Hydrocarbons Policy, Shocks and Collective Imagination: What Went Wrong in Bolivia?∗

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FIEL and University of La Plata, Argentina. This essay is dedicated to the memory of Guillermo Justiniano, graduate in economics at the University of La Plata and ministerial reform leader in the attempted modernization of Bolivia in the 1990s. Errors and misinterpretations are the author’s responsibility.
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1. Introduction

On November 1, 1990 the National Congress in Bolivia was approving Law 1194 aimed at introducing some more private sector involvement in the upstream oil and natural gas sector in Bolivia while retaining state control under the umbrella of the state-owned YPFB, who would write contracts with international oil companies in a 50/50 sharing arrangement, command both pricing and commercialization aspects of export ventures and guarantee full state ownership resources. Exactly 15 years and six months later, on May 1, 2006 the Executive in Bolivia was passing Supreme Decree 28701 declaring the nationalization of all fields, a return to YPFB control of all quantities and prices, commercialization either domestic or abroad, and a heavy government take based on explicit royalties of 50% plus additional sharing participation in favor of YPFB. Within this time span, Bolivia witnessed a major cycle from state control to liberalization and back again. First, an important big-bang -within a deeper structural reform process- in the reorganization of the hydrocarbons sector was achieved through Law 1689 approved by the National Congress on April 30, 1996. The new and modernizing framework established legal and contractual conditions for private sector involvement in upstream with free disposal of production, and a rebalancing of government take means, by reducing royalties to 18% for new fields and raising direct income taxation. The response to this policy reform was an unprecedented investment increase in upstream activities and a seven-fold jump in certified probed and probable reserves of natural gas. Second, a subsequent reversion process, within a political crisis in 2003, heading towards a national referendum in July 2004 to abrogating preexisting hydrocarbon legislation and giving room for a return of YPFB control and for an explicit government take of not less than 50% of revenues. Third, the congress approval of Law 3058, on May 18, 2005 which introduced a new additional royalty adding up to 50% of sales revenues and a sharing scheme of proceeds for subnational governments and many other stakeholders ranging from universities and armed forces to indigenous groups, which accommodated pressures for the distribution of oil rents.

Figure 1 illustrates the stages just described along with the evolution of the international price of oil. This is so because a natural hypothesis in this story of attraction and partial expropriation of investment would suggest that, in need of heavy investment to comply with a demand-pull export-oriented development of its natural gas base, Bolivia needed to provide strong incentives. And once such investment had been sunk and the price of oil (the indexing element in export contracts) reverted to new highs, incentives to renegotiate terms and conditions would come up to the front. Thus, oil price shocks triggered a counter-reform process. While this hypothesis is an attractive explanation, there are several reasons to point to alternative explanatory forces related to compounded problems in policy design and collective approval of the reform process. Indeed, the time span chosen in Figure 1, and the reference to the 1990 reform is intentional enough, to call the attention to the fact that in the mind of most Bolivians the reform of 1996 had led to an unfair arrangement for national stakeholders. For beyond what can be shown in terms of actual performance and
available options, the political exploitation of this collective imagination of an unfair deal probed to be effective in the overthrown of the policy reform regime.

This paper deals with issues related to the reversion of the mid 90s hydrocarbons policy reform in Bolivia and the evidence on the drivers of the new “populist wave”. It is focused on up-stream natural gas because this is what the story is about. Therefore, the account will necessarily not cover all aspects of the hydrocarbons sector. Also, it does not purport to be either an account or a synthesis of the natural gas debate in Bolivia because that would involve much more historic knowledge and research than the one an outsider of this process can get. Rather, the paper provides an outsider’ view of some dimensions that can enrich the discussion of a very attractive case. In section 2 we describe the reform and counter-reform changes in the contractual and fiscal framework of the natural gas up-stream sector more precisely. Section 3 develops a central argument in the paper, namely, that the rebalancing of the fiscal regime adopted in Bolivia –lower royalties, higher profit taxes-while efficient on investment and production accounts (and even on incentive grounds in well-designed optimal environments, c.f. Rigobon (2006)) failed at complying with a latent political constraint (related to the collective imagination of Bolivians) that required that fiscal revenues performance in a natural resource big bang should be as good as the investment euphoria caused upon it. Using a data-set from several sources and estimates and assumptions, we simulate the likely path of fiscal revenues between 1995 and 2015 of the policy reform package against a no-reform policy option, showing that uncertainties on the net fiscal gain could have been, or indeed were, justified. While previous (on the whole positive) assessments on the effects of the reform accept that it actually reduced fiscal
revenues with respect to the no reform status-quo (Medinacelli, 2003) our exercise is more counterfactual and speculative, allowing for quantity performance differences between regimes and extending the impacts to the future. We attribute the main policy pitfall design to the expensing allowance embedded in the tax treatment of investments in the upstream, but there may be other problems related to incentives to maximize net back prices of exports. Finally, Section 4 draws our main conclusions.

2. Reform and Counter-Reform of Hydrocarbons Regimes in Bolivia

Law 1194 enacted on November 1990 replaced a previous law of 1972 signaling an intention to bring private sector investment in an otherwise vertically integrated state-controlled monopoly. It opened access in pipeline transmission and downstream sectors while retaining monopoly control through YPFB in upstream, allowing private sector entry only in association with the state-owned firm. The backdrop of private sector call and response were the perspectives opened by the signature in 1988 of a Natural Gas Purchase Agreement with Brazil, which was updated by a new accord in October 1991. Thus, a demand-driven export-oriented pattern in natural gas, brought Bolivia into a competition to serve the Brazilian market, since its historic trade partner, Argentina, was under a “gas bubble” effect caused by its own discoveries in Patagonia. Upstream contractual arrangements were organized in two types, namely operation and association contracts. In the first and indeed main type, private companies carry exploration and production activities within a 50/50 share of gross production, bore all costs (up to fiscalization or metering point) and had no additional taxes (or rather they were subsumed or discounted so as to make them irrelevant).

While it is clear that the private sector firms would receive 50% on the production valued at wellhead prices for export or domestic markets (with a methodology set by the Ministry of Energy and Hydrocarbons), the actual government take embedded in the regime was less straightforward because it came out of explicit taxes (paid by both private firms and YPFB)\(^2\) and of transfers from YPFB to the Treasury\(^3\). Nevertheless, and in spite of the role of non-tax items, government take operated, in practice, as an ad-valorem royalty on the

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1 By 1995 there were 15 operation contracts plus 3 secondary recovery contracts in 24 blocks and involving 25 private firms. Association contracts, which extended the operation format with an optional equity participation with YPFB (in which case the state owned firm becomes an actual partner with a share in costs and management) were much less preferred, with only 3 contracts. Finally, YPFB was itself operating in 26 blocks.

2 The tax system was formed by 31% explicit ad-valorem taxes on the value of production made out of a royalty of 12% earmarked for subnational government levels (departamentos, i.e. provinces) and a national tax of 19%. There was also a corporate tax of 40% but in practice considered “a fiction” (Mueller et.al (2003); Medinacelli (2003) since it could be completely deducted from the payment of the previous taxes.

3 The relevant transfer to consider here, for upstream natural gas calculations, is a so-called financial surplus on the exports of natural gas, which worked as an ad-valorem transfer. Data in Medinacelli (2003) based on YPFB sources, shows that between 1990 and 1995 it represented on average a 31% on the value of natural gas exports. Expressed in terms of total sales it represents an average equivalent royalty of 28% for 1991-95. These average figures overstate actual numbers because include payments of debt arrears with Argentina particularly in 1993. For 1995 the equivalent number was 23%.
value of production of about 50%. And that is what it seems to have been recorded in the eyes of many Bolivians.\(^4\)

Evaluation of this regime by international financial institutions in the mid 90s pointed to several flaws that required a fundamental reshape in the lines the current government was moving. A loan evaluation report by the World Bank (1995) considered the above described tax regime undue for a natural gas country that seeks access to neighbor countries, hindering Bolivian competitiveness in this respect. Besides, it was judged that the existing framework lacked flexibility for upstream operators, most fundamentally free disposal of natural gas (and oil and oil products) and freedom of exports and imports of all hydrocarbons. Beyond this, low performance in the period was also considered in official assessments, since it was judged that the burden on YPFB was too strong to sustain a dynamic export demand and new reserves were needed for such a strategy.\(^5\) By 1995 proved (P1) natural gas reserves were 3.8 TCF while probable reserves added as much as 2.5 TCF and production capabilities existed but were insufficient for a more aggressive strategy.

The big bang in hydrocarbons policy came in the mid 1990s under the umbrella of a wider and aggressive structural reform process. In fact, the new hydrocarbons law 1689 was approved on April 1996 and duly behind previous related or complementary legislation on privatization (so called capitalization) of YPFB activities\(^6\), the creation of best-practice regulatory institutions\(^7\) and a new general tax law\(^8\). The principles inspiring Law 1689 can be seen looking at three important dimensions, namely contractual regulation, taxation and competition policy. First, adapting pre-existing contractual legislation through so-called

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\(^4\) Beyond public opinion, professional and academic economist in Bolivia sustained this view, even though the system did not have an explicit royalty of 50%. See for example Barja and Urquiola (2003, page 8, fn 21, “The 1990 Hydrocarbons Law required that all fields pay 50% in royalties, plus a profit tax”)

\(^5\) Comments and analysis from World Bank evaluations at that time show YPFB as a high-cots firm, enjoying a privileged position from the granting of statutory monopoly. However, a thorough analysis of upstream (drilling) activities, discovery success ratio, human resources and reliability as partner to private companies did not show a very bad record to render YPFB a basket case. What is acknowledged is that the many constraints faced by YPFB insofar as funding was concerned prevented expansion, while evidence of poor management, overmaning and maintenance of uneconomic units was present as well. While it is difficult to separate upstream from downstream operations to get a clear picture, Barja and Urquiola (2003) provide data showing that about a quarter of total employment of YPFB was in the upstream sector and that private firms taken over upstream activities later on operated with about 40% of the labor force.

\(^6\) Capitalization was the Bolivian way to accommodate private sector participation in productive activities. The Capitalization Law 1544 was approved by the National Congress on March 21, 1994 and structural reform loans rapidly move to support the reform (World Bank, 1996) which in oil and gas was completed in 1996/97. See Barja and Urquiola (2003) for a thorough account of the capitalization process in Bolivia in general and in the oil and gas sector. Assets of YPFB where disintegrated, reorganized from a modern competitive cum regulatory regime, and partially (50%) sold to private investors gaining control. The rest of the value of the firm was (45%) put into a pension fund scheme for Bolivians (which seated in the Board) and also handed (5%) to the workforce.

\(^7\) Under Law 1600 of October 1994 (so called SIRESE Law), Bolivia created a regulatory structure for the infrastructure sector with a general super-intendancy and 5 sectoral specialized super-intendancies among them one for hydrocarbons.

\(^8\) General Tax Law 1606 of December 1994 established a common corporate tax regime of 25% on taxable income for companies involved in exploration, exploitation, pipeline transport and marketing. It also introduced explicit excise taxes on end-user petroleum products consumption.
risk-sharing contracts for exploration and production; and introducing flexibility, in particular the freedom to import, export and internally trade hydrocarbons (Art. 5) and free disposal (under regulatory supervision) of the oil and gas obtained (Art. 24). Second, changing the tax regime to make it competitive with that of other countries, while meeting “fiscal needs”, by establishing royalties (to be allocated to the departments and the Treasury) of 18% along with direct taxes and a clear separation between new fields and old ones so as not to loose revenues or gave raise to undue windfall gains. Old fields had a burden of royalties and taxes amounting in total to 50% of production value, so as to replicate government take in the previous tax treatment. Finally, introducing vertical separation of upstream and transmission, eliminating barriers to entry and guaranteeing open access to pipelines with a non-discriminatory pricing surveillance.

While the principles guiding the reform were clear enough and inspired in best practice, readings of available documents (e.g. World Bank, 1995) of IFIs working closely with Bolivian authorities show some absence of ex-ante risk assessment of proposed reforms or considerations of potential trade-offs.

First, on the tax regime, the objectives of bringing a competitive tax regime may collide (at the beginning or later in the reform process) with the objective of meeting fiscal needs. The risk here was to end up with a low government take to the eyes of the public opinion as it finally occurred. This is particularly so because the term “fiscal needs” means something different to international investors and IFIs concerned on fiscal sustainability than to the polity that voice demands on public expenditures in a poor country. Demands are normally much higher than resources and the term fiscal needs embedded in DSA evaluations is not the same as that derived from political economy equilibrium. Thus, even though a stated objective of the reform was not to affect fiscal revenues it is not clear what was the actual target. For if it was to keep at least the same revenues in dollar terms (as it actually happened) in an otherwise booming sector, the invitation to a political challenge needs not much motivation.

The second risk front relates to the institutional design for contract regulation regime. Bolivia followed best practice recommendations based on an arm’s length approach to establish so-called independent institutions. In the case of hydrocarbons the attempt was clearly to do that to promote E&P investment, negotiate and administer contracts, manage E&P data bank units, and monitor investors investments. But the risks with this approach

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9 Constraints to satisfy volumes directed at domestic consumption and to honor preexisting export contracts by YPFB conditioned free commercialization allowance. New contracts were allowed to be traded under the acceptance of the regulatory body.

10 First, a corporate tax (IUE) of 25% on earnings (less royalties), with expensing of exploration and/or development costs and allowing for unlimited loss-carry forward. Second, an additional tax on extraordinary profits (Surtax) targeted on companies involved in extractive activities operating large fields. The rate was 25% on earnings computed in the IUE less 33% of investments and less 45% of the value of production at each field (up to a ceiling of 55 million dollars per year). Third, a remittance tax of 12.5% of the value of remittances abroad. Fourth, indirect taxes on domestic sales (VAT, at 13% and a tax on transactions, at 3%).

11 Old fields faced four tax components. First, a royalty of 12% earmarked for departments (provinces). Second, a royalty of 13% called National Complementary. Third, a 19% participation (called National) to mimic YPFB’s share in those contracts. Fourth, a 6% participation for the Treasury. The first and fourth items were the only royalty components for new fields.
are that regulatory capture or, even worse, influence activities by oil companies on policy decisions above independent regulators do not necessarily disappear and may be important in practice or to the eyes of the public opinion. This maps particularly into the tax regime for hydrocarbons insofar as informative inputs to implement royalties or deductions in corporate tax associated with investments expensing come from these specialized units.

The third risk is related to a trade-off between deregulation and government take. The problem to watch here was a likely tension between free disposal, export-import freedom, and deregulated pricing and the risk of being lenient on business practices or contractual provisions that may shift hydrocarbons rents to other (perhaps non-national) segments of the value chain, leading to low wellhead net-back values relevant for government take. Thus, even under no problems in the aforementioned trade-offs, the polity may be reluctant to accept seemingly competitive frameworks that operate detracting hydrocarbons rents. With a few large projects, as in the case of Bolivia, and given the format of long term contracting it is not guaranteed that outcomes will avoid business practices that divert hydrocarbons rents. One option is to auction export proposals, but this was not the case in practice. Even under a contractual density larger than the one observed in Bolivia, contractual provisions, normally unregulated or even unchecked under deregulation, may operate transferring rents abroad.\(^\text{12}\)

The supply response to the new reforms was impressive, giving room to a metamorphosis in the technology and performance of the upstream sector in Bolivia. Six years after the law was approved Bolivia jumped (from less than 6) to about 53 TCF of P1+P2 reserves of natural gas, with production capabilities moved at the same pace as the country was prepared to launch a competitive challenge to go beyond the Gas Sales Agreement with Brazil and towards North American markets. Existing projections in 2001/02\(^\text{13}\) went as far as depicting a path towards 100 MM m\(^3\) day of production, with exports leading the way but also with domestic market development for industrial projects such as petrochemicals and Gas-to-Liquids. The aggregate investment displayed in upstream activities during the first years of the reform was also impressive and is registered in many documents and papers.\(^\text{14}\) Between 1997 and 2001, upstream investment accumulated about 2.5 billion dollars in an economy with a GDP averaging 8.2 billion dollars in the same period. Exports of natural gas rose to become about 20% of total exports, or 250 billion dollars.

Beyond this evidence, a political debate in a society experiencing first fatigue and then open opposition to reforms was acquiring visible dimensions. Slow economic performance

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\(^\text{12}\) For instance, contractual arrangements observed in exports of natural gas from Argentina to Chile had provisions whereby export prices could not deviate much from domestic prices (see Navajas, 2007). While this practice enforces a strong cross border integration (one price) form and it has desirable features for integrating markets, it poses a serious challenge for the exporting country in case political pressures demand transferring hydrocarbons rents in the form of lower prices for domestic users. The trade off either implies that this practice will create pecuniary externalities to outside buyers or alternatively domestic prices will have to converge to (price of oil adjusted) export prices. Both ways create tensions in terms of political sustainability.

\(^\text{13}\) See, for example, Ministry of Economic Development of Bolivia (2002).

after 1999, out of sluggish or recessive regional environment\textsuperscript{15} and economic crisis in neighbor countries such as Argentina (with a demonstration effect used by critics of reform) fuelled demands. Voice started to be soundly expressed on many dimensions of reform open to debate, namely low government take, low net-back prices embedded in new large proposed export projects through Chile or Peru, loss of value from moving out segments of the value chain at the expense of those countries or from unregulated lack of separation and pricing of by-products, a challenge to the legal or constitutional status of the contracts steaming out the reform and last, but not least, the very same fact of using a Chilean port on territory lost in the Pacific War at the end of the XIX Century, which determined Bolivia’s insularity. A growing far left-wing opposition with an indigenous peoples base support, representing a new coalition expressing demands for century old denied rights of social participation, took solid form in the 2002 general election (with an obvious stronghold in western and densely populated areas of the country) and since then cleverly set the political agenda around the natural gas debate.

Everything thereafter looks to an outside observer as pure dynamics around a strong trend towards counter-reform. Urban middle class groups or the “modern” segments of society rapidly became a minority, besides being fragmented, or even being doubtful on the merits of the reform process given the claims against it. Fierce street protests in El Alto city above La Paz mounted in February 2003 and then in October leading to the resignation of the President and the assumption of the Vice-President who kept office seat at the expense of concessions while, being a historian and a journalist, trying to fight an information or propaganda war. Neither compromising on pitfalls of design, nor organizing debate seminars on the merits and demerits of capitalization and reform were enough to grab the leading agenda-setting role from the opposition. The attempt to manage the process through an information campaign finally led to a national referendum in July 2004 to revoke Hydrocarbons Law 1689 and to propose new legislation in order to raise government take up to an explicit 50\% and to the “re-foundation” of YPFB. Results of the referendum were presented as a victory for the Executive but thorough examination shows that a serious problem was ahead for such a strategy.\textsuperscript{16} In a parallel fashion to the gas war strategy of the left wing opposition, latent demands for political autonomy from the eastern part of the country were entering into the political economy fight for rent distribution. A new law, 3058, voted by National Congress on May 2005, created an additional explicit royalty of 32\% (called \textit{impuesto directo a los hidrocarburos} or IDH) on the value of production with a new sharing arrangement for stakeholders that was on impact detrimental to the position of the Treasury.\textsuperscript{17} Worse for investors, the jump in royalties was not compensated (as attempted by the executive and in some way voted in the referendum) by a downward adjustment in direct and other taxes, which were kept as before. Even worse for investors, the law mandated a renegotiation of all existing upstream contracts, after a Supreme Court innuendo on the issue.

\textsuperscript{15} See Calvo (2006).
\textsuperscript{16} Ballot results showed a strong opposition even to exporting natural gas, particularly in Potosi and western departments.
\textsuperscript{17} See Catena and Navajas (2006). At the then projected values of natural gas prices, it also generated doubts on the long term fiscal sustainability of Bolivia, as delayed expenditures from the sharing mechanism would imply a “roller-coaster” behavior of the fiscal primary surplus.
The challenge to the legal status of contracts was a clever attempt to put them into a limbo and so weaken the very same foundation of reform. The political constitution of Bolivia in its article 139 mandates that the property of natural resources, in this case oil and gas reservoirs, are of public domain, i.e. belong to the nation. So moving towards allowing free disposal of oil and gas production had to circumvent a potential legal trouble. The drafting of the hydrocarbons law 1689 stated the national property nature of stocks and delegated to the government the ability to write joint venture contracts for exploration and production arrangements. Those contracts were drafted by the executive and approved by a Supreme Decree 24806 in August 1997, at the end of the mandate of the administration implementing reforms.

Thus, one of fronts of the “gas war” was directed at exploiting the confusion, either real of in the collective imagination of Bolivians, that SD 24806 had been a way to violate the constitutional mandate, exploiting the contradiction that there could not be private property rights in a flow out of a stock with collective property rights, and that joint ventures could only guarantee the property of the tangible capital added by private contractors but not the oil and gas coming from the underground. As we know from the theory of the firm, joint ventures need some governance to avoid reluctance to them by parties potentially exposed to hold-up problems and the interpretation given above (by the way endorsed by the Supreme Court) was to our view somewhat problematic for contracts. But the shot was more direct and ambitious, and the challenge here was threefold. A first challenge was on the property rights on extracted resources and the violation of article 139. A second on the property rights on the flows and the nature of the joint ventures, as a non-permanent association that could not establish property rights on produced (i.e. extracted) resources. The final, and more problematic in the end, was the illegality stemming from the absence of congressional approval of the contracts written under the umbrella of la 1689 and approved by DS 24806. The Supreme Court passed a sentence in December 2003 declaring that there was no constitutional violation. But later on in March 2005, and reconsidering the issue, it suggested that contracts should be approved by Congress. That was enough to send them to the limbo.

Law 3058 did not change the status on free disposal of oil and gas. This final missing piece in the counter-reform puzzle came in May 2006, as the newly elected left-wing coalition declared a “nationalization” of all fields, interpreted as granting YPFB full control of commercialization and an additional transitory participation of 32% on large fields so as to initiate a renegotiation of existing contracts. What came behind was a renegotiation process to sustain committed export contracts to Brazil and to include a new export agreement between YPFB and state-owned ENARSA to expand exports to Argentina. This process is still in a fluid state, as performance has not come back to normality.

18 The legal challenge to SD 24806 came in 2003 in a presentation by the MAS opposition to the Supreme Court (Constitutional Tribunal) arguing that articles 59 (5 and 7) and 139 of the Constitution had been violated and that DS 24806 should be declared unconstitutional and therefore all contracts were illegal. Different views and details of this ongoing process can be found in Medinacelli (2006), Lopez (2007) and Artana et al (2007).
3. Simulating Counterfactuals: Revenue Performance under Reform and No Reform

Among the many challenges that the reform process faced, the one that has been perhaps more visible is the fact that fiscal revenue performance was behind expectations, which triggered criticisms that an unfair deal had been struck in Law 1689. Actual behavior of hydrocarbons revenues stabilized, in dollar terms or as a percentage of GDP, in the second half of the 1990s and the beginning of 2000s (in relation to the first half of the 1990s). However, the problem with this evidence was twofold. First, performance was poor considering the jump in production and exports. Second, a visible shift towards indirect taxes on end-users of petroleum products invited the criticism of a shift out of oil rent appropriation and towards indirect taxes on households and firms. While some detailed and rigorous comparative measurements conceded the point that upstream revenues in the new regime underperformed the previous one based on law 1194 (e.g. Medinacelli, 2003), many public defenses of the new regime (particularly from the business community) insisted on the claim that the total contribution of the hydrocarbons sector to the Treasury had improved much more than just looking at royalties and upstream taxation. But this was in the end an unhappy benchmarking that played in the hands of the opposition’s argument that there had been a relative shift from upstream to downstream taxation and that Bolivians were paying through indirect taxes and levies what should be paid by upstream producers (cf Villegas, 2003).

Our reading suggests that the central issue, and prime candidate to examine, was the fact that the rebalancing, sought in Law 1689, shifting upstream taxation from royalties to profit taxes, failed to deliver a proper boost in government take either by design, calibration or regulatory capture. While this point has been somewhat overlooked by papers evaluating the hydrocarbons reform, its existence was acknowledged in an ex-post evaluation report by the IMF. To put it simply, the expensing mechanisms and unlimited carry forward of losses allowed in the profit tax base amounted to an effective reduction of the tax burden (while the investment process was proceeding), and the generous deduction of part of gross revenues in the tax base of the extraordinary profits tax (Surtax) had the same effect, perhaps on a more permanent basis. Throughout the first 5 years after the reform (1997-2001), profit taxes were on average barely 8% of what was collected through royalties on new and old fields. The Surtax did not contribute at all.

In order to assess what could have been behind one of the major arguments for counter-reform we perform an exercise on the likely performance of fiscal revenues under reform and no-reform scenarios between 1995 and 2015. By reform we mean Law 1689, while no reform means the scheme under the previous Law 1194. This is a highly speculative and counterfactual exercise since it is based on many estimates and assumptions. We will

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20 See IMF (2005 page 24). The comments attributed an initial impact in the “generous (i.e. narrow) definition of ‘old’ (higher royalties) relative to ‘new’ fields…[which was]…part of a deliberate strategy to make the capitalization offer attractive”. It added that this risk had been flagged early on to the authorities by the World Bank and by the IMF, in a letter in September 1996. It also mentioned the effect on profit taxes of the amortization of large investments and generous deductions in the Surtax. Finally, it hinted that…”the level of compliance may have declined over time, as the authorities have not adjusted quickly to the new tax system, while oil companies have learned to exploit loopholes”.

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simulate proxies of the behavior of the reform regime rebalancing towards profit taxes (for new fields) under two alternatives, one that makes few or none allowances for deducting investments and has a strong control of actual costs (or profits) and other that is permissive both on tax allowances and declared costs (or profits). The alternative is the no reform regime with the assumption that a 50% royalty on a lower production level is sustained.  

Table 1 summarizes the main assumptions and data inputs used. The Appendix (TO BE INCLUDED) shows data in more detail.

Table 1: Data Set for Simulations of Fiscal Revenues Exercise

<table>
<thead>
<tr>
<th>Variable</th>
<th>Data and Assumptions</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Production Costs</strong></td>
<td>Assumed for the exercise. &quot;Low&quot; (L) and &quot;High&quot; (H) Types $c_i = c_o (1 - 0.3 (p_e - p_d) / p_o).p_o$ $c_i = 0.33$ for $i = L$ $c_i = 0.50$ for $i = H$ $p_o = 1$</td>
<td></td>
</tr>
<tr>
<td><strong>Investments</strong></td>
<td>Path assumed on E&amp;P investments from actual data but converging from high values of 1997/98 to be consistent with assumed production path</td>
<td>Mayorga and Tapia (2006) Lopez (2007)</td>
</tr>
<tr>
<td><strong>Royalties</strong></td>
<td>Reform Regime 18% on new fields, 50% on old fields No Reform Regime: Assumed at 50% on all fields</td>
<td>Law 1689</td>
</tr>
<tr>
<td><strong>Profit Taxes</strong></td>
<td>25% legal tax (IUE), an additional (effective) 3% due to remittances assumed as from 2005 Tax base: Sales less costs, less investments, less royalties. Only for new fields No Allowance Case: No investment deductions and no carry forward of losses Allowance Case: Full deductions</td>
<td>Laws 1606 and 1689 Molinedo and Velasco (2006)</td>
</tr>
<tr>
<td><strong>Surtax</strong></td>
<td>Simulations show only a very small contribution. Therefore not included</td>
<td></td>
</tr>
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Prices use official sources and available data to 2006 and projections beyond which exploit indexing clauses of contracts with fuel products. So the price scenario where all regime/cases are address is one with high values for exports (while price insulation of domestic markets is also assumed). Quantities delivered for export markets are different and come from official projections at 2001/2002 representing the reform-regime and for a status-quo serving (partially) Brazilian and Argentinian markets in the no reform scenario.

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21 The exercise is necessarily counterfactual because none of simulated path ends up representing actual behavior, but rather best guesses of likely performance. Assuming differences between alternative scenarios are in order for this kind of exercise. For instance, confronting reform vs. no re-form under similarly assumed quantities is biased against reform, for one of the things one should expect from granting incentives is to have a different supply response.
As for domestic markets differences also represent dynamic versus somewhat sluggish supply responses. Overall, the reform regime duplicates the no reform regime in production performance, with 116 against 60 million m$^3$ day, respectively. The proportion between old and new fields, which is essential for estimating revenues in the reform regime, is taken from data reported in previous studies up to 2006 and then calibrated onwards assuming that production increases come from new fields and that old field productivity declines slowly.

Production costs are assumed to come from a “low” and a “high” type that can be manipulated for tax profits declarations. For the low type it is assumed that, at the time the wellhead price is 1 dollar per million of BTU, production costs are 0.33 cents, and then partially indexed to oil prices. Thus the “base” value of 33 cents per MMBTU changes as prices depart from one dollar per MMBTU, with 33% of the difference between observed and the benchmark price. For the high type, it is assumed that they are 0.50 cents when well-head prices are 1 dollar per MMBTU, and the adjustment to the base value according to wellhead price changes is similar.\(^22\) Investment expenditures to be used in the deductions of profit taxes are assumed from existing historical figures and taken, for the reform regime, to be in line with the quantities projected.

Government revenues from these variables are easy to compute for the assumed no reform scenario, since it comes out from a 50% royalty on sales revenues. Royalties for the reform scenario are estimated according Law 1689 on new and old field production. Profit taxes (IUE) depend on the assumptions made on production costs (Low or High) and on the assumptions about expensing allowances of investments and to carry forward losses. The tax base for the profit tax also deducts royalties. In all cases estimates take care that only new fields are included, since old ones do not pay profit taxes. The tax rate on profits is assumed at 25%. An additional 3% effective on the same tax base is assumed since 2005 to accommodate payment of remittances.\(^23\) Finally, no extra revenue is assumed from the extraordinary profits tax (Surtax) since our estimates on collection are rather non-significant, and simulating a different deduction scheme would be highly speculative.

The results of this exercise are shown in Figure 2, where the evolution of fiscal revenues in current US dollars is drawn for the no-reform scenario and for the two extremes cases of the reform-scenario, one where profits are computed at low costs and no allowances are made on investment deductions and loss carry forward, and the opposite extreme case where costs are high and allowances are admitted. The path of fiscal revenues show that given the strong production performance of the reform case, the two variants of reform reach the end period of projections with higher revenues than in the no reform status quo. Both reform cases go towards fiscal revenues between 1.8 and 2 billion dollars by the end of the period while the no reform status quo tends to 1.5 billion dollars. A significant government take difference is achieved under the reform case and the difference should have been considered as a good dividend for Bolivians.

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\(^{22}\) Under high-type costs and a royalty of 50%, production becomes non-economic at well-head prices below 1 dollar per million of BTU. This is non-binding according the assumptions of the price path.

\(^{23}\) The tax on remittances has a rate of 12.5% on a tax base which is 50% of earnings. We assume a payout ratio close to 50%.
However trajectories show a problematic comparative performance, as the reform case under high-costs and investment and loss carry forward allowances significantly underperforms the no reform case all along the “counter-reform incubating period” and up to 2007. Even the reform case with low-costs and no-allowances underperforms the no reform case up to 2003 (mainly due to the old to new fields dynamics) and do not show a significant difference until production jumps out along with new export projects.

One can see these estimates as depicting an experiment in the minds of Bolivians assessing the merits of reform for their pockets, with both cases in the reform regime scenario denoting a range of uncertainty of performance, and actual observed performance up to 2004 more close to the low performance case of the reform regime. It is clear that the role of deductions impinged a particular dynamics of depressing revenues at the beginning of the reform process.

The performance of revenue collection in US dollars under different reforms is affected by the different production performance of reform and no reform regimes. On the other hand, estimating the effective government-take expressed as a percentage of production sales that result from the previous exercise, shows a more problematic picture for reform (see Figure 3). While one can argue that a reduction from 50% to 37% (of sales revenues) government take could have been a reasonable strategy for a country trying to compete in natural gas exports in South America in the 1990’s, the danger of introducing allowances that would lead to a much lower figure could have been equally dangerous for the political sustainability of the reform process. In the high-cots full-allowance case the government
take drops temporarily to reach as low as 20% in 2005. By that time, the political economy had done its job and the reform regime was a thing of the past.

![Figure 3: Simulating Effective Government Take as Percentage of Sales Revenues](image)

4. Concluding Remarks

One tempting conclusion from the previous section exercise is that while the hydrocarbons reform in Bolivia was an attempt to attract foreign capital, by offering a competitive tax regime for a country trying to establish itself as a potential hub, some pitfalls in policy design created a transitory negative effect on revenue collection. The fiscal revenue regime was not in its first years performing on the steady state path, which was probably going to show up and be much higher in coming years. But politics does not wait for the steady-state. Thus the erosion of public opinion support was in the end achieved by forces opposed to reform. The natural suggestion on reading the case from this perspective, would tend to conclude that …”these problems [could have been avoided] …by strengthening regulations in areas such as transfer pricing and amortizations as well as the institutional capacity of the tax agency” (IMF, 2005).

Even when we have made an effort to quantify the plausibility of such an explanation, with an exercise that illustrates the problem, our wider reading of the general case commented in section 2 shows a more problematic picture. This is so not only because the challenge was part of a more general anti-reform environment under sluggish economic performance,
political fragmentation and major disruptions in neighbors such as Argentina. The success of the opposing forces to build a strong anti-reform coalition rested in its ability to convey to many groups of society including segments of the urban middle class the image that a status-quo that was more favorable to Bolivians, including society’s control of natural resources, had been taken away. Under this perspective, previous socio-cultural elements conforming to a ‘collective imagination’ that would retaliate in the course of the reform process could not have been easily preempted by a just better design of the tax regime. That retaliation would have happened anyway, according to this view, in even the most favorable performance scenario. Given previously, century-accumulated socio-political imbalances, and given the political fragmentation of formal parties, Bolivia had a date with a wider reaction to structural, pro-market reforms.

The separation between design-pitfalls-induced, shock-induced or culture-induced reversions in hydrocarbons policy reforms is crucial for both our understanding of such processes and the recommendations for future design blue-prints. The Bolivian case shows that all elements were present and it is hard to avoid the conclusion that the next opportunity to attempt a competitive leap forward will have to properly address them all.
References


