

NITRATE EXPORT COLLAPSE AND THE GREAT DEPRESSION: TRIGGER OR CHANCE?

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1. INTRODUCTION

Nitrate extracted from natural fields constituted the main Chilean export in the 1920's. The Great Depression brought about a dramatic reduction in these and other exports, a shock from which nitrates never recuperated. Being the principal tax base¹, the contraction of nitrate exports generated an acute pressure on government finances in the early 30's. A quite extended interpretation of these and other events, a view here identified as "conventional wisdom", looks at the Great Depression as an exogenous factor responsible not only for an acute and rather permanent decrease in nitrate exports, but also for restrictions imposed on fiscal expenditures and long run public finance.

The view gets additional sustainability from third countries reactions. The collapse of the international payments system and the more or less general decrease in exports experienced by most countries in the early 1930's, opened the way for selective but quite general tariff increments around the world, as well as other trade restrictions. Nitrates obtained from natural deposits were not exempted from this trend. In fact, countries equipped with the necessary skills and technology to produce artificial nitrates, designed tariffs and quotas to induce import substitution, limiting exports from Chile.

Severe export contraction correlates nicely with the beginning of the Great Depression turning therefore this period into a plausible landmark, an easy to remember dividing line between two distinct export performances of Chilean nitrates.² So far so good, but the test establishing causality from the Great Depression, surely an exogenous phenomena for Chilean development, to nitrate production and export contraction and then, through this channel, to institutional changes like those which took place in Chile during that period, does require further discussion.

In what follows we concentrate on the nitrate industry in the country, in particular, on its fiscal treatment and consequences. The main hypothesis is that this tax treatment –which initially captured Chilean monopoly rents in this

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¹ See Table 1 in "Early 1930's: A Unique Period in Fiscal Evolution?", this panel. *Cuadernos de Economía* 121, año 40, December 2003.

² Domestic consumption is insignificant in relation to exports.

industry—, was possibly welfare enhancing until the beginning of World War I, when—together with a sharp reduction in that monopoly power— it became an undesirable tax on trade. In particular, two aspects of this tax should be taken into account: (i) as a factor retarding technological change in the 1920's and, (ii) as influencing even before that decade the market share of Chilean industry. It is our contention that even without an Depression in the 1930's, severe difficulties in Chilean nitrates competitiveness would have been present. The discussion will distinguish between, on the one hand, the characteristics imposed by the particular relationship existing between government and industry, and on the other, the timetable introduced by the Great Depression, an exogenous factor determining the precise moment in which this industry experienced a rather definitive and negative shock.

We begin by describing the tax system introduced in 1880, which survived for the following half Century and then, based on Lüders and Wagner (2003), tax optimality is briefly examined, the discussion centering on the identification of the precise time period in which the excise tax mutated its character, turning from a welfare enhancing device into an inefficient trade tax. Secondly and of a more speculative fashion, we evaluate the incidence of the nitrate tax on incentives faced by industry. Thirdly, we reflect on the political economy type restrictions faced by government in the design of an optimal tax treatment for an export oriented natural resource based industry. Finally, we draw conclusions, arguing that the Great Depression should be seen as influencing the precise time-table of the export contraction, but not the outcome itself. This is, of course, contrary to “conventional wisdom”.

2. THE OPTIMUM CHARACTER OF THE NITRATE TAX

Once the territorial control over the former Bolivian and Peruvian natural nitrate resource fields was completed, around 1880 and only a relatively short time after the Pacific War against Perú and Bolivia had started, Chilean authorities established a tax of 1,6 gold pesos per ton of exported nitrate. This tax was cheap to collect, because the voluminous character of the product facilitates³ and also because exports flowed necessarily through a few ports. At the time it was first imposed, the tax fits nicely into the tradition of an optimum export charge. In the absence of such a tax, the unrestricted solution of an industry in which the country has monopoly power, but many producers compete among themselves for the export market, suggests a product price close to marginal cost and therefore, less income for the country. This does not imply that in the absence of such a tax the only alternative outcome would have been competition, since alternatively an

³ Information provided by tax agents in charge of the collection could, on the other hand, easily be checked with navy's—supposedly an independent agency— statistics on ship movements and freight.

internationally managed cartel could have siphoned off potential monopoly rents into foreign coffers. Therefore competition in our analysis is simply a reference point for evaluating tax optimality and not necessarily an assertion about the alternative outcome under a strictly *laissez faire* type of policy. (But, see below: 3)

Fixed in terms of gold, the real value of the tax once measured in units of a broader composite, fluctuated with the metals price. As a result, the approximate optimality of the tax was extended over time when the price of gold and the monopoly power of Chilean exports both fell together, as happened between 1895 and 1916. However, from this latter date onwards, the price of gold rose, making this form of nitrate taxation non optimal and an increasingly costly device to raise fiscal revenues.

In Lüders and Wagner (*op. cit.*), the degree of tax optimality is determined as a difference between the effective –real– tax rate and the respective Lerner coefficient given Chile's monopoly power in the world nitrate market. Based on the elasticity of the excess demand faced by the country, aggregating all local producers, Lerner coefficients are simulated for each of the fifty years. Based on these simulations, the authors conclude that the turning point in tax optimality probably was somewhere in the decade of the 1910's, around World War I. However, were it not for the exogenous fall in gold's price, this turning point would have been approximated much earlier. For the present purposes then, it is assumed that already in the 1920's, well before the Great Depression, nitrate's export tax begun to play the more traditional role of a costly government revenue collecting device.

3. NITRATE TAX: INCENTIVES FOR PRODUCERS

In the Bickerdike-Scitovsky⁴ tradition the objective of the welfare enhancing export tax is to simulate a cartel, that is a tax coherent with the implicit Lerner coefficient. Compared to the alternative purely competitive solution, such a tax implies less physical exports of the respective industry.⁵ Under stationary conditions, the underlying determinants are stable and hence the same tax will accomplish its optimum task, year after year.

In the Chilean case of the time conditions were not stationary, as they never are in practice: (i) the nitrate market evolution implied a rather continuous decrease in Chilean monopoly power and (ii) an unchanged export tax law together with an exogenously fluctuating gold price, kept the real value of the excise tax changing constantly. Hence the optimum character of the tribute almost certainly had to get lost, as it in fact did. Even worse, the particulars of the Chilean tax on nitrate exports –a given amount of gold per ton exported– given a declining

⁴ Scitovsky (1987).

⁵ The paper discusses the implicit alternatives and in particular poses the possibility of a second stage monopoly .

monopoly power in the industry, had a potential for pushing industry's output off its long run sustainable path.⁶

Two inter-temporal dimensions implicit in the above context should be noticed: (i) the demand elasticity faced by the country, say in year $t + x$, may depend on the tax level in year t , where the channel of transmission runs through long run supply decisions by third producers, and (ii) the tax level in year t may also have an incidence on future domestic supply conditions. Both aspects are briefly analyzed below.⁷

If no second stage monopolist is operating, world price simply has to be cost (now including freight and a commercial, non-monopoly margin) plus the export tax. Therefore a direct relation between tariff and price must exist. And the direct—in the same time period—effect on competitors production depends on the corresponding contemporaneous supply elasticity. Eventually a local export tax induced higher price will increase output of foreign producers and therefore the excess demand elasticity faced by the nitrate exporter, diminishing the corresponding market power. But also and this could be more important, the higher price in year t may stimulate investment and eventually technological progress, and through these channels increase the supply of foreign producers in, say, $t + x$ and provoke an additional loss of market power from there onwards. Hence excessive taxation in t widens the gap between effective and optimum excise taxes in future years, and potentially the country can become a price taker, as happened with Chilean nitrate. That is why the ideal is to consider, when fixing the level of such an excise tax, both, the existing short run market power, as well as tax's long-run consequences on that same power.

The consequences of the tax for producers established in Chile are easily illustrated in the case where the excise tax charged in a given year exceeds its optimum level. Depending on the exact conditions determining investors outlook of the tax, the difference may easily fall on returns of fixed investment and through this channel on industry's future investment and production, with the consequent loss of market presence and power.

Chilean nitrate market participation reached 90 per cent in the early 1880's, but only 50% by 1913. World War I brought about a fall to about 40 per cent which reversed rapidly at the end of the conflict. However, thereafter the former downward trend is resumed and by the time of the Great Depression the market share had fallen to 20 per cent. How much of this drop was due to excessive taxation? Could a different and more industry friendly tax policy have extended the viability of

⁶ We understand that supply conditions of the natural resource input may for the sake of this analysis be understood as if non exhaustible. In other words the assumed disposable quantity and in relation to the rate of extraction is a large enough factor so that even low discount rates make future scarcity irrelevant for present decisions. Additionally one should mention that competition to be expected from "artificial" nitrate was a factor explicitly present in public discussion of the topic at least from 1900 onwards; this expectation points toward a similar conclusion: do not worry about long run availability of the natural resource, there "always" will be plenty of it.

⁷ Both issues are explored in Lüders and Wagner (op. cit).

Chilean nitrate? These are essentially unexplored questions, but what can be said is that in the second half of the 1920's explicit signs pointing towards increasing difficulties at industry level were observed, difficulties which were reduced through lower taxation. Before that period industry officials complained about the inadequacy of the tax, but in the 1920's it is government who starts a public program of tax devolution, through subsidies granted in relation to gross revenues. Beginning with a devolution of two percent of gross revenues in 1927, these subsidies rose up to 21 and 26 even per cent in the following years. There was, however, no long-run commitment to reduce or eliminate the nitrate export tax, making those subsidies less effective. The underlying rationality of government is unknown to us, but those export tax offsetting subsidies seem to be consistent with an official view that the nitrate industry was going through a temporary crisis. Be that as it may, by the end of the 1920's government was actively searching for a new tax regime and in 1930 the old nitrate export tax was definitively discarded and a tax on profits was adopted, together with a mayor reorganization of the industry.

All this underlines that in the 1920's, if not before, Chile's market power in the world nitrate market was rapidly disappearing, if it had not already happened. It is also important to notice that in practice it becomes extremely difficult to "turn the clock back" and revive a whole industry which has lost most of its market share. This has been the case of Chile. The implications of this analysis for the defining moment hypothesis are two: (i) the Great Depression should not be seen as "the" cause of Chile's nitrate industry deterioration and (ii) public policy cannot be exempted from having responsibility in this outcome.

4. ON THE RATIONALITY OF PUBLIC SECTOR'S BEHAVIOR

The above hypothesis –that excessive taxation might have "killed the chicken which lay the golden eggs"– might be more acceptable if reasonable arguments could be found to explain the public sector persistence in keeping the nitrate export tax unchanged. Putting it in a different way: why did it take the government so long to realize that its nitrate tax policy was on the wrong track? Alternatively, one could also ask if it could have been in the interest of government to maintain the export tax intact, in the context of an industry which in the 1920's was rapidly becoming less competitive?

Government behavior is many times the outcome of a particular blend of collective choice making, where private preferences and restrictions of particular individuals are not necessarily absent. Assume that governments in the 1920's and even before that, perceived the constantly increasing competition in the nitrate market. Assume further that they were aware of unstopable technological advancement by competitors, something quite present in public discussions about the topic. It was also known that competitive nitrates were being developed in detriment of the Chilean natural resource based product, and government officials

might have felt that conditions for long run survival of the Chilean industry were not guaranteed. In such a context and assuming a strong believe in the inevitability of this outcome, a revenue maximizing government would try to extract rents from that industry at the maximum possible speed, that is before the definitive disappearance of the nitrate tax base. Lowering the tax would not increase production, but generate less revenue, at least for the government in charge. Subsidies conferred to the nitrate industry in the second half of the 1920's are coherent with this hypothesis if one understands them simply as a phasing out program for the nitrate export tax revenues.

There are, however, other possible explanations for the government failure to reduce the export tax at the appropriate time. Some may prefer an agency type hypothesis, where a policy of reducing the export tax would have been rational from the governments point of view when taking a long run perspective, but they might feel compelled to decide only taking into account their constitutional time horizon, which is inconsistent with the selection of an optimum policy from a social point of view. Note that here industry's long run survival is possible provided the right tax policy is applied, but a tax reduction is not in the interest of government.

Yet another explanation for governments behavior at the time is of a political transaction cost variety. The adoption of a Pareto policy assumes that short run effects of a tax cut translate into decreasing revenue to start with. This would be the case because investors make industry sustainability possible only after perceiving that the tax reduction is of permanent character, a process which inevitably takes some time. In the case of this hypothesis, governments time horizon is not the problem and industry potential for survival under amicable conditions is granted, but the difficulty stems from the prohibitive costs of finding a political agreement favoring a transitory alternative tax. If there is no other foreign factor available to be taxed, governments would have had to tax domestic sources, a revenue base already expanding rapidly (see Table 1, "Early 1930's: A Unique Period in Fiscal Evolution?", this Panel).

Which one of the above explanations is the most plausible requires a discussion on the validity of the assumptions, a task belonging into the realm of history and something we do not feel prepared to do now. Whatever the explanation for the delay in adapting the export tax to the Chilean monopoly power in the industry, both observed and expected in the future, does not enter into conflict with the main conclusion: the fall in nitrate exports and government revenues, even if influenced by the Great Depression in its exact timing, has profound roots in other more fundamental factors, which at the time were well known.

The discussion on nitrate policy provides new insights into the depth reached by the depression in Chile, as well as into the sharp fall in its exports and product. For conventional wisdom the origin of this phenomena is strictly foreign, initial shocks then multiplying through propagating factors. But one could also interpret the Great Depression in Chile as an endogenous phenomena aggravated by exogenous shocks, following Mitchell as mentioned by Zarnowitz (2002). In the particular case of Chile during the first part of the XXth Century, public policy towards nitrates played the role of the former, while the worldwide depression was

the external exogenous aggravating circumstance. Exactly what constitutes the better explanation cannot be settled here, but present analysis suggests that the latter interpretation is more in line with the facts of the case here reported.

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