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The Political Economy of Government Revenues in Post-Conflict Resource-Rich Africa: Liberia and Sierra Leone

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Abstract: At the end of their pernicious civil wars, Liberia and Sierra Leone faced critical challenges relating to government revenues: resuscitating collapsed revenues, ensuring that natural resource revenues promote peace and development, and eliminating highly distortionary forms of taxation. This paper examines the two countries' efforts to address these challenges. First, we provide empirical evidence highlighting the existence of disparities between Liberia and Sierra Leone with respect to state capacity to rehabilitate its revenue in the aftermath a civil war. Then we develop a political economic model of state revenue rehabilitation to explain these disparities. Our model links state performance to its choice of revenue rehabilitation strategy and formalizes impediments to state adoption of a Stiglitz-like patience strategy in the rehabilitation of public revenue in the aftermath of a civil war. The study calls for the emergence of an international civil society to substitute for the lack of a pro-active national civil society in a resource-rich post-conflict societies. Unless such a device is put into place as part of the peace-consolidation process, abundance of natural resource is bound to be a curse that creates a vicious cycle of civil wars and inefficient resource extraction.

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1. Introduction

Liberia and Sierra Leone appear to be success stories of political transition from civil war in Africa, having emerged from it as budding democracies. Sierra Leone has had two peaceful postwar elections, the second of which was won by the opposition, while Liberia has elected Africa's first female president. However, at the end of the war, the two countries faced daunting public revenue challenges which were critical to prospects for lasting peace and long-term development. First was the need to resuscitate collapsed government revenues to help finance the peace-building and reconstruction process. In Liberia, government revenues plummeted from around US$240 million just before war onset in 1989 to about US$45 million at the onset of peace in 2003. In Sierra Leone, government revenues fell from 17% of GDP in the 1970s to around 9% of GDP at the end of the 1991-2001 civil war.

Second, both countries needed to establish control over their natural resources not only to generate revenues but also to ensure that the resources did not undermine the peace or promote criminality. In wartime Liberia, the warlord Charles Taylor, leader of the main rebel movement, presided over commerce in gold, timber and rubber (Reno 1998). Ships from all over the globe used Liberia as a "flag of convenience" while much of the revenues generated from maritime registry and natural resources were kept outside the budget process. Even after his election as president of Liberia in 1997, Charles Taylor continued to sponsor an arms-for-diamonds trade with the Sierra Leone rebels (UN 2000), prompting UN sanctions on export of diamonds (and also timber) from Liberia.[2] In Sierra Leone, even before the war, diamonds had played a sometimes pernicious role in the political economy. Diamonds were at the epicenter of a thriving underground economy in the 1980s, in the face of price control and other strong government interventionist measures. The diamonds were mostly smuggled abroad, generating foreign exchange for the import of basic commodities which were in turn sold in black markets. The diamond fields attracted thousands of young

[2]Charles Taylor is currently standing trial in The Hague for war crimes and crimes against humanity for his role in the Sierra Leone civil war.

men who ended up as quasi-criminal illicit diggers, providing a recruitment base for the rebellion (Reno 1998). Diamonds subsequently financed the rebellion (Smillie et al 2000)

Third, revenue strategies with perverse distributional and efficiency consequences needed to be reformed. The pre-war Sierra Leone government relied heavily on implicit sources of revenue: seigniorage, financial repression and purchases of foreign currency from the private sector at overvalued exchange rates (Davies 2000). Explicit and implicit taxation of agriculture marginalized the southeastern regions where the war started (Davies 2007).

How Liberia and Sierra Leone respond to their post-war revenue challenges was critical to long-term prospects for peace and economic recovery: Failure to generate substantial revenues would imply continued aid dependence, and an inability to finance critical development projects aimed at alleviating poverty and reducing the risk of future conflict.

The objective of this paper, therefore, is to examine, from a political economy perspective, efforts by Liberia and Sierra Leone to tackle their post-war revenue challenges. This is done in two steps. First, we investigates the following questions: How did the two countries tackle the key challenges facing them at the onset of peace? What are the lessons to be learned? Second, on the basis of empirical answers to these questions, we develop a political economic model to highlight factors that determine government's choice of revenue rehabilitation strategy in a post-conflict environment.

We find that in both Liberia and Sierra Leone, greater emphasis is put on exploitation of natural resources as a state revenue rehabilitation strategy, although in recent years efforts have been directed towards the development of tax-based revenue sources. Both countries, however, continue to face major challenges in the negotiation, implementation and monitoring of contracts for the exploitation of their natural resources. Contract terms vary widely even within a country and for a given resource (e.g. oil exploration in Liberia and iron ore in Sierra Leone), reflecting lack of policy consistency.

From the viewpoint of public governance performance, both countries have made efforts to introduce some measure of transparency and accountability in the collection of revenues

from natural resources and reduce the risk that the resources could be used to fund conflict. Notably, they have joined the Extractive Industries Transparency Initiative (EITI) but Liberia has gone much further, becoming Africa's first EITI compliant country in October 2009. Sierra Leone is yet to reach that stage. As result, more generally, Liberia seems to have outperformed Sierra Leone with regard to revenue generation with a revenue-to-GDP ratio of about 25% in 2009 compared with Sierra Leone's 12%, one of the lowest ratios in Africa even among post-conflict countries.

Future prospects also point to continued reliance on natural resources, as both countries have substantial, natural resource-based revenue potential: Sierra Leone has discovered oil (though the commercial viability is yet to be confirmed) and is set to become a leading exporter of iron ore in Africa. Oil prospecting is ongoing in Liberia and the prospects for discovery are favorable. There is also considerable potential for generating revenues from marine resources, especially fisheries in the two countries.

Our political economic model relates government choice of revenue rehabilitation strategy to the political and economic costs of delaying tapping up on the country's natural resource till sound institutions of accountability are put in place. On one hand, relying on natural resource extraction to generate state revenue in the aftermath of civil war may expose the country to resource predation by profit-maximizing mining companies (Stiglitz 2007). This "impatience strategy" has been shown to breed corruption, as the political elite conspire to deprive their people with substantial means to improve their living standards, particularly when these people lack adequate access to accountability mechanisms, as is often the case in the aftermath of a civil war. In this context, Stiglitz argues that adopting a "patience strategy"— which consists of delaying the tapping up of natural resources until sufficient progress has been made in the strengthening of state-citizens accountability relationships— can reap sizable dividends for the post-conflict country. On the other hand, given that most post-conflict countries have poor credit ratings that severely limit the state's ability to borrow funds from the international capital market, unless the country

has a large enough non-resource related fiscal base, adopting a patience strategy may be a luxury the government of a resource-rich country cannot afford in the aftermath of a civil war. Our political economic model therefore formalizes impediments to state adoption of a Stiglitz-like patience strategy in the rehabilitation of public revenue in the aftermath of a civil war. It calls for the emergence of an international civil society to substitute for the lack of a pro-active national civil society in a resource-rich post-conflict society. Unless such a device is put into place as part of the peace-consolidation process, abundance of natural resource is bound to be a curse that creates a vicious cycle of civil wars and resource depletion.

The rest of this study is structured as followed. Section 2 presents the context of the study, emphasizing the main features of post-conflict Liberia and Sierra Leone. Section 3 then provides empirical evidence on the comparative performances of state revenue rehabilitation strategies in both countries. Section 4 presents the model formalizing these countries' choices of revenue rehabilitation strategies. Finally, section 5 concludes.

2. The Post-conflict Context in Liberia and Sierra Leone

In this section we present a brief outline of the socioeconomic and political context characterizing post-conflict Liberia and Sierra Leone.

2.1. History, politics and the war

Liberia and Sierra Leone share a border and certain economic, historical, geographical and cultural features. The civil wars in Liberia and Sierra Leone have been blamed on somewhat similar factors: State failure in the 1980s, induced by a sharp decline in economic and political governance (Reno 1998). In Liberia, a military coup by Sergeant Samuel Doe ended the 130 year aristocracy of the Americo-Liberian ethnic group but only magnified the underlying problems of corruption, nepotism and repression (Liberia Poverty Reduction

Paper 2005). Charles Taylor launched the rebellion in 1989, receiving widespread support. Splinter groups emerged and a West African force ECOMOG intervened, preventing Taylor from taking complete power. In 1997 ECOMOG conducted presidential elections which Taylor won.

However, Taylor failed to transition from warlord to statesman. He sought to eliminate political opponents and godfathered an arms-for-diamond trade with the Sierra Leone rebels. Most of the trade in Liberia's timber and other natural resources were off-budget. Fresh fighting soon broke out. In 2003, with rebels closing in on Monrovia, the national capital, Taylor agreed to hand over to an interim government and leave the country. In 2005, elections were conducted which were won by Mrs Ellen Johnson Sirleaf.

The roots of the 1991-2001 civil war in Sierra Leone have been linked to the political leadership of the preceding years that emphasized informalization and control of markets and their reward, and replacement of political competition with a struggle for political favour (Reno 1998). There was extensive intervention in key markets for rice, foreign exchange, diamonds and export produce while political or civil opposition was curtailed, culminating in a one-party state in 1978. By the mid-1980s, the economy was characterized by burgeoning black markets, dysfunctional infrastructure and high unemployment. In 1991, rebels of the Revolutionary United Front (RUF) launched the rebellion with help from Charles Taylor's rebel movement in Liberia. The war finally ended in 2002.

The war in Liberia claimed 270000 lives (Liberia Poverty Reduction Strategy 2005) for a prewar population of about three million, compared with 50000 deaths in Sierra Leone for a prewar population of about 4.5 million. Much of the fighting was outside of Freetown the national capital, sparing much of the decadent infrastructure in the city. In Liberia, much of the fighting took place in Monrovia, damaging much of the infrastructure. At the end of the war, Monrovia had no running water or public electric supply, unlike Freetown.

The UN has staged two of its largest peacekeeping operations in the two countries to help end the civil war. It deployed 17000 peacekeepers in Sierra Leone starting in 2000 and

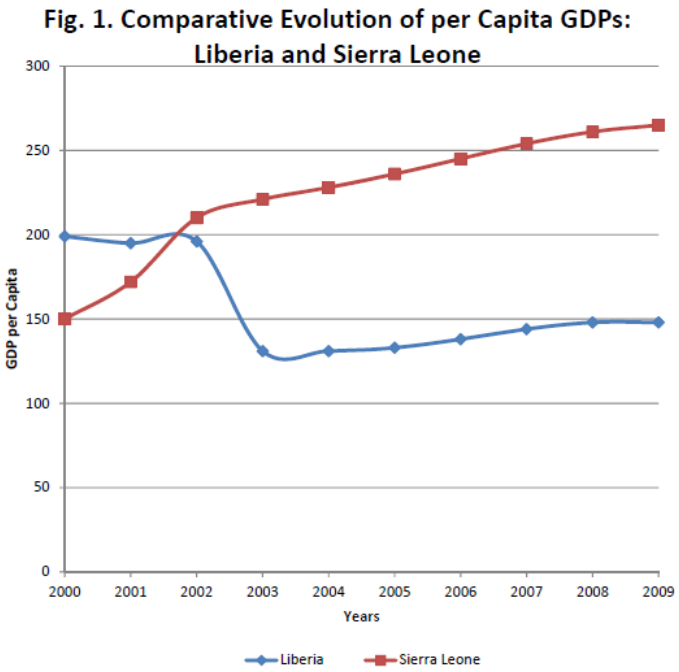
a similar number in Liberia. The two countries have emerged from civil war as budding democracies. Notably, Sierra Leone has conducted two peaceful post-war elections, with the opposition winning the second. Liberia elected Africa's first female president in the first post-war elections conducted in 2005.

2.2. Comparative Post-Conflict Economic Indicators

In this subsection we provide a comparative snapshot of the economic performances of two post-conflict countries in the onset peace. Liberia and Sierra Leone are both resource-rich coastal economies endowed with iron ore and marine and other natural resources. Diamonds have played a prominent role in Sierra Leone – for good or ill. They accounted for 90% of exports and some 15% of GDP in the 1960s and 1970s and about a quarter of revenues. Iron ore, timber and rubber (mainly from large-scale plantation agriculture) have historically been Liberia's leading exports. Sierra Leone has discovered oil (though the commercial viability is yet to be confirmed) after Ghana along the West African coast while iron ore is set to become one of its leading exports from 2012. Liberia, lying just below Sierra Leone along the West African coast, is also actively prospecting for oil.

While both countries are low-income countries recovering from pernicious civil conflict with per capita income of less than US$300, following the onset of peace, Sierra-Leone seems to have fared better in terms of per capita GDP performance, as suggested by the

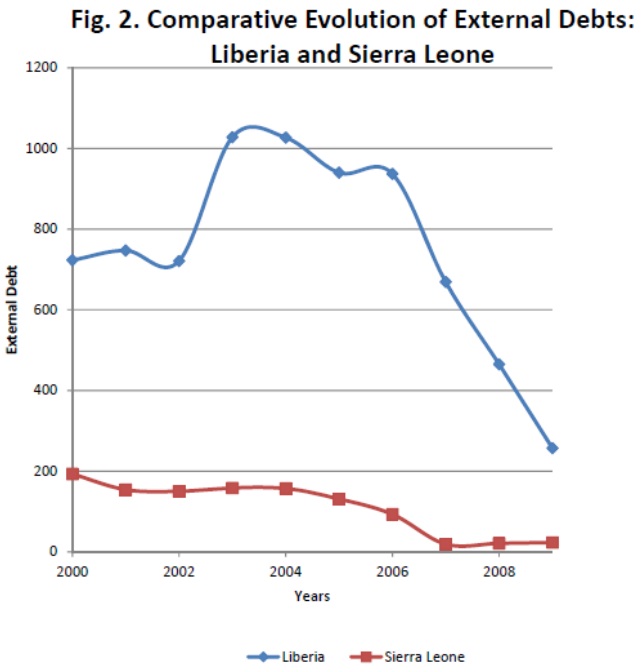
Fig. 1 below, which drawn from Table 1 and 2 in the Appendix.



Indeed, while per capita GDP has been slow to rise in Liberia during the post-conflict era, Sierra Leone's per capita GDP, by contrast, exhibits a steeper upward trend,partly reflecting the relative abundance of natural resource in the latter.

At the end of the civil war, Liberia and Sierra Leone embarked on an IMF-supported the Extended Credit Facility (ECF) economic reform program. They both benefited from forgiveness of almost all their debt to the IMF, World Bank and African Development Bank after reaching the completion point of the Highly Indebted Poor Countries (HIPC) initiative. As a result, the external debt stock has been declining in both countries, with Liberia exhibiting the strongest decline, as shown in Fig. 2 below, also drawn from Tables

1 and 2 in the Appendix section.



How did these economic performances affect state revenue measures in both countries? The next section addresses this question from an empirical perspective.

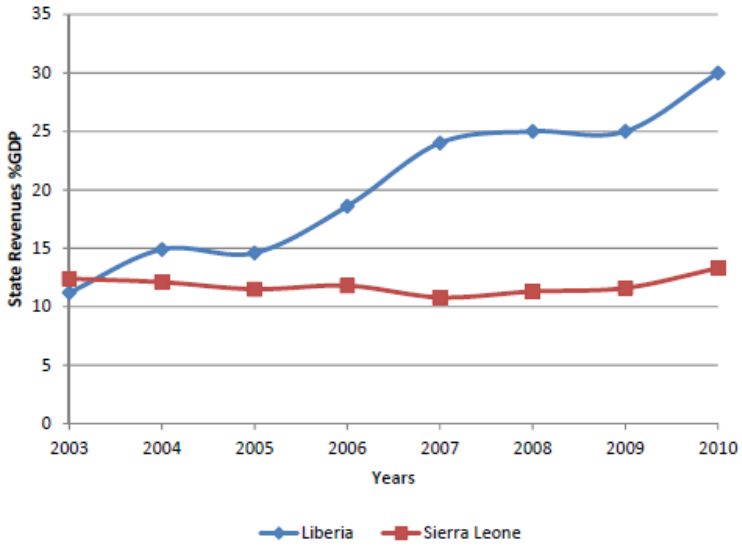
3. Post-Conflict Revenue Measures

In this section we document efforts by Liberia and Sierra Leone to address the key revenue challenges facing them at the onset of peace.

3.1. Resuscitating collapsed government revenues.

Tables 3 and 4 in the Appendix section list respectively state revenue performance in Liberia and Sierra Leone and the key measures that have been undertaken to resuscitate collapsed government revenues. Given that per capita GDP has been higher in Sierra Leone than in Liberia, one would expect the government of the latter to perform relatively better in terms of post-conflict state revenue rehabilitation.

Fig. 3. Comparative Evolution of State Revenues in Liberia and Sierra Leone: % GDP



Yet Fig. 3 above, drawn from Table 3, suggests the reverse. Indeed, the government of Liberia outperformed its Sierra Leone's counterpart with regard to revenue generation since the onset of peace in both countries, with a revenue-to-GDP ratio of about 25% in 2009 compared with Sierra Leone's 12%, one of the lowest ratios in Africa even among post-conflict countries. This performance disparity with respect to revenue rehabilitation needs to be explained. A comparative analysis of both countries public governance performance seems to provide a valuable clue to this cross-country disparity. Indeed, from the viewpoint of public governance performance, while both countries have made efforts to introduce some measure of transparency and accountability in the collection of revenues from natural resources and reduce the risk that the resources could be used to fund conflict—notably, they have joined the Extractive Industries Transparency Initiative (EITI)—, Liberia appears to have gone much further, even becoming Africa's first EITI compliant country in October 2009. Sierra Leone, by contrast, is yet to reach that stage.

3.1.1. Automation of revenue collection

In this subsection, we provide a comparative assessment of revenue rehabilitation efforts put in place by governments of Liberia and Sierra Leone respectively since the onset of peace. At the onset of peace, all aspects of revenue collection in Liberia and Sierra Leone were undertaken manually. This offered substantial scope for fraud with tax assessors exercising considerable discretion. In both countries, efforts to automate revenue collection have focused principally on customs revenue, and in Sierra Leone, on the administration of the value-added tax as well.

The two countries have attempted to automate customs revenue collection through the introduction of the Automated System for Data Analysis (ASYCUDA) developed by UNCTAD. Automation could eliminate a major source of private revenues for corrupt customs officials; and increase costs for importers involved in import duty evasion. Unsurprisingly, the attempt at automation has met with major obstacles in both countries.

Nevertheless, Liberia was able to operationalize within 18 months the more sophisticated, internet-based ASYCUDA World in the Freeport of Monrovia which handles 85% of the country's trade transactions.[3] On the other hand, Sierra Leone has not been able to operationalize the less sophisticated non-internet-based ASYCUDA++ since efforts began in 2009.[4]

3.1.2. Establishment of an independent revenue authority and centralization of revenue administration

Sierra Leone brought customs, tax and non-tax revenue administration together under the management of a semi-autonomous National Revenue Authority (NRA) in 2003. The NRA

[3]Liberia has some 17 ports some of which are not in use.

[4]Liberia has faced some logistical challenges in the implementation of ASYCUDA: The Free Port of Monrovia has no electric power supply. A 20 KVA generator was bought which is operated for 10 hours every day. The ASYCUDA system is operated during those ten hours. Limited band width for internet access is another constraint. Wireless internet connection is used as Liberia does not have fiber optics technology.

is similar in spirit to the independent revenue authority many African countries such as Uganda and Rwanda. The driving factor has been the prospect of improving coordination of revenue collection activities and reducing duplication, and the desire to insulate revenue administration from undue external or political influence.

However, unlike the pattern observed in other countries, domestic revenues fell as a proportion of GDP following the creation of the National Revenue Authority. The revenue to GDP ratio fell from 12.4 percent in 2003 to 11.5 percent in 2005 and further to 11.6 percent in 2009. A 2007 report on the National Revenue Authority highlighted the following problems: too many departments and vehicles, weak internal control over revenue collection, and political nepotism (Presidential transition team report, 2008). The report noted that the NRA's last completed audit was for 2004. The Sierra Leone experience suggests that the existing revenue institutions may need to be reformed and modernized prior to the setting up of an independent revenue authority.

In Liberia revenue collection has been undertaken by the Ministry of Finance. Plans are underway for the setting up of an independent revenue authority.

3.1.3. Development of a fiscal regime for natural resources

Stiglitz (2007) argues that the key problem facing developing countries with regard to getting full value for their natural resources is that private sector parties have interests to maximize their revenues and to minimize those accruing to the country. Conflicts of interest may also arise on the part of public officials tasked with negotiating and implementing contracts with private firms on behalf of citizens. Resource-rich countries therefore need to develop public sector management institutions to address these conflicts of interest. An appropriate fiscal regime for natural resources exploitation is a key element of the institutions required to minimize conflict of interest and ensure that a country gets full value for its natural resource wealth. The fiscal regime should be minimally complex and fully transparent (Stiglitz 2007). Liberia has made considerable efforts to develop a fiscal

regime for natural resources with the help of the IMF. Mrs Johnson Sirleaf's government, upon taking office in 2005, decided to renegotiate all natural resource agreements, driven by the view that the agreements generally yielded very little value to the country for its natural resources. The government also subsequently signed agreements for the mining of iron ore with at least four firms including Acelor Mittal, the leading global steel producer. However, the fiscal terms – royalty rate, signature bonus (initial down payments) and withholding taxes — vary widely across the agreements. Furthermore, concerns have been raised that the government has prioritized large initial payments (signature bonuses) while granting considerable tax concessions over the medium to long term. Liberia has also signed agreements with two separate Malaysian investors for the cultivation of 100,000 hectares of oil palm each. Commercial logging in Liberia's vast forest areas is managed through an auction-based concession system.

Sierra Leone has now sought the help of the IMF to develop a fiscal regime for its natural resources. In the absence of a standard framework for taxation of natural resources, the treatment of investors has been on a case by case basis. The key large scale mining investors include African minerals (iron ore) and London Minerals (iron ore), Koidu Diamonds (Kimberlite diamonds) and Sierra Rutile.

3.1.4. Tax reforms and Reduction of Tax Exemptions

Liberia and Sierra Leone have undertaken a number of tax reforms. Sierra Leone introduced a value-added tax in 2010 to replace the domestic and import sales tax. The motivation has been to replace inefficient production and sales tax (which sometimes involves multiple taxation) with a less distortionary tax, resulting in increased revenue and efficiency gains. Plans are underway to implement the VAT in Liberia by 2013. Both countries have introduced tax payer identification numbers.

Tax exemptions have been a recurring theme in Liberia and Sierra Leone because they could represent a major source of revenue leakages. There are three categories of

exemptions in the two countries: (i) institutional exemptions for pre-defined institutions and categories of people such as diplomatic missions, members of parliament and religious institutions; (ii) exemptions granted to investors and (iii) discretionary exemptions granted by the Ministry of Finance.

Liberia and Sierra Leone attempted to reduce large tax concessions initially granted to investors by renegotiating agreements. Liberia has limited the number of vehicles members of parliament can import in any one year to two (previously there was no limit).

3.2. Ensuring that natural resources promote peace and development

Table 4 in the Appendix section lists some initiatives that have been pursued to ensure that natural resources promote peace and development in Liberia and Sierra Leone. The two countries have joined the Kimberley Diamond Certification Scheme. A major issue for Sierra Leone –which produces more diamonds than Liberia – is the difficulty of policing its alluvial diamond resources. By nature, the resources are widely dispersed and can be mined with simple implements. This tends to encourage illegal mining and smuggling to evade taxes. Sierra Leone presently sets its tax rate on diamond exports at 6% compared to 2% in Liberia. In the past – and perhaps presently as well – smuggling of Sierra Leone diamonds to Liberia was widespread. Fiscal revenues from diamonds in Sierra Leone have been low, less than US$10 million (at most 0.4 percent of GDP). Revenues come from license fees; and an export tax (recently increased from three to six percent), shared among several entities, with the diamond-producing community and the government treasury each receiving a quarter. Companies are also subject to company and income tax.

Liberia and Sierra Leone have also joined the Extractive Industries Transparency Initiative (EITI). Here, Liberia has made much more progress than Sierra Leone. It became the first country in Africa — and the second in the world — to attain EITI compliant status on October 2009. Liberia has also adopted the Chain of Custody certification scheme for timber and timber products. The scheme is a traceability system that requires accurate

records from maps of harvest trees to transport waybills and export permits. The aim is to ensure that certified products come from an ethically well managed source. The scheme is run by a private Swiss inspection company.

Overall the above empirical findings suggest that while both countries have made significant efforts to strengthen public governance and reform their fiscality, Liberia seem to have nudged ahead of Sierra Leone in terms of its government's relative success at rehabilitating state revenue. What may explain this observed disparity between these similar countries? The next section address this question.

4. A Model of Revenue Rehabilitation in a Post-Conflict Environment

In this section, we develop a political economic model to explain the observed disparity between Liberia and Sierra Leone with respect to state capacity to rehabilitate public revenue in the aftermath of a civil war. Consider a benevolent government aiming to raise revenue so as to improve the welfare of its population. The country is resource-rich, being endowed with a stock, θ, of a given natural resource (e.g., diamond, iron ores, gold, timber, rubber, or copper). The government hires a private contractor (a multinational mining company) to mine the resource on behalf of the people. There are major challenges facing the government in the negotiations of mining contracts with potential suitors. First, mining is a complex investment and mining contracts often exhibit moral hazard and/or adverse-selection problems that may severely reduce the benefits to the people, unless they have access to accountability mechanisms that constrain the actions of the government representing them in these negotiations. Second, in a post-conflict environment, the risks of a relapse of the conflict are real, and state fragility and institutional weakness are still high. This situation causes the country to have a poor credit rating in the international capital market, thus limiting its capacity to borrow at competitive interest rates. Therefore

a government that may want to delay tapping up on natural resources until it has the full capacity to secure favorable contracts for their exploitation may face low returns to this strategy, particularly if the natural resource exhibits high price volatility. Third, rehabilitating government revenue in the aftermath of a civil war may be urgent, owing to the pressing need to restore normalcy say, by securing the rule of law and/or reconverting ex-combatants to productive activities. Therefore in a post-conflict environment, choosing a revenue rehabilitation strategy may be a conundrum even for a benevolent government. The choice here is between a revenue rehabilitation strategy characterized by patience (i.e., delaying the tapping up of resources) and another characterized by impatience (tapping into the resource as a means to raise revenue in the onset of peace).

The model suggests that resource-rich countries emerging from conflict may be well advised to first up and strengthen institutions for the negotiation, implementation and monitoring of contracts before opening up the resources for exploitation by multinational corporations.

The focus on Liberia and Sierra Leone is not fortuitous. The two countries have faced similar revenue-generation challenges under somewhat similar circumstances. An analysis of how these challenges have been addressed in each country could therefore provide insights for policy. The focus on the political economy dimensions of revenue collection is consistent with the primordial importance of political factors in shaping economic decisions and outcomes in the two countries, as in many other African countries.

4.1. The Payoff from Being Impatient

Suppose the government has an offer on the table from a mining company for the extraction of the resource. The company offers to mine the resource right away, and sell it at the current market price, p. Total proceeds from the sale are thus $p\theta$. The government will get a share, $\lambda p\theta$, and the remaining share, $(1-\lambda)\,p\theta$, will accrue to the company. The mining costs are charged to government, which further reduces the share of the natural resource

windfall accrued to the society. In other words, the net revenue accrued to the government will be $\lambda p\theta - C$, where $C \in \left[C_0, \bar{C}\right]$ denotes the mining cost declared by the company.

An important feature of the model is that mining costs are the company's private information. As a result, the company may not have the incentive to truthfully reveal the true size of these costs to the government. Knowing this, the government must create an administration for auditing the company so as to induce truthful revelation. Assume that setting up this auditing administration costs ω in government revenue, and suppose that the auditor is corruptible. We interpret ω as the budget managed by the auditor. Then the net revenue accrued to the government is given as follows:

$$R = \begin{cases} \lambda p\theta - C_0 - \omega + f_A + f_M & \text{with prob. } \rho \\ \lambda p\theta - C - \omega & \text{with prob. } 1 - \rho \end{cases} \tag{4.1}$$

where ρ is the probability that corruption is uncovered say, by an element of the civil society (a whistle-blower), in which case both the auditor and the company are punished: the auditor is assessed a fine, f_A, the company, f_M, and the looted money is recovered by the state. But if corruption is not uncovered, the government will pay the declared cost, C. We make the following assumption.

A.1. The probability that corruption is uncovered is an increasing function of both the quality of institutions of accountability, $\alpha \in (0, 1)$, and of the degree of over-reporting of the cost of mining, $\sigma = C - C_0$:

$$\rho = \alpha\sigma. \tag{4.2}$$

In a post-conflict environment, the quality of institutions of accountability, α, may also need time to reach an adequate level, in particular if the country had no previous history of sound government-citizens accountability relationships. A sign of weak institutions is often the paucity of an active civil society, the emergence of which may take considerable

time in the aftermath of a bloody conflict. Since citizens tend to treat natural resources as a windfall, they may not have the incentive to mobilize politically to demand state accountability for the use of this windfall. Ensuring transparency and accountability in state management of natural resource windfalls may thus be best carried out by sections of the civil society. However, in a post-conflict environment, a pro-active civil society may take time and effort to emerge.

If the government has overwhelming reasons to be impatient, it will accept the contract as it is, set up an auditing administration that costs, ω, and receive an expected net revenue given by

$$V(0;\lambda,\alpha) = \lambda p\theta - C_0 - \omega + (f_A + f_M)\,\alpha\sigma - (1-\alpha\sigma)\,\sigma. \tag{4.3}$$

The level of public funds looted, σ, is privately determined by the mining company. Therefore care must be taken to explain how its level is determined.

4.2. The Payoff from Being Patient

Suppose instead that the government considers being patient, which means leaving the resource untapped till a future period when institutions are sufficiently strong— a solution advocated by Stiglitz (2007). Suppose also that if the government follows this alternative, it will have to create alternative fiscal instruments to generate revenue, due to the pressing need of financing economic recovery. Examples include, but are not restricted to import duties, export taxes, and per capita taxes. Because this revenue is collected out of citizens pockets, this is likely to induce them to politically mobilize so as to hold the tax administration accountable not only for the level of tax burden, but also for how tax revenue is used.

Let T be the amount of taxes collected, and suppose that setting up a tax administration also costs ω. Let π denote the probability that in the future, the price of the natural resource

will be low: $p' = \underline{p} < p$, and $1 - \pi$, the probability that it will be high: $p' = \bar{p} \geq p$. Then, the expected net revenue accrued to the society when the government follows a "patience" strategy is given by:

$$V(1; \lambda, \upsilon, T) = \lambda\theta\bar{p} - C_0 + T - \omega - \upsilon\lambda\theta, \tag{4.4}$$

where

$$\upsilon = \pi\left(\bar{p} - \underline{p}\right)$$

is a measure of the degree of volatility of the price of the natural resource. Patience resolves the problem of corruption, but is a risky strategy when the resource price is highly volatile, and the available tax base is too low, say due to the scale of devastation caused by years of civil wars. The term $\upsilon\lambda\theta$ measures the financial risk facing the government when it chooses to play a patience game with the extraction of the natural resource. This risk is higher, the more volatile the price of the natural resource, where the degree of volatility is measured by υ. The government's problem thus is to choose which strategy to adopt: either $s = 0$, in which case the government is impatient, or $s = 1$, the government is patient instead. The optimal strategy therefore is s^* such that

$$s^* = \arg\max_s \left\{sV(1; \lambda, \upsilon, T) + (1 - s)V(0; \lambda, \alpha)\right\}.$$

Before we get to the solution of this problem, let us, next, outline the process giving rise to σ.

4.3. A Coalition Game of Corruption

We assumed above that if the government-appointed auditor works hard enough, he or she will uncover the true level of the mining cost, thus leading to truthful revelation. The mining company knows that, and the auditor knows that the company knows that he or

she has the capability to uncover the true level of the mining cost, C_0. Suppose then that one of these two agents (either the company or the auditor) proposes a deal to the other stipulating that the company can over-state the mining cost on the condition that both parties— the company and the auditor— share the looted funds, $\sigma = C - C_0$. The contract for looting public funds is thus a pair, (β, σ), where $\beta \in (0, 1)$ denotes the share of looted funds accrued to the auditor, with the remaining share $1 - \beta$ going to the company.

For the auditor, refusing to be a part of the coalition involved in the looting of public funds generates a payoff ω— for being honest. By contrast, accepting the terms of this contract, yields a payoff, $\omega + \beta\sigma$, with probability $1 - \alpha\sigma$, and $\omega - f_A$ with probability $\alpha\sigma$. The auditor's expected payoff thus can be written as follows:

$$\phi_A = \omega + \beta\sigma - (f_A + \beta\sigma)\,\alpha\sigma. \tag{4.5}$$

For the auditor therefore, a participation constraint must be satisfied:

$$\phi_A \geq \omega; \tag{4.6}$$

otherwise, he or she will not agree to the terms of the contract.

Likewise, for the mining company, the payoff from rejecting the contract is $(1 - \lambda)\,\theta$, while the payoff from accepting it is $(1 - \lambda)\,\theta + (1 - \beta)\,\sigma$, with probability $1 - \alpha\sigma$, and $(1 - \lambda)\,\theta - f$, with probability $\alpha\sigma$, where $f \geq 0$ denotes a fine assessed by the government as punishment for violation of truthful-revelation of the cost of mining. Therefore, the company's expected payoff from being a part of the coalition for looting public funds is

$$\phi_M = (1 - \lambda)\,\theta + (1 - \beta)\,\sigma - [(1 - \beta)\,\sigma + f_M]\,\alpha\sigma. \tag{4.7}$$

For the mining company therefore, a participation constraint must also be satisfied:

$$\phi_M \geq (1-\lambda)\,\theta; \tag{4.8}$$

otherwise, the company will reject the chance to form a coalition with the auditor for looting public funds.

An efficient contract thus can be construed as a solution to a Nash-bargaining game defined by the following Nash-solution:

$$\max_{\langle\beta,\sigma\rangle} \Gamma(\beta,\sigma)$$

where $\Gamma(\beta,\sigma) \equiv (\phi_A-\omega)\,[\phi_M-(1-\lambda)\,\theta]$. Using (4.5) and (4.8), it can be shown that the maximand, $\Gamma(\beta,\sigma)$, reduces to:

$$\Gamma(\beta,\sigma) = [\beta-(f_A+\beta\sigma)\,\alpha]\,(1-\beta-[(1-\beta)\,\sigma+f_M]\,\alpha)\,\sigma^2. \tag{4.9}$$

The timing of events in the negotiation process between the auditor and the mining company are as follows. First, both parties decide by how much to over-state the cost of mining. This amounts to determining σ. Then, both players learn whether or not they have been successful at looting public funds through this scheme. If corruption is uncovered they return the looted funds, and take the punishment. If corruption is not uncovered, then, with the looted funds in hand, both parties next determine the sharing rule, β.

Assume that the parties follow a backward induction process for determining the pair (β,σ). That is, given σ, they first agree on how to share the looted funds. Then knowing the sharing rule, they then decide how much to loot.

4.3.1. The Sharing Rule

Let β^* denote the optimal sharing rule. Then it must be that β^* solves the following first order necessary and sufficient condition:

$$\beta - (f_A + \beta\sigma)\,\alpha = 1 - \beta - [(1-\beta)\,\sigma + f_M]\,\alpha. \tag{4.10}$$

In other words, the optimal sharing rule equates both parties's net expected gain from coalescing to loot public funds. Solving equation (4.10) for β yields this optimal sharing rule as follows:

$$\beta^* = \begin{cases} 0 & \text{if } \alpha \geq A\,(\bar{\sigma}, f_A, f_M) \\ \dfrac{1 - \alpha\,(\sigma + f_M - f_A)}{2\,(1 - \alpha\sigma)} & \text{if } \alpha < A\,(\bar{\sigma}, f_A, f_M) \end{cases} \tag{4.11}$$

where

$$A\,(\bar{\sigma}, f_A, f_M) = \frac{1}{\bar{\sigma} + f_M - f_A},$$

and $\bar{\sigma}$ is the maximum admissible level of corruption. Hence the following Proposition:

Proposition 1. Suppose α satisfies

$$\alpha < A\,(\bar{\sigma}, f_A, f_M)\,, \tag{4.12}$$

then, the auditor's share of the looted funds, β^*, (i) rises with the penalty assessed to a corrupt auditor, f_A, and (ii) decreases with the level of fined assessed to corrupted mining company, f_M.

Condition (4.12) is necessary and sufficient for the auditor's share of the looted funds to be strictly positive. This condition states that the quality of institutions of accountability is too low. When this condition is violated, the share received by the auditor becomes zero, thus violating his or her participation constraint as specified in (4.6). In other words,

violation (4.12) will thwart the coalition for looting public funds.

4.3.2. The Incidence of Corruption

Having reached an agreement on how to share the looted funds, members of the coalition must now determine by how much to over-state the mining cost, a scheme, we argue, allow them to loot public funds accrued to citizens. Just to recall, the amount of public funds looted through this scheme is $\sigma = C - C_0$. We take this figure as a proxy for the incidence of corruption in this post-conflict country. Whether or not corruption will mar government revenue rehabilitation strategy depends on whether the government will succumb to impatience as opposed to patience. To characterize the incidence of corruption thus defined, we maintain condition (4.12).

On the basis of Proposition 1, we can thus re-write the maximand in (4.9) as follows, by substituting in (4.11), re-arranging:

$$\Gamma^*(\sigma) = \left(\left[1 - \alpha \left(\sigma + f_A + f_M \right) \right] \frac{\sigma}{2} \right)^2 .$$

At this stage, both parties must now reach an agreement on σ. The optimal level of looted funds, σ^*, thus is defined by

$$\sigma^* = \arg\max_{\sigma} \Gamma^*(\sigma) .$$

This optimal level satisfies the following necessary and sufficient condition:

$$1 - \alpha \left(f + \sigma + \omega \right) - \alpha\sigma = 0. \tag{4.13}$$

Combining (4.13) with (4.11), it can then be shown that the optimal funds looting contract

is a pair (β^*, σ^*) such that:

$$\sigma^* = \begin{cases} 0 & \text{if } \alpha \geq A^*(f_A, f_M) \\ \dfrac{1-\alpha(f_A+f_M)}{2\alpha} & \text{if } \alpha < A^*(f_A, f_M) \end{cases} \tag{4.14}$$

$$\beta^* = \begin{cases} 0 & \text{if } \alpha \geq A^*(f_A, f_M) \\ \dfrac{1+\alpha(3f_A-f_M)}{2(1+\alpha(f_A+f_M))} & \text{if } \alpha < A^*(f_A, f_M) \end{cases} \tag{4.15}$$

where

$$A^*(f_A, f_M) = \frac{1}{f_A + f_M}.$$

Hence the following Proposition;

Proposition 2. Suppose

$$\alpha < A^*(f_A, f_M). \tag{4.16}$$

Then, the incidence of corruption σ^* decreases with the stiffness of the penalties (f_A and f_M) imposed on corruption.

In other words, Proposition 2 implies that stiffer penalties for corruption can discourage corruption. However, imposing stiffer penalties is unlikely to eradicate the problem when institutions of accountability are too weak, as implied by condition (4.16). At this level, a question of interest is: if the onset of peace, the quality of institutions of accountability is weak, why would impatience characterize a post-conflict government's revenue rehabilitation strategy? In other words, why is corruption ripe in post-conflict environments?

4.4. Optimal Choice of Revenue Rehabilitation Strategies

We argued above that corruption will not permeate the public finance of a post-conflict state if the government follows the patience route in attempting to rehabilitate its revenue collection capacity in the aftermath of a civil war. This point is in line with Stiglitz's view that strengthening institutions of accountability is an unavoidable priority in the process

of rehabilitating state revenue. But this begs the following question: why would a post-conflict state choose to ignore this warning and proceed with the allocation of tenders for the exploitation of its natural resources immediately following the onset of peace? Why did the governments of Liberia and Sierra Leone engage their respective countries in the extraction of their natural resources in the aftermath of the civil war? We address this question below:

Suppose the quality of post-conflict institutions of accountability is characterized by condition (4.16). Let $\vartheta(\alpha, \upsilon, \theta, T) = V(1; \lambda, \upsilon, T) - V(0; \lambda, \alpha)$ denote the expected net gain in revenue when the government chooses a revenue generation strategy characterized by patience. Arguably, if $\vartheta(\alpha, \upsilon, \theta, T) > 0$, the government will find it optimal to follow a revenue rehabilitation strategy characterized by patience. But if $\vartheta(\alpha, \upsilon, \theta, T) < 0$, the government will find it optimal to be impatient— which unfortunately will invite corruption. We look for socioeconomic forces that may cause impatience to permeate government choice of revenue rehabilitation strategy. For this purpose, we must first compute $\vartheta(\alpha, \upsilon, \theta, T)$. This follows in two steps.

First, consider the state expected revenue, when the government's revenue rehabilitation strategy is characterized by impatience, $V(0; \lambda, \alpha)$, as defined in (4.3). Then, using the fact that $\sigma = C - C_0$, we can rewrite this expression as follows:

$$V(0; \lambda, \alpha) = \lambda p\theta - C_0 - \omega + (f_A + f_M)\alpha\sigma^* - (1 - \alpha\sigma^*)\sigma^*. \tag{4.17}$$

where σ^* is as defined in (4.14). Second, combining (4.4) and (4.17), using (4.14) and re-arranging, yields

$$\vartheta(\alpha, \upsilon, \theta, T) = \frac{1}{4\alpha}\left[1 - \alpha(f_A + f_M)\right]^2 + T - \upsilon\lambda\theta. \tag{4.18}$$

Proposition 3. Let condition (4.16) holds. Then, (i) stronger state accountability institutions, (ii) abundance of natural resources, (iii) a higher degree of volatility of

natural resource prices, and (iv) a low fiscal base induce the government to choose a revenue rehabilitation strategy characterized by impatience. In other words,

$$\begin{aligned} (i) \qquad & \vartheta_{\alpha} > 0 \\ (ii) \qquad & \vartheta_{\upsilon} < 0 \\ (iii) \qquad & \vartheta_{\theta} < 0 \\ (iv) \qquad & \vartheta_{T} > 0 \end{aligned}$$

Proposition 3 implies that in a post-conflict state is characterized by weak institutions of accountability, a benevolent government will not resort to the extraction of the country's natural resources as a revenue rehabilitation strategy unless, (i) the civil war left the country with too low a fiscal base (i.e., T is too low), (ii) the international market for the resources exhibit high price volatility (i.e., υ is too high), (iii) it has abundant resources (i.e., θ is too high). All these factors will cause the net gain from following a "patience" strategy to be negative. Because the devastating effects of armed conflicts create enormous financial needs that humanitarian aid alone cannot satisfy, resource-rich post-conflict countries may be exposed to a form of resource curse linked to factors that impede government's implementation of revenue rehabilitation strategies characterized by patience.

5. Conclusion

This paper examined the challenges faced by the governments of Liberia and Sierra Leone in their respective efforts to rehabilitate state revenue in the aftermath of their pernicious civil wars. We found that while both countries governments have made efforts to diversify the sources of state-revenue, introduced some measure of transparency and accountability in the collection of revenues from natural resources, and reduced the risk that the resources could be used to fund conflict, public governance problems remain that undermine the

efficiency of these countries respective revenue collection processes. The magnitude of these problems appeared to be higher in Sierra Leone than in Liberia, resulting in the former having a relatively poorer performance with respect to state revenue rehabilitation in the aftermath of the civil war.

We then developed a political economic model highlighting potential explanations for this observed disparity in state revenue rehabilitation performance. Our model contrasts two different revenue generation strategies, one emphasizing reliance on tax-based revenue sources in the aftermath of the civil war when state institutions of accountability are still weak (the patience strategy), and the other emphasizing the rush to resource extraction to fund state revenue right from the onset of the peace-consolidation process (the impatience strategy). We show that the latter breeds corruption due to citizens' inadequate access to accountability mechanisms. We highlight three main reasons that may induce a post-conflict government to choose a revenue generation strategy characterized by impatience. First, the non-resource related fiscal base must be too narrow, say due to the devastating effect of the civil war. Second, the country must have abundant natural resources. Third, the international market for the resources must exhibit high price volatility, thus creating uncertainty with respect to the future prospects for natural resource windfalls. In the presence of some or all of these factors, and given the pressing needs to consolidate peace, the government of a post-conflict country may have no choice but to resort to impatience in its attempt to rehabilitate state revenue. On the basis of this model, the observed disparity between Sierra Leone and Liberia with respect to state capacity to rehabilitate state revenue in the aftermath of a civil war can be explained by the fact that the former is relatively more endowed in natural resources, which causes impatience to permeate its government's choice of revenue rehabilitation strategy.

Our political economic theory of state revenue rehabilitation in the aftermath of a devastating conflict suggests that the peace consolidation agenda should prioritize the rehabilitation or the emergence of a pro-active civil society, as well as the promotion of political

participation at the grassroots' level so as to speed up the process of institutional reform without which the state revenue rehabilitation strategy will be marred by inefficiencies. Perhaps as an accompanying measure, it also calls for the emergence of an international civil society to substitute for the lack of a pro-active national civil society in a resource-rich post-conflict society. Unless either one of these two sets of measures are put into place as part of the peace-consolidation process, abundance of natural resource is bound to be a curse that creates a vicious cycle of civil wars and resource depletion.

6. Appendix

In this section we report relevant tables supporting our analysis.

Table 1. Liberia: economic indicators

Indicator Name	GDP (current US$)	GDP growth (annual %)	GDP per capita (constant 2000 US$)	Population, total	External debt stocks (% of GNI)	External debt stocks, total (DOD, current US$)
2000	560900012	26	199	2824427	723	2.8E+09
2001	543000032	3	195	2957510	747	3E+09
2002	559300024	4	196	3056860	721	3.3E+09
2003	410200004	-31	131	3137852	1028	3.6E+09
2004	459999996	3	131	3224643	1027	3.8E+09
2005	530200009	5	133	3334222	940	3.9E+09
2006	611859675	8	138	3471020	937	4.2E+09
2007	734933279	9	144	3627285	669	3.7E+09
2008	842507278	7	148	3793400	465	3.1E+09
2009	876300028	5	148	3954979	257	1.7E+09

Source: World Development Indicators

Table 2. Sierra Leone: economic indicators

Indicator Name	GDP (current US$)	GDP growth (annual %)	GDP per capita (constant 2000 US$)	Population, total	External debt stocks (% of GNI)	External debt stocks, total (DOD, current US$)
2000	6.36E+08	3.8	150	4228178	193	1.19E+09
2001	8.06E+08	18.2	172	4367781	154	1.2E+09
2002	9.36E+08	27.5	210	4540322	150	1.36E+09
2003	9.91E+08	9.3	221	4732526	158	1.52E+09
2004	1.1E+09	7.5	228	4925922	157	1.63E+09
2005	1.24E+09	7.2	236	5106977	131	1.54E+09
2006	1.42E+09	7.3	245	5270799	93	1.27E+09
2007	1.66E+09	6.4	254	5420400	19	3.12E+08
2008	1.95E+09	5.5	261	5559853	21	3.99E+08
2009	1.94E+09	4.0	265	5696471	23	4.44E+08

Source: World Development Indicators

Table 3: Domestic Revenues in Liberia and Sierra Leone

	Million US$		% GDP	
	Liberia	**Sierra Leone**	**Liberia**	**Sierra Leone**
2000		73		11.4
2001		105		13
2002		114		12.2
2003	45.7	123	11.2	12.4
2004	68.2	132	14.9	12.1
2005	77.1	144	14.6	11.5
2006	114	167	18.6	11.8
2007	175	180	24	10.8
2008	200		25	11.3
2009	211	222	25	11.6
2010	275	252	30	13.3

Source World Development Indicators and Governments of Liberia and Sierra Leone

Appendix Table 1. Measures to resuscitate and increase revenues

Measure	Aim	Liberia	Sierra Leone
Automate customs revenue collection.	Facilitate customs clearance and minimize fraud	Implemented internet-based Automated System for Customs Data Analysis (ASYCUDA World) within a year, by January 2010. Customs clearing time reduced from 12 to 4 days, and from 21 to 10 steps.	Attempting to implement less sophisticated non-internet based ASYCUDA++ over two years
Automate domestic tax revenue collection	Increase tax compliance and minimize fraud	Introduced Tax Administration System (TAS) with limited automation of tax collection.	Value-added tax (VAT) introduced in January 2010, automated. All taxes, except VAT, are manually administered.
Introduce value-added tax	Reduce reliance on distortionary trade taxes	Scheduled for 2013. Goods and services tax of currently in force.	Introduced in January 2010
Develop fiscal regime for natural resources	Ensure the country and host community benefit adequately from natural resources.	Fiscal regime for natural resources and large agricultural projects developed with help of the IMF. National Investment Commission and Inter-Ministerial Technical Committee responsible for contract negotiation. Contracts awarded by competitive bidding comprising two volets: technical proposal and "signature bonus": e.g. US$40m (China Union – iron ore)	No clear policy or procedure for contract negotiation.
Establish independent revenue authority	Improve tax administration by ..elite...	Plans underway	National Revenue Authority (NRA) established in 2003
Centralize revenue collection	Tap economies of scale, reduce duplication and increase transparency and accountability in revenue collection	Revenues are collected by the Bureau of Customs and Excise under the Ministry of Finance. Plans are underway to set up NRA-type revenue authority.	Semi-autonomous National Revenue Authority set up in 2003. Revenue collection initially centralized under NRA followed by partial reversion to decentralized collection.
Curb duty waivers and tax exemptions	Curb revenue leakages	Discretionary tax exemptions outside Liberia revenue code (2009) banned.	Parliament delegates power to grant exemptions to Minister of Finance.

		duty and tax waivers are published in local newspapers. MPs initially enjoyed waivers on unlimited vehicle imports during their term; reduced to two vehicles per year in 2000...	
Promote credibility, transparency and accountability in revenue collection....		Liberia became Africa's first EITI compliant country in October 2009.	Sierra Leone yet to attain.....
Promote audits and court-based prosecution of delinquent taxpayers		Tax court reactivated in 2009. Assistant Minister of Justice for Taxation appointed in 2009 to handle legal aspects of taxation.	
Introduce tax payer identification number			
Police territorial waters to prevent illegal fishing		Authorities begin to tax foreign vessels fishing in Liberian water (not done up to December 2005).	

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