R. and J. Svensson (2004), "Local Capture: Evidence From a Central Government Transfer Program in Uganda," *Quarterly Journal of Economics*, Vol. 119, May, 679-709.
- Riker, W. (1964), *Federalism: Origins, Operations, and Significance*, Boston, MA: Little, Brown.
- Rodrik, D. (1999), "Democracies Pay Higher Wages," *Quarterly Journal of Economics*, Vol. 114, August, 707-738.
- Shleifer, A., R. LaPorta, F. Lopez-de-Silanes, C. Pap-Eleches (2004), "Judicial Checks and Balances," *Journal of Political Economy*, Vol. 112, April, 2004, 445-470.
- Waldmeir, P. (1997), *Anatomy of a Miracle: The End of Apartheid and the Birth of the New South Africa*, New York: W. W. Norton and Company.
- Verba, S., and N. Nie (1972), *Participation in America*, Cambridge, MA: Harvard University Press.

APPENDIX A: PROOFS

(In Process)

PROPOSITION 1: SUSTAINABLE DEMOCRATIC FEDERALISM: *For elite provincial size and redistributive assignment satisfying the Border and Assignment Constraints, there exists a grim trigger strategy equilibrium where democratic federalism is sustainable. For majority and elite residents with discount factor $0 < \delta \leq 1$, that equilibrium is characterized by:*

(1) *For majority punishment strategy U, the majority chooses g_F within the bounds:*

$$g^{max}(U) \geq g_F > g^{min}(U), \text{ where:}$$

$$g^{max}(U) = [\tau(U)^{max} \cdot N(U)^{max} - Z] / M, \text{ with:}$$

$$\tau(U)^{max} \cdot N(U)^{max} = [1 / (1 - \phi^l \mu_e)] \cdot \{ \tau_U \cdot N(\tau(U)^{max}) - [M s_e(q) + Z] \mu_e \phi^l - Q^{max}(\delta; U) \cdot N(\tau(U)^{max}) \}, \text{ and,}$$

$$Q^{max}(\delta; U) = [y(F, \phi^H) - y(U)](1 - \delta); \text{ and:}$$

$$g^{min}(U) = [1 / (1 - \phi^l \mu_e)] \cdot \{ g_U - [s_U(q) - s_F(q)] - s_e(q) \mu_e \phi^l + Q^{min}(\delta; U) \}, \text{ with:}$$

$$Q^{min}(\delta; U) = [\omega(A, \phi^l) - \omega(U)](1 - \delta);$$

(2) *For majority punishment strategy A, the majority chooses g_F within the bounds:*

$$g^{max}(A) \geq g_F > g^{min}(A), \text{ where:}$$

$$g^{max}(A) = [\tau(A)^{max} \cdot N(A)^{max} - Z] / M, \text{ with:}$$

$$\begin{aligned} \tau(A)^{max} \cdot N(A)^{max} &= [1 / (1 - \phi^l \mu_e)] \cdot \{ [\tau_U (1 - \phi^H \mu_e) + \rho] \cdot N(\tau(A)^{max}) \\ &+ [M s_e(q) + Z] \mu_e [\phi^H (N(\tau(A)^{max}) / N(\tau_U)) - \phi^l] - Q^{max}(\delta; A) \cdot N(\tau(A)^{max}) \}, \text{ and,} \end{aligned}$$

$$Q^{max}(\delta; A) = [y(F, \phi^H) - y(A; \phi^H)](1 - \delta); \text{ and:}$$

$$g^{min}(A) = [1 / (1 - \phi^l \mu_e)] \cdot \{ g_U (1 - \phi^H \mu_e) + s_e(q) \mu_e (\phi^H - \phi^l) + Q^{min}(\delta; A) \}, \text{ with:}$$

$$Q^{min}(\delta; A) = [\omega(A, \phi^l) - \omega(A, \phi^H)](1 - \delta); \text{ and,}$$

(3) *The elite province adopts ϕ^l .*

APPENDIX B: MODEL CALIBRATION AND SENSITIVITY ANALYSIS

CALIBRATION: EXOGENOUS PARAMETERS

Demographics (M, N₀): Estimates of the voting age population for the elite and the majority residents in South Africa were estimated in three steps. First, the elite population and majority populations were defined based on worker skill categories in Development Bank of South Africa, *South Africa's Nine Provinces: A Human Development Profile*, March, 1995, (Hereafter, *DBSA*), Table 56 (Labor Force Distribution By Skill Level). The elite population was defined as workers in skill categories I (Professional and Technical), II (Managerial and Executive), and III (Sales and Skilled Production). The majority population was defined as workers in skill categories IV (Service Workers and Semi-skilled Production), and V (Farm Workers and Unskilled Production) for the census year 1991. Second, each elite worker was multiplied by 1.5 (worker plus .5 dependents over the age of 15) and each majority worker was multiplied 2.2 (worker plus 1.2 dependents over the age of 15), where labor dependency ratios are from *DBSA*, Table 55 (Labor Dependency Ratios). The result is an estimate of 20.72 million majority adults and 9.60 million elite adults for census year 1991. Total population in 1991 was 38 million residents. Third, the estimated annual rate of population growth from 1991 to 2004 is 1.6 percent per annum, from *South African Statistics*, Mid-Year Population Estimates (Source: www.statssa.gov.za/census01). This annual rate of growth was applied to 20.72 million majority residents to estimate M as 22 million in 1996 (= "low" estimate), as 25 million in 2004 ("best" estimate), and as 27.6 million in 2010 ("high" estimate). We have assumed no population growth in the "untaxed" initial pool of elite residents, holding N₀ fixed as 9.6 million for all simulations.

Low Estimate, M = 22 million; Best Estimate, M = 25 million; High Estimate, M = 27.6 million.

Best Estimate, N₀ = 9.6 million.

Demographics (β): Estimates of the marginal effect of elite taxation on the size of the elite tax base (β) are drawn from the public finance literature estimating the elasticity of tax base with respect to tax rates. No studies of the response of tax base to tax rates for wealthy South Africans are available. We draw on the U.S. literature to provide bounds for our estimates. Haughwout, et. al. (2004) estimate the long-run elasticity of employment (assumed to be skilled workers) with respect to city income tax rates for New York City and Philadelphia as -.16 and -.36, respectively. Gruber and Saez (2002) estimate the elasticity of personal tax base for all U.S. taxpayers earning more than \$10,000 a year as -.30. (This is the direct elasticity of base with respect to the tax rate, computed from Gruber and Saez's .40 estimate of the elasticity of base with respect to the marginal dollar of after-tax income.) Compared to the U.S. data, we have chosen conservative values of β, where the implied arc elasticity of N with respect to τ ranges from a low elasticity of -.075 for β = .000125 ("low" estimate), to an elasticity of -.10 for β = .00015 ("best" estimate), to an elasticity of -.20 for β = .0003 ("high" estimate).

Low Estimate, β = .000125; Best Estimate, β = .00015; High Estimate, β = .0003.

Income (Y and W): Elite and majority workers' annual income were estimated from data from the September, 2000 Labor Force Survey as summarized by Leibbrandt, Levinsohn, and McCrary (2005, Appendix, Figure 2). The modal elite (white) worker annual income for 2000 is estimated as 80,000 (real 2000) Rand per worker. We estimate the annual rate of growth in real income over the period 1991 to 2004 as 2.5 percent per annum from data provided by the Reserve Bank of South Africa (www.reservebank.co.za; series code KBP6244J). Using this growth rate, we predict elite worker income for FY 2003 as 86,000 (real 2000) Rand, chosen as our best estimate of Y. Allowing elite incomes to grow to 2010 provides our high estimate of Y equal to 102,500 (real 2000) Rand, while deflating elite income to 1996 provides our low estimate of 72,500 (real 2000) Rand.

Low Estimate, Y = 72,500 Rand; Best Estimate, Y = 86,000 Rand; High Estimate, Y = 102,500 Rand.

The modal majority (Black) worker annual income for 2000 is estimated as 9,000 (real 2000) Rand per worker. Using annual growth rate of 2.5 percent, we predict majority worker income for FY 2003 as 9700 (real 2000) Rand, chosen as our best estimate of Y. Allowing majority worker incomes to grow to 2010 provides our high estimate of Y equal to 11,500 (real 2000) Rand, while deflating majority worker income to 1996 provides our low estimate of 8,100 (real 2000) Rand.

Low Estimate, W = 8,100 Rand; Best Estimate, W = 9700 Rand; High Estimate, W = 11,500 Rand.

Elite Capture (ϕ^L , ϕ^H): Estimates of ϕ^L and ϕ^H are from Reinikka and Svensson's (2003, 2004) studies of capture by local government officials of unconstrained capitation school grants to local schools in Uganda. In the earlier years of the school aid program before teachers understood the level of local grant funding, only 13 percent of the grant was received by the local schools, implying 87 percent of the grant had been captured by local politicians. We therefore set our best estimate of maximal capture at $\phi^H = .85$. From Reinikka and Svensson (2003, Table 1, reporting values for $(1 - \phi)$). A one standard deviation in ϕ^H about its estimated mean of .85 implies a low estimate of $\phi^H \approx .50$ and a high estimate of $\phi^H \approx 1.00$. By 2001, however, following widespread publicity of the program and detailed local press coverage of grants received by local officials, 81 percent of the grants found their way to local schools; only 19 percent was captured. We therefore set our best estimate of $\phi^L = .20$, now with a one standard deviation low estimate of $\phi^L \approx .10$ and a one standard deviation high estimate of $\phi^L \approx .30$.

Using the "exit" specification for ϕ^H presented in footnote 15 in the text and for the values g_F for the Western Cape, $s_m(q)$, and $s_c(q)$ reported in Table 2 for FY 2002/03, we can estimate the implied annual "exit costs" consistent with each value ϕ^H . They are E = 225 Rand per year for $\phi^H = .85$; E = 0 for $\phi^H = .50$; and E = 327 Rand per year for $\phi^H = 1.00$. If majority residents feel no allegiance to the residing in the Western Cape and moving is costless, then E = 0, and an estimate $\phi^H = .50$ is appropriate. If majority residents feel a strong allegiance to residing in the Western Cape or moving is costly so that E is at least 327 Rand per year (about 5 percent of annual income), then $\phi^H = 1.00$ is appropriate.

Low Estimate, $\phi^L = .10$; Best Estimate, $\phi^L = .20$; High Estimate, $\phi^L = .30$.

Low Estimate, $\phi^H = .50$; Best Estimate, $\phi^H = .85$; High Estimate, $\phi^H = 1.00$.

Elite Capture (ρ): The protest costs (ρ) that the majority might impose upon the elite were the elite to capture more than ϕ^L in resources are estimated from the impact that the Congress of South African Trade Unions (COSATU) had upon South African economic growth from its inception in 1985. COSATU served as a political action umbrella for the individual trade unions. We have estimated various specifications for South African economic growth over the sample years, 1950-2000 (Source: Penn World Tables, Version 6.1). The reduced form estimate of COSATU's impact on real annual economic growth is:

$$\text{GROWTH} = 2.43 - 1.55 \cdot \text{Sanctions} - 2.09 \cdot \text{COSATU} + .33 \cdot \text{DEMOCRACY}$$

$$(.35)^* \quad (.66)^* \quad (.77)^* \quad (1.10)$$

$$R^2(\text{Adj}) = .35.$$

Our best estimate of ρ assumes majority protests will reduce elite incomes by 2 percent, or for $Y = 86,000$ Rand, by $\rho = -.02 \cdot 86,000$ Rand = 1720 Rand per year. Our low estimate assumes protests reduce elite income by 2 percent using the low estimate of Y ; $\rho = 1450$ Rand per year (= $.02 \cdot 72,500$ Rand per year). Our high estimate assumes protests reduce elite income by 2 percent using the high estimate of Y ; $\rho = 2050$ Rand per year ($\approx .02 \cdot 102,500$ Rand per year).

Low Estimate, $\rho = 1450$ Rand; Best Estimate, $\rho = 1720$ Rand; High Estimate, $\rho = 2050$ Rand.

Technology and Costs (a_e, a_m, a_u): The production technology for public services (q) is specified by a “private goods” technology of the form: $q = a \cdot (X/M)$, where a is the “productivity” parameter which translates public employees per service recipient (X/M) into public outputs (learning, healthiness, safety). The analysis specifies three classes of public employees distinguished by their level of training: *elite* providers whose productivity parameter is a_e ; *qualified majority* providers whose productivity parameter is a_m ; and *untrained majority providers* whose productivity parameter is a_u . We specify $a_e = 17$ (years), $a_m = 14$ (years), and $a_u = 10$ (years), using the scale provided by the Departments of Education of Western Cape and Eastern Cape, where 17 represents a teacher who has passed the matriculation examination (comparable to an average high school education) and has 7 addition years of training or experience (comparable to a four year college education plus experience), 14 represents a teacher with four years of training or experience beyond matriculation (comparable to a junior college education plus experience), and 10 represents a teacher who has passed the matriculation examination only; see Fiske and Ladd (2004, Tables 6.6 and 6.7). What is important for costs are the relative rates of productivity of the different public employees: $a_e/a_m = 1.21$; $a_e/a_u = 1.7$; and $a_m/a_u = 1.4$. Our “low” estimate of the three productivity parameters are chosen to give relatively low costs to public service provision; thus $a_e = 17$ (years), $a_m = 15$ (years), and $a_u = 12$ (years). Conversely so, for our “high” estimates where $a_e = 17$ (years), $a_m = 13$ (years), and $a_u = 7$ (years).

Low Estimate: $a_e = 17$ (years), $a_m = 15$ (years), and $a_u = 12$ (years).

Best Estimate: $a_e = 17$ (years), $a_m = 14$ (years), and $a_u = 10$ (years).

High Estimate: $a_e = 17$ (years), $a_m = 13$ (years), and $a_u = 7$ (years).

Technology and Costs (S): The costs per recipient of providing a level of output q , will be $s(q) = S \cdot (X/M)$, where S is the salary of the public employees and X/M are the number of public employees per recipient needed to provide each recipient with q units of public output. Thus $s_e(q) = S \cdot (X/M)_e = S \cdot (q/a_e)$; $s_m(q) = S \cdot (X/M)_m = S \cdot (q/a_m)$; and $s_u(q) = S \cdot (X/M)_u = S \cdot (q/a_u)$. For a common value of S , $s_e(q) < s_m(q) < s_u(q)$. In South Africa, all public employees are paid a common wage S . We estimate S as salary plus benefits earned by the average primary and secondary school teacher in the Western Cape in 2001, deflated to be measured in year 2000 Rand; Fiske and Ladd (2004; Tables 6.5 and 6.6). S equals 78,000 Rand per year in primary schools and 84,000 Rand per year in secondary school. We use $S = 80,000$ Rand as our best estimate, $S = 60,000$ Rand as our low estimate, $S = 100,000$ Rand as our high estimate.

Low Estimate, $S = 60,000$ Rand; Best Estimate, $S = 80,000$ Rand; High Estimate, $S = 100,000$ Rand.

Technology and Costs (m): If the central government were to centralize service provision our analysis assumes the elite providers will exit to the private sector (private schools, private clinics) leaving a potential shortage of trained majority public employees, where m is the percent of majority residents who are serviced by trained public employees (i.e., those for whom a_m applies). From the production technology, $q = a_m \cdot (X/M)_m$, where $(X/M)_m = (\mu \cdot X/m \cdot M) = (\mu/m)(X/M)$ where μ equals the percent of all majority public employees who are trained (a_m), m is the percent of majority residents who are treated by a trained public employee, and X/M is the ratio of all majority public employees to all majority residents. Thus $m = (a_m/q)(\mu)(X/M)$. Setting (a_m/q) equal to the FFC's target employee to recipient ratio for education and health care of 1/31 (see below), μ equal to the measured percent of public employees who are qualified, and X/M to the actual public employee to recipient ratio, we can estimate m . Using data from Fiske and Ladd (2004, Table 6.7) for education in Eastern Cape (a majority province), we estimate $m = .64$ for 1997, $m = .71$ in 1999, and $m = .78$ in 2001. The upward trend represents the fact that South Africa has invested resources in training teachers. Continuing the trend we estimate $m = .85$ in 2003 and by 2010 $m = 1.00$. Data from *DBSA* (1995, Table 26) for trained primary care doctors and nurses in 1992 allows us to estimate $m = .75$ in 1992. Assuming comparable rates of training in the health professions as in education, an estimate of $m = .85$ for 2003 also seems reasonable. We adopt $m = .85$ as our "best" estimate, $m = .70$ as our "low" estimate, and $m = 1.00$ as our "high" estimate.

Low Estimate, $m = .70$; Best Estimate, $m = .85$; High Estimate, $m = 1.00$.

Special Interest Payments ($Z > 0$) or Outside Grants ($Z < 0$): Z represents outside payments (> 0) to powerful special interests required for peace in the democratic regime. Alternatively, $Z < 0$ represents transfers paid to the new democracy to assist in providing majority services or reduced elite taxation. We assume Z represents payments to the leadership of the Inkata Freedom Party (IFP) sufficient to compensate for the loss in patronage transfers to homeland leaders under apartheid. One important homeland transfer was a "decentralization grant" paid to the homelands; see Lewis

(1990, p. 51). The value of 1985 transfer paid to the KwaZulu homeland, the population base for the IFP, measured in real (2000) Rand is 632 million Rand. We adopt $Z = 600$ million Rand as our best estimate. As our low estimate we assume a comparable grant to the new democracy equal to a value of $Z = -600$ million Rand. For our high estimate we assume all of the basic (lump-sum) grant given to the new KwaZulu-Natal province in the first year of the new democracy (1996) was to compensate the IFP leadership; see FFC, *The Allocation of Financial Resources Between the National and Provincial Governments, FY 1996/97*, 8 September, 1995, Table 15. Our high estimate equals 1,000 million (real 2000) Rand.

Low Estimate, $Z = -600$ m. Rand; Best Estimate, $Z = 600$ m. Rand; High Estimate, $Z = 1000$ m. Rand.

Discount Factor (δ): The discount factor is defined as δ equals $1/(1 + r)$, where r is the rate of time preference for elite and majority residents. We assume the same rate for both the elite and majority populations. Our best estimate of $r = .03$ is the real rate of return on 10 year South African government bonds for 2003 adjusted for annual inflation; Source: www.reservebank.co.za, Series KPB2003J. For $r = .03$, $\delta = .97$. Our low estimate adopts a Rawlsian perspective for constitutional design and assume $r = 0.0$ and $\delta = 1.0$. Our high estimate sets $r = .10$ so $\delta = .91$.

Low Estimate, $\delta = 1.0$; Best Estimate, $\delta = .97$; High Estimate, $\delta = .91$.

CALIBRATION: CONSTITUTIONAL CHOICE OF μ_e AND q

Border (μ_e): The border condition μ_e is the percent of the majority voting population (M) “allocated” to live in the elite province. We select μ_e so that the elite is just guaranteed to win the provincial elections, even when tax rates are set at their revenue maximizing values and the elite population is at its minimum. This specification is consistent with all provincial and presidential voting results in the Western Cape since the first elections in 1994. The majority residents’ party, the ANC, won 45% of the vote in the most recent 2004 provincial and national elections; see www.elections.za/Elections2004. Given our quadratic specification for the revenue hill ($N \cdot \tau = N_0 - \beta \cdot \tau^2$), the smallest elite population will be $.5 \cdot N_0$, or for $N_0 = 9.6$ m., a minimal elite population of 4.8 million. Thus, we set:

$$\mu_e = 4.8/M.$$

Assignment (q): The assigned level of public service output, q , is specified to be consistent with the stated FFC target values for (X/M) for the provincially assigned public services of education, health care, and social security (welfare). From our production technology for public services, $q = a \cdot (X/M)$, specifying a and (X/M) allows us to specify q . For South Africa as a whole, we assume an average value of $a = 15$ (years) under a federal regime. The value of (X/M) is estimated from FFC targets of 1 teacher per 38 majority students, 3.5 clinic visits per year per majority resident, and 4500 Rand per year in social security spending per eligible majority resident. We assume one child for each majority resident so we need one teacher for every 38 majority residents or .026 education professionals per majority resident. We assume that each medical professional can provide 3.5 visits to each of 500 majority residents a year (1750 total visits or about 7 majority patients a day) so we

need .002 health care professionals per majority resident. Finally, we estimate that approximately 30 percent of the majority population qualifies for some form of income assistance for an average spending per majority resident of 1350 Rand per year or in public employee equivalent units, about .017 ($= 1350\text{Rand}/S = 1350/80,000$) public employees per majority resident. Together, we estimate the FFC target value of (X/M) as .045 public employees per majority resident: $.045 = .026 + .002 + .017$. If $a_m = 15$, then the implied target level of public service is $q = 15 \cdot (.048)$, or:

$$q^* = .68.$$

SUSTAINABLE FEDERALISM: SENSITIVITY ANALYSIS

Table B.1 presents estimates of intergovernmental transfers for the best, low, and high values of each parameter value. The baseline simulation using the preferred value for all parameters is presented in the first row. All simulations are for a common specification of the constitutional parameters, $\mu_e = 4.8/M$ and $q^* = .68$. Each parameter value is changed individually, holding fixed all other parameters at their best values. Predicted grants are reported as real (2000) Rand per majority resident. For purposes of comparison to the results in Table 2, grants per majority resident are then adjusted to real (2000) Rand per capita (*italics*), computed as (Transfers per majority adult) \cdot (Majority Adults/Population), where (Majority Adults/Population) $= (25 \text{ m.}/45.5\text{m}) = .55$ for 2002/2003 population.

In cases where either a high or low value of a parameter placed $q^* = .68$ outside the feasible range for an amendment-proof federal constitution, defined by $q^{\min}(\mu_e > 0) \leq q < q^{\max}$ as shown in Figure 1, q was adjusted to that value closest to .68 that would fall just within the required feasible range; see Table B.1. In some instances, the high or low parameter value made an amendment-proof federal constitution impossible for any value of q – that is, $q^{\min}(\mu_e > 0) > q^{\max}$. If so, the calibration parameter value was adjusted until $q^{\min}(\mu_e > 0) = q^{\max}$ was just obtained, and both the required new calibration parameter value (indicated by an \approx) and its corresponding value of q are reported in Table B.1.

**TABLE B.1: RSA PREDICTED INTERGOVERNMENTAL TRANSFERS:
SENSITIVITY[†]**

(Transfers per Majority Adult Resident, Real 2000 Rand; *Transfers per Capita, Real 2000 Rand*)

| PARAMETER VALUE | MAJORITY PUNISHMENT | q | g_U | g^{\max} | g^{\min} | $s_c(q)$ | b_c | $s_m(q)$ | b_m |
|---------------------------|---------------------|------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| “BEST” ESTIMATES | Unitary | .68 | 6120 3366 | 6119 3365 | 5933 3263 | 3200 1760 | 2919 1503 | 3886 2137 | 2233 1228 |
| M = 22 m. | Unitary | .72 | 6954 3825 | 6953 3824 | 6778 3728 | 3388 1863 | 3565 1961 | 4114 2263 | 2839 1561 |
| M = 27.6 m | Unitary | .61 | 5543 3049 | 5542 3048 | 5383 2961 | 2871 1579 | 2671 1469 | 3486 1917 | 2056 1131 |
| $\beta = .000125$ | Unitary | .76 | 7349 4042 | 7348 4041 | 7163 3940 | 3576 1967 | 3772 2075 | 4343 2389 | 3005 1653 |
| $\beta (\approx) .00017$ | Unitary | .57 | 5397 2968 | 5396 2967 | 5253 2889 | 2682 1475 | 2714 1493 | 3257 1791 | 2139 1176 |
| $\varphi^L = .10$ | Unitary | .68 | 6120 3366 | 6119 3365 | 5872 3230 | 3200 1760 | 2919 1503 | 3886 2137 | 2233 1228 |
| $\varphi^L (\approx) .24$ | Unitary | .69 | 6120 3366 | 6119 3365 | 5950 3273 | 3247 1786 | 2872 1580 | 3942 2168 | 2177 1197 |
| $\varphi^H (\approx) .75$ | Unitary | .628 | 6120 3366 | 6119 3365 | 5968 3283 | 2955 1625 | 3164 1740 | 3588 1973 | 2531 1392 |
| $\varphi^H = 1.0$ | Unitary | .68 | 6120 3366 | 6119 3365 | 5933 3263 | 3200 1760 | 2919 1503 | 3886 2137 | 2233 1228 |
| PARAMETER VALUE | MAJORITY PUNISHMENT | q | g_U | g^{\max} | g^{\min} | $s_c(q)$ | b_c | $s_m(q)$ | b_m |

| | | | | | | | | | |
|---|-----------------|-----|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| $\rho = 1450R$ | Unitary | .68 | 6120 3366 | 6119 3365 | 5933 3263 | 3200 1760 | 2919 1605 | 3886 2137 | 2233 1228 |
| $\rho (\approx) 2000R$ | Unitary | .63 | 6120 3366 | 6119 3365 | 5967 3286 | 2965 1631 | 3154 1735 | 3600 1980 | 2519 1385 |
| $a_c=17; a_m (\approx) 14.7;$ $a_u = 12$ | Unitary | .73 | 6120 3366 | 6119 3365 | 6034 3319 | 3435 1889 | 2684 1476 | 3973 2186 | 2146 1180 |
| $a_c=17; a_m=13;$ $a_u = 7$ | Adm. Federalism | .68 | 6120 3366 | 6118 3364 | 5614 3088 | 3200 1760 | 2918 1604 | 4185 2302 | 1933 1063 |
| $S = 60,000R$ | Unitary | .84 | 6120 3366 | 6119 3365 | 5967 3283 | 2964 1630 | 3155 1735 | 3600 1980 | 2519 1385 |
| $S = 100,000R$ | Unitary | .58 | 6120 3366 | 6119 3365 | 5902 3246 | 3411 1876 | 2708 1489 | 4143 2279 | 1976 1089 |
| $m = .82$ | Unitary | .68 | 6120 3366 | 6119 3365 | 5892 3242 | 3200 1760 | 2919 1605 | 3886 2137 | 2233 1228 |
| $m = .98$ | Unitary | .68 | 6120 3366 | 6119 3365 | 6110 3361 | 3200 1760 | 2919 1605 | 3886 2137 | 2233 1228 |
| $Z = - 600m R$ | Unitary | .68 | 6168 3392 | 6167 3391 | 5983 3291 | 3200 1760 | 2967 1632 | 3886 2137 | 2281 1255 |
| $Z = 1000 m R$ | Unitary | .68 | 6104 3357 | 6103 3356 | 5916 3254 | 3200 1760 | 2903 1597 | 3886 2137 | 2217 1219 |
| $\delta = .91$ | Unitary | .68 | 6120 3366 | 6119 3365 | 6093 3351 | 3200 1760 | 2919 1605 | 3886 2137 | 2233 1228 |
| $\delta = 1.0$ | Unitary | .68 | 6120 3366 | 6119 3365 | 5857 3221 | 3200 1760 | 2919 1605 | 3886 2137 | 2233 1228 |

†*COLUMN DEFINITIONS*: MAJORITY PUNISHMENT is the preferred long-run punishment strategy of the majority if the elite chooses to adopt the high (φ^H) capture strategy; q = Value of the constitutional assignment requirement; g_U = Intergovernmental transfer per majority adult resident (*per capita*) chosen under unitary democracy; g^{\max} = Maximal intergovernmental transfer per majority adult resident

(*per capita*) that will be paid by the elite under democratic federalism, where unitary democracy is the majority's credible punishment option; g^{\min} = minimal intergovernmental transfer per majority adult resident (*per capita*) that will be accepted by the majority under democratic federalism, where unitary democracy is the majority's credible punishment option; $s_e(q^*)$ = Intergovernmental transfer per majority adult resident (*per capita*) required to provide the constitutionally mandated level of public services per majority resident in the elite province; b_e = Basic grant per majority adult resident (*per capita*) in the elite province to fund all other provincial services, defined as $b_e = g^{\max} - s_e(q^*)$; $s_m(q^*)$ = Intergovernmental transfer per majority adult resident (*per capita*) required to provide the constitutionally mandated level of public services per majority resident in the average majority province; b_m = Basic grant per majority adult resident (*per capita*) in the average majority province to fund all other provincial services, defined as $b_m = g^{\max} - s_m(q)$.

APPENDIX C: DIRECT ECONOMIC BURDEN OF APARTHEID ON THE ELITE

At the time of negotiations for the new democratic constitution (1991-93), the economic elite of South Africa bore a direct economic burden from apartheid from each of four sources: 1) Military, justice, and police expenditures required to enforce the regulations

of the apartheid regime (1977-1993); 2) Transfers paid to maintain the South African homelands (1970-1993); 3) Reduced economic growth because of international economic sanctions (1976-1993); and 4) Reduced economic growth following worker unionization (1985-1993).

Enforcement Expenditures: We estimate the direct burden of enforcing the apartheid regime as the difference between the mean level of military, justice, and police expenditures in real (2000) Rand for the apartheid period 1976-1993, and the mean level of military, justice and police expenditures in real (2000) Rand for the post-apartheid period, 1994-2007. June 16, 1976, the day of the Soweto children's demonstration and massacre, marked a significant acceleration in Black South African resistance, both through peaceful demonstrations and ANC military activities. On April 26, 1994, Nelson Mandela was elected President of South Africa, officially ending apartheid in South Africa. Assuming that enforcement outlays pay for a pure public "good" from the perspective of the elite (NP) residents, we compare mean total outlays for enforcement over the apartheid years of repression (1977-1993) and to the outlays for enforcement in the democratic years (1994-2007).

Mean Enforcement Expenditures, 1977-1993 = 33.671 Billion (2000) Rand

Mean Enforcement Expenditures, 1994-2007 = 39.062 Billion (2000)Rand

Estimated Enforcement Burden of Apartheid

= 33.671 B. - 39.062 B. = -5.391 Billion (2000) Rand

Enforcement of the peace and in particular the control of urban crime is higher as an annual real expenditure under democracy than under apartheid by 5.391 Billion real (2000) Rand. There has been no peace dividend for the elite residents of South Africa. *Shared equally over the 9.8 million elite residents, apartheid provides a "savings" of 550 (2000) Rand per elite adult resident in annual enforcement spending.*

Homeland Transfers: As part of the apartheid strategy, the National Party funded the South African homelands as a means to encourage the social and economic separation of the races. Funding was for basic public services and public and private infrastructure within the homeland areas. Lewis (1990, p. 51) estimates the total public service expenditures for homelands as 25 Billion (2000) Rand in 1985. For the period 1985-1993, the South African Development Bank extended an average of 1.3 Billion in economic development "loans" to the homelands, expenditures we will assume were effectively economic development grants. Thus for the period 1985-1993, we estimate an annual transfer expenditure to the homelands of 26.3 Billion (2000) Rand per year (= 25 B. + 1.3 B) to be paid each year by the 9.8 million elite taxpayers for *an average burden of homeland transfers under apartheid of 2,684 (2000) Rand per elite resident.*

International Sanctions, Worker Unionization, and South African Economic Growth: Table C.1 presents regressions explaining the rate of growth of South African real GDP per capita from 1950-2000. Column 1 presents the basic growth equation for this economy, relating GDP growth to total trade (exports plus imports) as a percentage of GDP (*OPEN*) and gross investment as a share of GDP

(*INV*). Consistent with the usual growth equation specifications, both variables are significant and positive. Column 2 adds an indicator variable (*DEM*) equal to 1 for the years 1994-2000 following the democratic election of Nelson Mandela as President, and equal to 0 for the apartheid years, 1950-1993. The coefficient is negative but not significant. (*Source*: GROWTH RATE, OPEN, and INV are from the Penn World Tables, 6.1 and correspond to the PWT variables GRGDPCH, OPENK, and KI, respectively.)

SANC: Following the brutal suppression of the Soweto student uprising, the United Nations organized an arms embargo of South Africa (1976-1993), and soon thereafter the international capital markets refused to make long-term loans to the apartheid government (1978-1993) and short-term borrowing rates rose significantly (Waldmeir, 1997, p. 23). In August, 1985 in what became known as the Rubicon speech, then President P.W. Botha reaffirmed the National Party's commitment to a hardline apartheid position. The international capital markets lead by Chase Manhattan Bank sensed the increased political risk of such a position and effectively withdrew all short-term lending (Waldmeir, 1997, p. 56). In September, 1985, the EC and the British Commonwealth countries imposed trade and financial sanctions. In August, 1986, the U.S. Congress enacted the Comprehensive Anti-Apartheid Act, banning U.S. investments and loans to South Africa and imports from South Africa. All military, capital, and trade sanctions remained in place until 1993. *We summarize the existence of sanctions by an indicator variable, SANC, equal to 1 for the years 1976-1993, and 0 otherwise.* The effect of *SANC* on growth is negative and significant (Column 3) and operates through a significant adverse effect on international trade (Column 4).

COSATU: After a decade of wildcat strikes and random labor disruptions, Black trade unions were granted legal status in 1979. In 1985, the fourteen major public and private sector unions joined forces to form a national labor organization called the Congress of South African Trade Unions (COSATU). COSATU became a major voice, both economically and politically, for Black South Africans. *We measure the presence of powerful trade unionism during apartheid by the indicator variable, COSATU, equal to 1 for the years 1985-1993, and 0 otherwise.* The effect of COSATU on growth is negative and significant (Column 3) and operates through a significant adverse effects on both trade and investment (Columns 4 and 5).

In estimating the direct economic burden of apartheid at the time of negotiations for the new democratic constitution (1991-1993), we use the growth equation estimates in Column 3. A value of 1 is assigned to *SANC* and *COSATU* and a value of 0 to *DEM*. The imputed annual growth rate under the continuation of the apartheid regime would have been -1.22 percent per annum (= 2.431 - 1.554 - 2.099). With the adoption of democracy international sanctions were removed and COSATU channeled its political activities through the ANC. We therefore assume that the adverse effects of sanctions and COSATU disappear, and we set those variables equal to 0 for the period, 1994-2000. The estimated average annual rate of growth in the democratic period is therefore .66 percent (= 2.431 - 1.765). Compared to the latter years of apartheid, the move to democracy improved the growth prospects for South Africa by 1.88 percent per annum for the first seven years

of the new regime.⁵⁷

TABLE C.1: South African Growth under Apartheid and Democracy

| INDEPENDENT VARIABLES | GROWTH RATE (1) | GROWTH RATE (2) | GROWTH RATE (3) | OPEN (4) | INV (5) |
|-----------------------|--------------------|--------------------|-------------------|--------------------|--------------------|
| Constant | -6.938 (1.539)* | -6.933 (1.556)* | 2.431 (.355)* | 52.038 (.531)* | 14.777 (.487)* |
| OPEN | .137 (.037)* | .140 (.040)* | - | - | - |
| INV | .147 (.069)* | .137 (.085) | - | - | - |
| DEM | - | -.188 (.941) | -1.765 (.818)* | -3.909 (1.241)* | -7.142 (1.139)* |
| SANC | - | - | -1.554 (.659)* | -12.198 (.998)* | -.203 (.916) |
| COSATU | - | - | -2.099 (.772)* | -5.466 (1.176)* | -6.366 (1.079)* |
| R ² (Adj) | .345 | .344 | .345 | .869 | .600 |

* Standard errors reported within parentheses. An * indicates significance at the 5% level.

⁵⁷ The estimated positive effects on South African growth of the democratic transition are consistent with the work of Rodrik and Wacziarg (2005) for a world sample of democratic transitions and with their case study analyses of other Sub-Saharan African democracies.

APPENDIX D: CALCULATION OF NPVs

To compute the NPV for each regime, we first estimate the average elite resident's after-tax income under the continuation of apartheid (y_{At}):

$$y_{At} = y_0(1 + g_A)^t - HTAX_t - EEXP_t,$$

where y_0 is elite income at the date of the adoption of the democratic constitution, g_A is the expected rate of growth of income under apartheid, $HTAX_t$ is the expected level of elite taxation needed to support apartheid's separatist strategy of Black homelands, and $EEXP_t$ is the expected level of elite taxation needed to support apartheid-specific enforcement expenditures for military, justice (courts and prisons), and police services. We estimate that $y_0 = 72,500$ real (2000) Rand (Appendix B, Low Estimate Y). Appendix C provides estimates of the economic costs of apartheid for the elite residents. The estimated rate of growth in real income per capita for South Africa during the last years of apartheid, allowing for the impact of international sanctions and organized labor's resistance to apartheid, is $g_A = -.012$. $HTAX_t$ equals 2,684 real (2000) Rand per elite taxpayer. $EEXP_t$ is measured by the difference between mean military-justice-police expenditures per elite resident under apartheid (3,346 real Rand/elite resident) and democracy (3,986 real Rand/elite resident) and equals -550 real Rand/elite resident. As a means for protecting elite residents and their property, apartheid proved less expensive than democracy.

The average elite's resident's after-tax income under a democratic regime is specified as:

$$y_{Dt} = y_0(1 + g_D)^t - TDEM_t,$$

where y_0 is elite income at the date of the adoption of the democratic constitution, g_D is South Africa's expected (common) rate of income growth under democracy, and $TDEM_t$ is the anticipated level of elite taxation required to fund democratic intergovernmental transfers, varying by regime. The estimated rate of income growth over the initial four years following the removal of apartheid was $g_D = .0066$; see Appendix C. Since 2000, the economy has gradually returned to its long-run equilibrium rate of growth of .024 per annum. We specify $g_D = .024$ for all years beyond 2006 ($t > 10$) and smooth g_D from .0066 to .024 over the ten years from 1996 to 2006.

From 1996-2006 for both a unitary and federal democracy, $TDEM_t$ is estimated by the taxes per elite resident required to fund actual intergovernmental transfers as reported in Table 2; we assume the 1996-2006 period defined a binding fiscal constraint. From 2006 onward, however, we assume elite taxation must be sufficient to fund either the equilibrium level of unitary ($g_U = 6220$ Rand/Majority Resident; Table 3) or federal ($g_F = 6118$ Rand/Majority Resident; Table 3 and Section III) transfers. Federal governance allows the elite to capture back a portion of those aggregate taxes when the elite province receives its intergovernmental transfers; we assume an equilibrium rate of capture $\phi^L = .20$. For our specification of the South African economy, capture is the elite's primary economic advantage from the federal regime. The elite resident's estimated annual taxes to support g_U is 31,875 Rand and to support g_F is 31,865; capture returns 580 Rand per

elite resident under federalism.⁵⁸

For the average majority resident under apartheid, income is specified as:

$$w_{At} = w_0(1 + g_A)^t,$$

where w_0 is majority resident's income at the date of the adoption of the democratic constitution and g_A is the expected rate of growth of income under apartheid. We estimate $w_0 = 8,100$ real (2000) Rand per majority adult. We assume a common country-wide growth rate; thus as for the elite, $g_A = -.0122$; see Appendix C. We exclude any homeland transfers paid under apartheid as an economic benefit, consistent with the view that such transfers offered little direct benefit to majority residents.⁵⁹ The average majority resident's welfare under democracy equals his or her net income plus the utility value of mandated redistributive services:

$$\omega_{Dt} = w_0(1 + g_D)^t + GDEM_t - SQDEM_t + v(q^*)$$

where g_D is the expected rate of growth under democracy, $GDEM_t$ is the majority resident's intergovernmental transfers received under a unitary or federal democracy, $SQDEM_t$ is the average annual cost of providing redistributive services under the unitary and federal regimes, and $v(q^*)$ is the utility from mandated services. As for elite residents, g_D equals .0066 in 1996, is then smoothed to .024 by 2006, and is then equal to .024 for all years thereafter. For the democratic regimes, $GDEM_t$ is specified as the actual level of grants (*adjusted to*) per majority resident as reported in Table 2 (National Average). For years 2007 and beyond, $GDEM_t$ equals g_U (= 6120 Rand/Majority Resident) under the unitary regime and g_F (= 6118 Rand/Majority Resident) under the federal regime. $SQDEM_t$ is specified as $[m \cdot s_m(q^*) + (1 - m) \cdot s_U(q^*)]$ for the unitary regime and as $[s_F(q^*) - \phi^L \mu_e s_e(q^*)]$ for the federal regime; see Table 3. Mandated services, q^* , are assumed equal for both democracies with a common discounted value of $V(q^*)$.

⁵⁸ In both unitary and federal democratic equilibriums, there will be approximately 4.8 million adult elite residents and 25 million adult majority residents. Thus taxes paid to the central government by each elite resident will be $(25/4.8)(6120) = 31,875$ Rand to support g_U and $(25/4.8)(6118) = 31,865$ to support g_F . These tax payments imply an effective tax rate of approximately 40 percent against an estimated elite income of 80,000 Rand in 2006. Under federalism, the elite are able to capture .20 of the difference between g_F and $s_e(q^*)$ or $.20[g_F - s_e(q^*)][M_e/N(\tau_F)] = .20[6118 - 3200](4.75/4.8) = 580$ Rand/Elite Resident.

⁵⁹ Lewis (1990, p.51) concludes that the "positive impact of such expenditures is very limited." In the case of the KwaZulu homeland we have estimated most of these transfers were captured by the Zulu nation leadership as rents for tacitly supporting apartheid. Including such transfers would add 1030 real (2000) Rand to w_A , or an additional 12 percent to real incomes. None of conclusions below are changed by such an extension.