

Debt-for –Nature Swaps and the Coase Theorem

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Abstract:

Debt-for-nature swaps have emerged as one method for debt burdened nations to retire their foreign debt through international markets. In a typical debt-for-nature swap, conservation groups buy some portion of a nation's debt, usually in secondary markets at discounted prices, in return for long-term commitments from the country to preserve domestic ecological zones. The first debt-for-nature swap occurred in Bolivia in 1987. Since then these programs have been used by a variety of Least Developed Countries (LDCs) as a means of reducing debt loads.

While an extensive literature exists on the practical workings of these programs and on the level of their usage, there exists a dearth of theoretical explanations for the development of debt-for-nature swaps. The premise of this paper is that debt-for-nature swaps can be interpreted as an application of the Coase Theorem to the problem of environmental degradation.

In 1960, Ronald Coase published "*The Problem of Social Cost*". This work has had tremendous influence on the way that the legal system and many economists view the problem of externalities or third-party costs. As Coase stated in his 1991 Nobel prize acceptance speech: "I explained in '*The Problem of Social Cost*' that what are traded on the market are not, as is often supposed by economists, physical entities, but the rights to perform certain actions..."

The Coase Theorem, in simple terms, posits that in the presence of low transaction costs and competitive markets, solutions aimed at maximizing societal welfare will present themselves. Coase presented an alternative to the widely accepted Pigouvian solution for

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externalities. In the Pigouvian framework, direct taxation can be used as a means of reducing the social costs associated with externalities. The Coasean solution becomes especially pertinent when the influence of international institutions is limited. The ability to institute Pigouvian solutions on an inter-country basis is severely limited because it involves taxation across national boundaries.

I hypothesize that debt-for-nature swaps exhibit secondary markets for debt which are relatively competitive combined with three institutional entities willing to propose non-traditional solutions to the dual problems of debt and the environment - nations, environmental groups, and financial institutions.

This paper investigates the current state of debt-for-nature swaps, though the major theme is to develop the theoretical ties between the Coase theorem and these swaps. In his acceptance speech, Coase stated that it was his belief that the full impacts of his writings have yet to be determined in the arena of economic analysis. This paper attempts to contribute to that progression.

I. Introduction

This paper investigates the relationship between debt-for-nature swaps and the institutional arrangements surrounding them. Economist Ronald Coase has addressed a number of theoretical issues, which are relevant to the origins of debt-for-nature swaps and their potential to preserve the environment. Debt-for-nature swaps exhibit aspects relevant to Coase's work regarding the existence of the firm, the role of transaction costs, and the treatment of externalities.

The paper posits that the weakness of international legal institutions, especially with regards to enforcement issues, has led to Coaseian bargaining in debt-for-nature swaps. These swaps can be interpreted as a response by economic institutions to the realities that exist in international legal institutions. (Namely, that these legal institutions are far more adept at assigning property rights *ex ante* than they are at assigning economic damages *ex post*.) The paper is comprised of the following sections: a brief review of the Coase Theorem, an introduction to debt-for-nature swaps, the hypothesis that debt-for-nature swaps originated as a form of Coaseian bargaining, and a concluding summary.

II. The Coase Theorem

In a 1959 article, "*The Federal Communications Commission*," Ronald H. Coase introduced an alternative theoretical model that addressed the process of input allocation in competitive markets. In this article, Coase addresses what he refers to as the "reciprocal nature" of market transactions that has subsequently become known as the Coase Theorem. A more explicit development of the thesis was published in his 1960 article titled, "*The Problem of Social Cost*."

"*The Problem of Social Cost*" develops two basic theoretical themes: 1) the reasons why firms are formed in a competitive economy and 2) the role of the legal system, and in particular the assignment of property rights, in cases where production externalities exist. The first theme

of “why firms exist” represents an extension of his 1937 work "*The Nature of the Firm*." The later theme dominates and can be found in its nascent form in his Federal Communications Commission article. The tie that binds these theoretical themes is transaction costs.

Coase maintains that the modern firm owes its existence to transaction costs. These are the costs associated with the discovery and announcement of trading positions, negotiation, contracting, and ensuring of contract compliance. These costs are inherent to the price system and they can play an important role in production decisions. If transaction costs become large relative to price, they can prevent potential trades from being realized.

In the case of direct allocation by individuals through competitive market prices, the costs of obtaining, securing, and protecting the property rights to resources (i.e., transaction costs) must be subtracted from the gains that normally accrue to competitive market trades. Professor Coase reasons that if firms exist then it must be because the costs of factor allocation within the firm is efficient relative to the costs of direct factor allocation for individuals confronting the transactions costs of competitive market prices. Where negotiations are complex and/or where affected parties are numerous, the likelihood is that firms will emerge as an alternative agent for decision-making increases. Firms coexist with direct allocation by individuals because they provide a more efficient institutional arrangement for minimizing transaction costs.

The second major theme represents a decisive rejection of the then universally accepted (at least by neoclassical economists) method of correcting for negative externalities. Specifically, Coase rejects the Pigouvian solution, which is to internalize the damage costs to the producer of the externality through government intervention. Coase argues that the Pigouvian solution requires the legal system to assign damage in a capricious way. Suppose neighbors A and B share a duplex basement, and that neighbor A decides to produce beer in his basement and the fumes from the brewing cause headaches for neighbor B. Under a Pigouvian solution, neighbor A will be held accountable for the headaches of neighbor B, and the legal system will typically award damages to neighbor B or require the cessation of brewing in the basement by

neighbor A. But what of the harm which comes from the cessation of beer brewing to neighbor A? Does the activity of brewing have no value? If not, then why did neighbor A begin brewing initially? Coase makes the point that damages are of a "reciprocal nature" and that economic activity is attenuated under the Pigouvian solution.

Drawing upon a legal case where a doctor built an examination room adjacent to a confectioners candy-mixing machine, Coase comes to this conclusion...

... there is no analytical difference between the right to use a resource without direct harm to others and the right to conduct operations in such a way as to produce direct harm to others. In each case something is denied to others: in one case, use of a resource; in the other, use of a mode of operation...[This example] *also brings out the reciprocal nature of the relationship which tends to be ignored by economists who, following Pigou, approach the problem in terms of a difference between private and social products but fail to make clear that the suppression of the harm which A inflicts on B inevitably inflicts harm on A. The problem is to avoid the more serious harm.*ⁱ

Coase notes that his ideas fundamentally alter the relationship between economic and legal systems. Under the Pigouvian solution for externalities, a suit is brought before the court and the court is asked to assign liability and set compensatory economic payment. The critical input from the economic system is an *ex post* input; it occurs after the harm is done. The Coaseian solution for externalities is an *ex ante* solution. Here, the critical economic decisions rely upon the initial assignment of property rights by the legal system before the harm is done. According to Coase, the initial assignment of property rights is, under conditions of low transaction costs, irrelevant -- the economically optimal allocation of resources will prevail under any initial assignment. As Coase puts it "...the delineation of property rights is an essential prelude to market transactions; but the ultimate result (which maximizes the value of production) is independent of the legal decision."ⁱⁱ Once legal rights are established, negotiated modifications to the contract can and will occur where benefits exceed costs.

While University of Chicago economists initially rejected these ideas, the Chicago brand of free-market, neoclassicism fits well within Coase's work. The role of government is minimized if one accepts Coaseian solutions for externalities. As noted above, Coase views the

firm as an alternative to the market in allocating resources when the costs of using the market to allocate are high relative to the administrative costs associated with the operation of a firm. In turn, and following the same reasoning, if the costs of establishing or extending a firm are high relative to government regulation then Coase cedes that "...direct government regulation" remains as an alternative means of allocation. He states that government regulation is most likely to emerge as the allocation device of choice "...[when] a large number of people are involved and in which therefore the costs of handling the problem through the market or the firm are high."ⁱⁱⁱ

The use of direct regulation by the government introduces an entirely new set of problems and Coase warns the reader that this agency creates costs. He is particularly concerned about two issues: 1) the subversive role that rent seeking is likely to play in allocations, and 2) the complete absence of competitive restraint. Furthermore, neither of these is viewed as a significant problem under either direct allocation in markets or agency allocation through the firm.^{iv}

The government is, in a sense, a super-firm since it is able to influence not only the factors of production but also the institutional rules surrounding it. Any firm operating in non-monopolistic markets is subject to the competition of other firms. Competitors might administer the same activities at a lower cost and there is always the alternative of market transactions if the internal administrative costs become too great. The government is able, if it wishes, to avoid the market altogether, which a firm can never do.^v

Coase deplores the fact that many turn to government regulation with too much zeal and too little caution. "It is my belief that economists, and policy-makers generally, have tended to overestimate the advantages which come from government regulation."^{vi} Regardless, Coase clearly leaves open the possibility that we could turn to the government as an agency of allocation if market and firm failure are evident and persistent.

III. Debt-for-Nature Swaps

Debt-for-nature swaps have arisen as a partial solution to the dual problems of less developed country (LDC) debt and environmental degradation. Environmental groups or other governments purchase outstanding debt issues of a LDC in secondary markets in exchange for the LDC government's commitment to preserve a defined ecosystem. This has been enabled by two related factors: many of the remaining large and unique ecosystems are found in LDCs, which also have substantial international debt.

As environmental awareness has grown, appeals from environmental groups and the governments of developed countries have yielded little real progress in preserving ecosystems in LDCs. LDC governments have pointed out that the higher-income countries developed their frontiers with few restraints; so moral or ethical appeals to preserve the environment appear self-serving. Some arguments for preservation based upon enlightened self-interest have emerged. Eco-tourism has been touted as one potentially valuable use of preserved areas. There are also arguments concerning the potential economic value from drugs and medicines that can be realized in these unique ecosystems. The contributions of these areas to the preservation of biodiversity generally are also an important consideration. Unfortunately, allusions to future prospects in countries confronting immediate problems with the simple sustenance of human life may hold little political and moral weight. Concern for the environment is linked to national income levels, and low-wage countries are less likely to embrace preservation as a result.^{vii} The alternative is to convince governments that the preservation of such land is in their best interest. This path involves the use of substantial political capital, an explicit or implicit framework of taxation for raising the funds needed and tradeoffs with other national priorities.

In order to preserve ecosystems, those interested in habitat preservation must establish legitimate claims to property rights through the purchase or lease of the land in question. In North America, numerous examples of such claims exist including the purchase of wetlands by Ducks Unlimited in the U.S. and Canada and land acquisition programs of The Nature Conservancy. At the international level, environmental groups which have funded international

debt-for-nature swaps include: The Nature Conservancy, the World Wildlife Fund, the Puerto Rico Conservation Trust, the Missouri Botanical Garden, the National Park Foundation of Costa Rica, Conservation International, and the Rain Forest Alliance.^{viii} The concept also has the support of a number of additional environmental groups.^{ix}

The appeal of debt-for-nature swaps is multifaceted; LDC governments, international banks, and environmental groups do not view these swaps as a zero sum game. For LDC governments, debt-for-nature swaps can reduce extant debt load and provide expert guidance in the management, maintenance, and preservation of domestic ecosystems. Another appealing aspect for LDC governments is that both domestic and international political benefits can be realized. For instance, in the case of a Bolivian debt-for-nature swap, the agreement included provisions for the maintenance of indigenous Indian peoples. Where the extraction activities of native human populations are biologically and historically sustainable, native patterns of logging, hunting, and fishing can be maintained. Additionally, title and deed to the lands remain in the hands of nationals. Internationally, LDC governments can point to the swaps as a measure of cooperation in global environmental policies. LDCs gain to the extent that this cooperation accrues political capital with foreign governments and international agencies.

For lending institutions, debt-for-nature swaps can provide reductions in liabilities. Where the likelihood of debt payback is low, the lending institution can recoup at least some of the debt obligation. While it is true that the debt is typically sold at discount, discounting of bad debt is hardly confined to debt-for-nature swaps. What is added to the secondary market for international debt is a demand that did not exist in the market prior to debt-for-nature swaps. Price effects on debt will depend upon the magnitude of the swap purchases relative to other purchases and the relative elasticity's of the demand and supply curves.

For environmental groups, debt-for-nature swaps represent an extension of direct land acquisition programs that have existed for a number of years in North America (as noted on the previous page.) Debt-for-natures swaps provide direct habitat preservation and often include some level of input into land, forest, and wildlife management practices. Additionally, debt-for-

nature swaps provide leverage for the limited funds available within these organizations for the direct purchase of environmentally sensitive lands. The degree of leverage depends upon the spread between the face value of outstanding debt liabilities and the discounted prices in secondary markets.

The first facilitated debt-for-nature swap was between Bolivia and Conservation International in 1987. This swap involved the purchase of \$650,000 of outstanding debt. The debt was discounted to approximately \$100,000 and a Swiss bank purchased it through Citibank Investment Bank. In return, the government of Bolivia agreed to preserve approximately 3,700,000 acres surrounding the pre-existing 334,000 acre Beni Biosphere Reserve^x. The initial Bolivian - Conservation International swap has served as a model for subsequent swaps in Costa Rica, the Dominican Republic, Ecuador, Madagascar, Mexico, Peru, the Philippines, Poland, Tanzania, and Zambia. As of late 1991, approximately \$101,726,000 worth of LDC debt had been retired at a cost of approximately \$18,495,000. The average discount in the secondary debt markets over all of these exchanges has been 82%.^{xi}

It seems unlikely that debt-for-nature swaps will serve as anything other than one method among a host of debt relief measures, though the potential for them to play an increased role exists. The "Enterprise for the Americas Initiatives" contains provisions that are likely to make these trades more attractive to all parties. The provisions are also likely to extend debt-for-nature swaps beyond agreements to halt the destruction of unique ecosystems. Alternative agreements that have been put forward are generally aimed at linking debt-for-nature swaps to the economic and environmental sustainability of more traditional development projects such as potable water and sanitation infrastructure.

IV. Debt-for-Nature Swaps as an Application of Coaseian Bargaining

There are a number of characteristics inherent to debt-for-nature swaps that imply the existence and efficacy of Coaseian bargaining. Among those aspects of debt-for-nature swaps which have Coaseian qualities one would include: the mutuality of harm, the clear lack of legal

guidance concerning *ex post* restitution, the competitive aspects of the markets in which they take place, and particulars concerning transaction costs.

The first of these characteristics is the mutuality of harm. In "*The Problem of Social Cost*", Coase outlined *Bryant vs. Lefever* where the externality involved smoke back-drafting through a chimney into the house of the plaintiff. The back draft resulted when the defendant raised a wall adjacent to the chimney. At the initial trial the case was treated by the court as a traditional externality problem -- damages were awarded to the plaintiff. The court determined that the newly built wall caused the chimney to become inappropriately drafted. The subsequent appeals court disagreed, placing the blame on the plaintiff. "It is the plaintiff who causes the nuisance by lighting a coal fire in a place so near the defendants' wall, that the smoke does not escape, but comes into his house. Let the plaintiff cease to light his fire, let him move his chimney, let him carry it higher, and there would be no nuisance."^{xii}

This case presents a mutual harm, and the courts clearly identify the ambiguity in assigning blame. For Coase, any legal outcome is arbitrary. Quoting Coase, "Who caused the smoke nuisance? ...the answer seems fairly clear. The smoke nuisance was caused by the defendant who built the wall *and* the man who lit the fires. Given the fires, there would be no smoke nuisance without the wall; given the wall, there would be no smoke nuisance without the fires. Eliminate the wall *or* the fires and the smoke nuisance would disappear."^{xiii} The parallel notion in debt-for-nature swaps is this: environmental groups view the action of destruction of forested areas by LDCs as harmful; simultaneously, the LDCs view external restraints on development policies as intrusive and paternalistic.

Mutuality among the affected parties increases the potential for debt-for-nature swaps. For example, biologists agree that forests process the carbons emitted through the large scale burning of fossil fuels. LDCs can make the argument that their maintenance of global carbon sinks represent an uncompensated positive externality, which benefits high income countries. Research shows that per capita emissions of carbon dioxide are negligible until levels of around \$8,000 per capita income and that emissions then increase at rapid rates.^{xiv} One view of this is

that LDCs should be compensated for their provision of large-scale carbon sinks that offset the relatively high carbon dioxide emissions of high-income countries.

A second aspect of debt-for-nature swaps, which favors the development of Coaseian solutions, is the nearly complete absence of effective legal institutions at the world level. The development of world legal institutions is in its nascent stages and the abilities of existing "global" legal institutions, such as the International Court of Justice, to judge and assign damages where sovereign nations are involved are weak. Even if the institutions were able to judge and assign damages, the enforcement of *ex post* damage judgments would remain a problem.

Under the Coase theorem, the role of legal institutions is shifted from an *ex post* delineation of judgment and damages to an *ex ante* definition of property rights. Clearly defined property rights are required for Coaseian bargaining to be successful. In the case of debt-for-nature swaps, the lands that are offered are likely to embody clearly defined property rights. A majority of the lands involved in debt-for-nature swaps are "public" lands and the initial assignment is likely to be void of domestic ambiguity - they are those of the bargaining nation.^{xv} Where boundaries are in dispute, it is likely that the dispute has been a long-standing one.^{xvi} If boundary disputes exist, the likelihood of the lands being acceptable to the debt-purchasing parties involved in swaps would fall dramatically. Thus, it seems that in the case of debt-for-nature swaps, one *ex ante* stumbling block to Coaseian bargaining -- the initial assignment of property rights -- is removed.

Property rights could cause problems for debt-for-nature swaps due to incomplete contracting. The contract represents an agreement to set aside lands under certain conditions and terms and the initial agreement must be clearly understood by both parties. The problems of addressing the temporal and spatial conditions of the contract seem minor compared to the conditions set for acceptable use. It would be particularly important for the bargaining institutions to more completely define acceptable use including agreements on sustainability in resource extraction.

A third aspect of debt-for-nature swaps that mark them as Coaseian bargains is competitiveness. As noted earlier, a number of nations have been involved in offering lands for debt service. In addition to environmental groups, nations have been active participants in debt-for-nature swaps.^{xvii} LDC governments have cooperated enthusiastically because these lands have often already been set aside and the debt-for-nature swap includes provisions for assistance in the management of the lands. The swaps also represent a method of extracting unrealized rents from those who believe that the preservation and maintenance of the lands provides positive benefits that accrue to non-domestic parties. For LDC governments the risks associated with debt-for-nature swaps are minimal. If the LDC government violates the conditions of the swap, then it is unlikely to galvanize international political pressure given the weakness of international legal institutions.

A final aspect is the role of transaction costs, which are incurred at specific junctures of the trade. Discovery, announcements, negotiations, and contracting are *ex ante* activities whereas monitoring and compliance are *ex post* activities. For Coaseian bargaining to work, transaction costs must be low. In the case of debt-for-nature swaps, *ex ante* transaction costs will likely vary with the number of parties and the complexity of the particular transaction. In addition, the ability to guarantee *ex post* enforcement of the agreement will affect the complexity of the *ex ante* negotiations.

The competitiveness of the secondary debt market is also important. Historically, demanders of debt in these swaps have been able to obtain deep discounts ranging from 40% to 88%.^{xviii} In turn, banks holding the bad debt may look upon the swap as a terminal option for recovering some portion of their investment. Each of these factors drive the parties towards trade and may help to reduce the perceived *ex ante* transactions costs.

The problems of *ex post* costs of monitoring and ensuring contract compliance are difficult ones. The potential for effective legal remedies is limited. It has been noted that international legal institutions have great difficulty in enforcing cross country rules and agreements. If they cannot effectively assign judgment and damage or enforce claims, then *ex*

post costs of compliance become high -- perhaps even prohibitive. Without specific information regarding the costs of monitoring compliance, parties may have assumed that the costs are small and until other information is made available they will not act as a deterrent to future swaps. Perhaps, knowing that effective legal action is unlikely, each party incorporates this pre-existing knowledge into the agreed upon price in the swap agreement. Certainly, the sustainability of debt-for-nature swaps hinges on market participants to have faith that contractual conditions will be honored. If this is not the case, then the *ex post* costs of monitoring and compliance represent a major threat to the continued use of debt-for-nature swaps. While successfully negotiated swaps are the product of solid *ex ante* Coaseian bargaining, the weak *ex post* conditions may make them short-lived phenomena. Future research into the actual transaction costs associated with these swaps is needed. Though *ex ante* costs may be more clearly discernible, *ex post* costs may not be.

V. Summary

LDC governments face a range of problems that accompany low per capita incomes and the issues of environment degradation simultaneously. When these governments need a means of increasing domestic income, resource extraction is often a substantial, direct, and immediately available source. The positive relationship between increasing national per capita income and concern for the environment is well established and for many LDCs the former takes precedent. LDCs are leery of external regulations that hinder their development. Environmentalists, usually from the More Developed Countries, are pushing for limits that can impede economic growth in LDCs. Programs which require "sustainable" development, yet offer no *quid pro quo*, can be viewed as essentially free-rider claims on domestic resources from nations who have historically treated their frontier boundaries differently than is being currently proposed. Within the arenas of domestic and international politics, charges of paternalism/imperialism on the part of the more developed countries may be given credence. Additionally, LDC governments can make an

effective argument that the continued provision of unique ecosystems represents an uncompensated positive externality to the rest of the world.

Perhaps a consensus can be reached that demarcates the appropriate role for government in these swaps. Most economists agree that the primary role of government is to define and enforce property rights. Though Coase did note the potential role of domestic governmental institutions to intervene in cases of market failure, he did so with trepidation, and he did not address the workings of international institutions that were in their infancy when the Coase theorem was first introduced. Perhaps one appropriate role for these international institutions is to broker the swaps and thus minimize the transaction costs that accrue to the swap participants. If debt-for-nature swaps are to survive, minimizing *ex ante* transaction costs and *ex post* costs of monitoring and compliance is crucial. It seems within the purview of international agencies to act as brokers by coordinating the swaps and in doing so providing a more efficient vehicle for minimizing the *ex ante* transaction costs of announcement, discovery, and negotiation.

End Notes

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- ⁱ Coase restates this argument in the beginning of Section II of "The Problem of Social Cost." He wrote [that] "The traditional approach has tended to obscure the nature of the choice that has to be made. The question is commonly thought of as one in which A inflicts harm on B and what has to be decided is: how should we restrain A? But this is wrong. We are dealing with a problem of reciprocal nature. To avoid the harm to B would inflict harm on A. The real question that has to be decided is: should A be allowed to harm B or should B be allowed to harm A? The problem is to avoid the more serious harm."
- ⁱⁱ See "The Federal Communications Commission," pp. 26-27.
- ⁱⁱⁱ See "The Problem of Social Cost," p. 30.
- ^{iv} It is not clear to the author how Coase incorporates the costs to firms in their attempts to influence political bodies.
- ^v See "The Problem of Social Cost," p. 29.
- ^{vi} See "The Problem of Social Cost," p. 30.
- ^{vii} Concern over environmental problems within a given populus and the relationship between types of environmental problems and per capita GDP are given full discussion in the World Development Report, 1992, p. 11, figure 4.
- ^{viii} See "Debt-for-Nature Swaps: A New Agenda." p. 36.
- ^{ix} Other environmental groups which have endorsed the swaps include: Rainforest Action Network (San Francisco, CA), Cultural Survival, Greenpeace USA (New York, N.Y.), Earth Island Institute (San Francisco, CA), the Environmental Defense Fund (Washington, D.C.), the Frank Weeden Foundation and the National Wildlife Foundation. See "Debt-for-Nature Swaps: Effective But Not Enforceable," p. 142.
- ^x Additional details of the swap and the agreement concerning the legal status of the lands involved can be found in "Debt-for-Nature Swaps: Effective But Not Enforceable." pp. 142-5.
- ^{xi} See "Debt-for-Nature Swaps: A New Agenda," p. 36.
- ^{xii} See "The Problem of Social Cost," pp. 23-24.
- ^{xiii} See "The Problem of Social Cost," p. 25.
- ^{xiv} See The World Development Report - Development and the Environment, 1992, p. 11.
- ^{xv} For the purposes of this paper, domestic legal disputes preclude participation in debt-for-nature swaps and clear title is not an issue. Again, it seems reasonable that lands under any type of legal action would be unlikely to be acceptable to all parties involved in the debt-for-nature swap.
- ^{xvi} Lands in dispute among nations are often in dispute because they are perceived to have some economic value. Given that the effect of debt-for-nature swaps is to provide more explicit recognition of the value of unique ecosystems future border disputes may be exasperated.
- ^{xvii} Holland and Sweden are responsible for the two largest single swaps, both of which were with Costa Rica.
- ^{xviii} See "Debt-for-Nature Swaps: A New Agenda," p. 36.

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