ENVIRONMENTAL TAXATION IN CHILE: A CRITICAL ANALYSIS

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Abstract
This article analyses the role of tax measures for the protection of the environment, both in relation to local pollution and climate change, for which Chile is used as a case study. It argues that there is room for increasing the tax burden on environmental taxes, comparing the revenues that the latter represents in its GDP with the rest of OECD countries. It highlights the relevance of taking into consideration the theoretical framework and the "polluter pays" and "double dividend" principles in the design of environmental taxes, as well as for the design of rest of the alternative or complementary tax measures. It shows that Chile has been a pioneer country in Latin America by including a tax on fixed and mobile emissions. However, it argues that such tax can still be more efficient in terms of its scope and tax rate. On the other hand, it recommends to include a waste management tax, rethink its fuel tax and its specific tax on mining revenues, as neither of these take into consideration environmental aspects or negative externalities.

Keywords: *environmental taxes; externalities; pollution & climate change; double dividend principle, polluter pays principle.*

LIST OF ABBREVIATIONS

Corporate income tax ("CIT")
Environmentally related taxes ("ERT")
European Union ("EU")
Foreign direct investment ("FDI")
Greenhouse gases ("GHG")
International energy agency ("IEA")
Organisation for economic co-operation and development ("OECD")
Research and development ("R&D")
United Nations framework convention on climate change ("UNFCCC")
Value added tax ("VAT")
Withholding tax ("WTH")

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I. INTRODUCTION

The purpose of this work is to critically analyse the environmental taxation system of Chile. Although the research is particularly focused on such country, the theoretical framework, the comparative cases and recommendations may be applicable to other Latin American jurisdictions.

With this in mind, it starts describing and making a diagnosis of the main environmental issues of this country, from both a local and global point of view.

Subsequently, there is a general theoretical overview of the most common measures used to tackle global and local pollution, which are environmentally related taxes and other complementary or alternative measures. The OECD's and IEA's points of views are described and analysed for this purpose.

Having examined this theoretical framework, the research identifies current environmental taxes used in Chile as well as some that are not being used, but are generally considered in other jurisdictions with successful results. In this regard, it addresses the specific fuel taxes, fixed and mobile emissions taxes, landfill taxes and mining taxes. Additionally, other complementary measures for environmental purposes are analysed from a Chilean and worldwide perspective, such as tax preferences and carbon markets.

Finally, the author gives recommendations for the enhancement of environmental policies from a taxation point of view, proposing ambitious but realistic measures. The recommendations are aimed at improving the Chilean system, in order to achieve an efficient protection of the environment taking into account the Paris Agreement, but without neglecting the economic effects of the proposed measures.

II. MAIN ENVIRONMENTAL PROBLEMS IN CHILE

Chile is a Latin American country with more than 18 million inhabitants.[1] Over the past twenty years, it has experienced a considerably economic growth. Its GDP was approximately 277 billion in 2017[2] and has been a member of the OECD since 2010.

The extraction of natural resources is the basis of its economy. Mining is the most significant economic activity, being the largest producers and exporters of copper in the world and one of the biggest producers and exporters of lithium. Fishing, agriculture and forestry are also part of the fundamental activities for the Chilean economy.[3]

1 The World Bank (2018).

2 The World Bank, Chile GDP (current $US) https://data.worldbank.org/country/chile Accessed on May 16, 2019.

3 OECD (2016), p. 3.

The economic prosperity gained over the last 30 years has allowed progress and development of the country in comparison with the rest of the region. However, it has brought environmental damage as well, which Chile has not yet been able to address efficiently. From a local point of view, air pollution is currently the greatest concern due to its significant deterioration, additionally there is water and land pollution. From a global perspective, GHG emissions have increased in recent years.[4]

2.1 Local pollution

2.1.1 Air pollution

Chile has air quality standards that regulate maximum concentrations of particulate matter (PM10 and PM2.5), sulphur dioxide (SO2), nitrogen dioxide (NO2), tropospheric ozone (O3), carbon monoxide (CO) and lead (Pb).[5] However, many cities far exceed the established limits, being declared saturated zones and triggering the implementation of environmental decontamination plans to comply with air quality standards.[6]

According to OECD's research,[7] since 2005 emissions of air pollutants have increased in Chile. They mainly arise from thermoelectric energy, freight and passenger transportation -using diesel fuel- and wood combustion for heating. In terms of pollution from mining, research shows that sulphur oxide ("SOx") has significantly decreased, however it is still high.

Santiago faces the highest levels of air pollution due to its geographic characteristics and the amount of pollution arising from vehicles. Large cities with a high population concentration and mining cities are particularly affected from air pollution in Chile. The OECD's report establishes that in an average year, 15% of the population in Chile is subject to high or severe PM2.5 concentration levels.[8]

2.1.2 Landfill

Waste generation has increased in Chile during the 2000s by 30%. Landfills receive 70% of municipal solid waste. In the metropolitan region this amount is even higher, reaching 91.3%. In 2017, only 11.8% of municipal waste was recycled[9].

There is still a significant portion of waste sent to uncontrolled or inadequate dumping. Although, it has decreased from 40% in 2009 to 25% in 2015. By 2010, two thirds of municipalities did not have access to sanitary landfills, but now there is a plan for doubling such access by 2020.[10]

4 OECD (2016), p. 3.

5 Pizarro, Pinto & Ainzúa (2018), p. 4.

6 Pizarro, Pinto & Ainzúa (2018), p. 4.

7 OECD (2016), pp. 22-23.

8 Ibidem, p 23.

9 Ministerio de Medioambiente de Chile (2019), p. 79.

10 Idem.

Recycling is still not developed in Chile. Municipalities can charge its inhabitants for recycling. Nevertheless, only 20% currently charges for this service. Approximately 80% of the municipalities in Chile do not have a plan for waste management, mainly due to a significant lack of resources.[11]

2.1.3 Water pollution

The pollution of surface water arises mainly from urban and industrial wastewater, fisheries and agriculture activities.

Agricultural runoff has increased pollution in lakes, wetlands and rivers. Mining activity has increased heavy metal pollution in surface waters.[12]

There is also an overuse of water resources, by these sectors, in the central and northern regions respectively.[13]

2.2 Global pollution (climate change)

The international community has agreed that climate change is a main concern and challenge for both future generations and ours.[14] It is generally accepted that this phenomenon is caused by anthropocentric activities, mainly because of GHG emissions arising from burning fossil fuels and changing land use.[15]

Chile's GHG emissions are below the OECD average and represent only 0.2% of global emissions in 2010. However, these emissions have increased by 114% since 1990, mainly due to Chile's economic growth[16].

From 2000 to 2010 the emissions increase arose mainly from energy production and use, representing 75% of total GHG emissions.[17] In terms of energy generation, the most widely used fuels are coal and oil, while diesel is the most used within the transport sector. Agricultural emissions represented 15% of total emissions in 2010 and there was a significant increase in nitrous oxide (N2O) emissions arising from the use of fertilizers.[18]

With that in mind, Chile entered into the Paris agreement, in which it committed to take actions to tackle climate change by enhancing its policies towards sustainable development in order to reach the overall objective of limiting temperature rise below 2°C.[19]

11 Idem.

12 Ibidem, p. 25.

13 Idem.

14 Grupo Intergubernamental de Expertos sobre el Cambio Climático (IPCC) (2019), p. 6.

15 Harrison (2017), p. 246.

16 Ministerio de Medioambiente de Chile (2019), p. 144

17 OECD (2016), p. 171.

18 OECD (2016), p. 171.

19 United Nations Paris agreement (2015), article 2 No. 1 (a).

In 2017, this commitment was confirmed and ratified before the UNFCCC.[20] Chile committed to reduce its emissions by 30% by the year 2030 in comparison to 2007.[21]

The pledge takes into consideration the principle of common but differentiated responsibilities, in which developed countries should take the lead and provide finance and technical assistance to developing countries. In this regard, Chile committed to reduce its emissions by 45%, in case the international community provides additional financial support.[22] It is important to point out that the Chilean engagement is subject to the achievement of sustained economic growth during such period.

III. ENVIRONMENTALLY RELATED TAXES

There are different instruments for tackling pollution and climate change, such as environmentally related taxes ("ERTs"), tax incentives or tax preferences, tradable polluting permits, among others.

The purpose of the following chapters is to critically evaluate these measures used for the protection of the environment in order to understand and determine its efficiency.

In addition, it includes a specific critical analysis of Chilean tax legislation for environmental purposes, which will be described in order to identify its main virtues and weaknesses. Furthermore, it also embraces the analysis of ERTs from other jurisdictions.

ERTs are obligatory payments to the government on tax-bases, with a particular relevance from an environmental point of view.[23]

The two main reasons why governments impose these types of taxes are to protect environment and obtain revenues. These taxes are considered an economically efficient way to face environmental issues.[24]

Governmental intervention in environmental policies is fundamental, mainly because it is a way to force companies and households to take effective measures for environmental purposes. In general, although households and companies may be concerned with pollution and climate change, the chain of pollution responsibility is long and spread between different parties.

With this in mind, governmental intervention through regulation is essential. Some governments include one or a mixture of the following measures to protect the environment from pollution and climate change: ERTs, carbon markets, subsidies

20 Gobierno de Chile (2015) p. 12.

21 OECD (2016), p. 37.

22 OECD (2016), p. 37.

23 OECD (2017), p. 7.

24 OECD (2017), p. 7.

and permits, amongst others. This chapter focuses only on ERTs. The rest of these instruments are discussed in the following chapters.

The most common ERTs are taxes on emissions, landfill, fuel, transport, and mining etc.[25] The design and implementation of this type of tax is based on the "polluter pays principle".[26]

3.1 The value of externalities. Private cost versus social cost

ERTs intends to force households and companies not only to take into consideration the private cost but also the social cost of their activities.[27]

The economist Arthur C. Pigou developed a theory about marginal private cost and marginal social cost of products and services.

On one hand, his theory identifies that industries, when creating a product, take into consideration their own marginal private cost or interest, which is the sum of money that costs the creation of one unit of a certain product. On the other hand, it provides that there is an additional cost called the marginal social cost, which is the amount of money that costs society the production of one unit of a certain product. The latter is called negative externality.[28]

The negative externality for society, generated by a product (e.g. sale of a pack of cigarettes), can be incorporated through a tax, into the production value of such a product so that the producer takes into account the social effects generated by its product and discourages its consumption.[29] This example is also applicable to pollution.

Overall, ERTs try to dissuade the negative external costs that affect society, through the application of a tax that allows matching the social value and the private value of a good. In other words, it includes within the price the value corresponding to the externalities that affect society. Thus, there is an incentive for companies and households to reduce negative effects. In addition, the government, when applying a tax, receives revenue equivalent to the value of the negative externality.

3.2 Double dividend theory. ERTs revenues enables to cut distortionary taxes

The double dividend theory states that the taxation of a product or service, which generates a negative externality, creates a double dividend as it increases the government revenues and avoids or reduces the negative externalities.[30]

25 Speck, Summerton, Lee & Wiebe (2011), p. 2

26 The Rio Declaration on Environment and Development (1992), Preamble (principle 16), at http://www.unesco.org/education/information/nfsunesco/pdf/RIO_E.PDF Last visit July 8, 2019

27 OECD (2003), p. 37.

28 Pigou (2017), p. 135.

29 Pigou (2017), p. 135.

30 Tullock (1967), pp. 643-644.

Taxing emissions or any particular polluting activity may not only improve the environment, which would be the first dividend, but it also may increase the efficiency of the taxation system of a government, which would be the second dividend.[31]

In this regard, it helps efficiency as the additional revenues arising from ERTs enable a reduction in other distortionary taxes.[32] For example, the effects of taxing GHG emissions are compensated with the reduction of other distortionary taxes as employment tax.[33]

Several OECD members have used the double dividend theory for the implementation of its fiscal tax reforms. Specifically, by including ERTs and reducing distortionary taxes as consumption or employment taxes. The results have differed greatly depending on the country.[34]

Some authors have questioned the double dividend theory, pointing out that it cannot be taken for granted that the implementation of ERTs and the subsequent reduction of income taxes improves the environment and creates a more efficient tax system.[35]

In this regard, the theory asserts that "returning tax revenues through cuts in distortionary taxes leads to cost savings relative to the case where revenues are returned lump sum".[36]

L. Goulder believes that numeric simulations empirically prove this statement. However, this could only arise in the case that the initial tax system is inefficient and therefore ERTs could work to change the burden of taxes in a more efficient way.[37] Furthermore, he argues that there is always the need for an empirical simulation of numbers in order to determine whether the double dividend may work.

Recent evidence demonstrates that the inclusion of carbon and energy taxes and the subsequent reduction of other taxes have had a positive result on employment figures.[38] In this sense, the OECD's report affirms that 27 EU members investigated the results in employment, as well as the inclusion of ERTs, raising taxes on electricity and water for large users[39] and reducing other taxes, which are considered distortive. The numerical simulation, made by the macro econometric E3ME model, estimated

31 Ciaschini, Pretaroli, Severini & Soccia (2009), p. 3

32 Pearce (1991), pp. 938-948.

33 Ciaschini, Pretaroli, Severini & Soccia (2009), p. 3

34 OECD (2017), p.7.

35 Goulder (1995), p. 157.

36 Goulder (1995), p. 175.

37 Goulder (1995), pp. 175-176.

38 OECD (2017), p. 15.

39 See OECD (2017), p. 15: "A total of EUR 554bn is shifted from labour towards natural resources and consumption, which is equivalent to 13% of labour tax revenue and results in a 5.6%-point reduction of average personal income tax rates".

that the result after 4 years would increase employment and GDP by 3% and 2% respectively. On the other hand, the use of water and energy would be reduced and carbon emissions will decrease by 5%.[40]

Overall, these latest econometric simulations validate the relevance and positive effects of the double dividend.

However, this research does not deny that the double dividend cannot be taken for granted and firmly believes in its benefits only in the case that it is implemented in an accurate and precise way.

3.3 Should environmental taxes be earmarked?

Earmarking is the practice by which an authority establishes that the revenue from a certain tax will be used to finance a specific activity or public policy.[41]

The revenues arising from ERTs are sometimes subject to the claim of earmarking. The latter mainly because the constituency agrees with an ERT for environmental purposes, therefore it could be argued that such revenues should be used for environmental purposes as well. Considering the above, it is often suggested, by the electorate that for example revenues arising from carbon emissions taxes, for example, should be used for investments in renewable energies.[42]

Supporters of earmarking provide different arguments. Some authors believe that earmarking helps to gain support for the creation of ERTs, as it may be considered a way of policy transparency.[43] Others believe that earmarking is a way to restrict the big amount of discretionary power that politicians have in connection to tax revenues.[44] In addition, there is another position, which believes that earmarking is an efficient way for enhancing environmental policies as it directly attacks the issue that has already been identified as harmful and therefore taxed.[45]

Notwithstanding these viable arguments, most of the doctrine believes that earmarking is an inefficient use of public spending. From a long term point of view the inflexibility of the earmarking practice is believed to be counterproductive.[46] Economists strongly recommend, according to traditional welfare economics, that there must be a separation between income and expenditure. Under that economic theory, earmarking has no place. Moreover, it must be avoided so that there is certainty or at least a possibility that the expenses always go to the sector that needs it most, instead of being previously predestined to go towards a certain sector or activity.[47]

40 OECD (2017), p. 15.

41 Buchanan (1963), pp. 457-469

42 OECD (2017) p. 13.

43 OECD (2017) p. 13.

44 Brett & Keen (2000), p. 317.

45 Pirttilä (1999), p. 204

46 OECD (2017), p. 13.

47 Brett & Keen (2000), p. 336.

Earmarking should not be confused with the application of fees and charges. Fees and charges are payments that are made in proportion to "*ad quantum*" for a provided service, in which its revenues are predestined to be given to specific beneficiaries[48] (e.g. municipal service for waste collection). On the other hand, France and Poland are examples of countries, which use earmarking, as their emissions tax revenues are used to grant funds for pollution reduction technology.[49]

However, the purpose of this chapter is not to analyse fees and charges payments, since their implementation and design are based primarily on the recovery of the costs of a provided service, usually at a local or municipal level.

Finally, William McCleary states that earmarking always includes its own set of problems. Nevertheless, it should not be always discarded. He believes that earmarking can be considered a valid option, in certain circumstances provided to obtain a satisfactory result in a series of tests.[50] Such tests are intended to measure the possibility of improvement by the use of earmarking.[51]

3.4 ERTs in Chile

The most relevant ERTs in Chile are the specific taxes on fuels, tax on emissions from fixed sources and from mobile sources (vehicles). Below is a critical analysis of the mentioned taxes from an environmental perspective. In addition, this chapter analyses the landfill tax and the taxation of the mining industry.

3.4.3 Specific tax on fuels

Chile consumed 15 million tonnes of oil during 2015.[52] The largest consumer is the transport sector (49%). In second place is the industry sector (20%). Specifically, the mining sector is the largest oil-consumer in the industry sector[53] and diesel is the most dominant oil product used in Chile, taking up more than half of the total consumption, followed by motor gasoline at 22%.[54] It is important to point out that from 2010-2016 there was a 76% increase in purchase of diesel cars.

The price of fuel in Chile includes both 19% VAT and a specific tax, which levies the sale or importation of motor gasoline, diesel and natural gas used for transport.[55] Its tax rate is 1.93 UTM[56] per thousand cubic meters for compressed

48 OECD (2017), pp. 13-14.

49 Pirttilä (1999), p. 202

50 McCleary (1991), p. 102.

51 McCleary (1991), pp. 81-104.

52 International Energy Agency (2018), p. 47.

53 International Energy Agency (2018), p. 47.

54 International Energy Agency (2018), p. 47.

55 Ley N° 18.502, article 6.

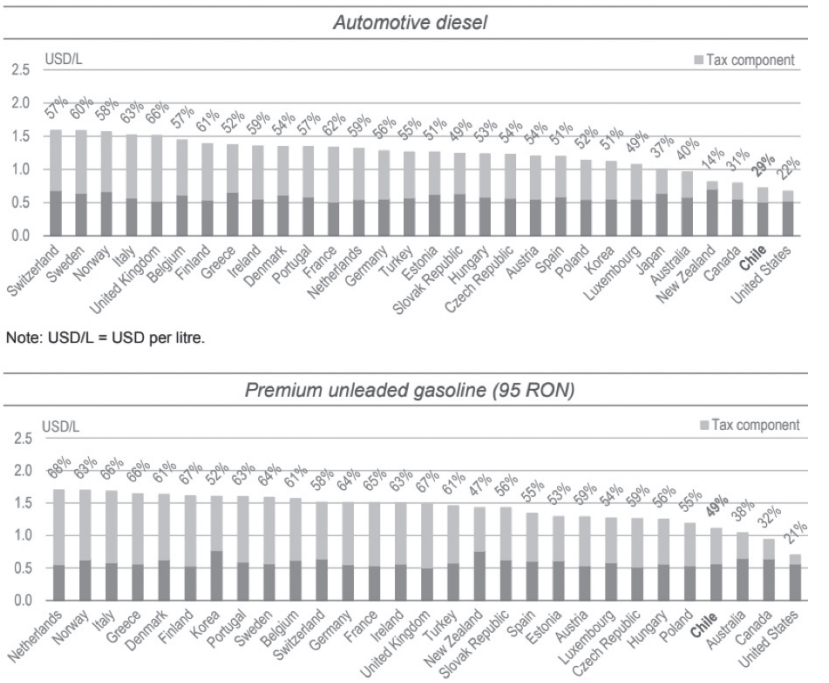
56 *Unidad tributaria mensual* ("UTM") or monthly fixed unit is a Chilean currency, which includes on a monthly basis the variation of inflation http://www.sii.cl/valores_y_fechas/utm/utm2019.htm Accessed on August 12, 2019

natural gas, 1.40 UTM per cubic meter for liquefied petrol gas, 6 UTM per cubic meter for motor gasoline and 1.5 UTM per cubic meter for diesel. Furthermore, the price of the fuel is determined according to a stabilisation mechanism, which reduces the tax rates on petrol and diesel when international fuel prices are above a price cap, and raises them when international prices are lower with a cap.[57] Finally, aviation fuel, biodiesel and bioethanol2 are not subject to this specific tax.

Figure 1 shows that the taxation of transport fuels in Chile for both motor gasoline and diesel is low in comparison to the rest of OECD/IEA countries. The result, in both motor gasoline and diesel, is a low price for transport fuel. In the case of diesel, only the United States has a lower price. In terms of motor gasoline, only three among 30 countries have a lower price for it.

Despite these discouraging statistics, there has not been a proposal to modify this tax in any of the last three tax reform projects during the years 2014,[58] 2016[59] or 2018.[60]

Figure 1. Transport fuel prices in Chile and IEA countries, second quarter 2017.



57 Ley N° 18.502, article 6.

58 Ley No. 20.780 (tax reform).

59 Ley No. 20.899 (Simplification of the 2014 tax reform).

60 Bill of law No. 107-366 of 2018 for the modernization of the tax system.

The specific tax on fuels in Chile has several particularities from an environmental point of view. The incorporation of specific taxes on vehicles was not originally designed for environmental purposes. Law N°18.502 of 1986 was enacted months after the 1985 earthquake in order to obtain additional resources for the reconstruction of public roads. Therefore, although it taxes negative externalities, the tax rate continues to be considerably low. Its design did not take into account the environmental effects by taxing diesel less than gasoline and by not taxing aviation fuel.[61]

The tax rate for diesel (1.5 UTM/m3)[62] is 4 times less than that of gasoline's tax rate (6 UTM/m3),[63] even though the latter is less polluting than the first.[64] During 2018, the specific tax for gasoline corresponded to 36.9% of its selling price; in the case of diesel, such tax only represented a 12.3%.[65]

Finally, due to the significant level of imports of fuel in Chile, there is a mechanism for price stabilisation in order to avoid the constant variation of the price of fuel because of the international market.[66] This policy of granting a subsidy to the transport sector does not go in the line of protecting the environment, nor does it aid in correcting negative behaviour. This further demonstrates that the Law N°18.506 was not created initially for environmental purposes. The same can be said for aviation fuel, biodiesel and bioethanol2, which are not subject to this tax.[67]

3.4.2 Tax on emissions from fixed sources

On 2017, for the first time in Chile and in Latin America, an emissions tax was included through a significant tax reform.[68]

The emissions tax levies the emissions from facilities with stationary sources (boilers and turbines) with a combined power of 50MW. This tax levies emissions at a local level according to a formula that takes into consideration the air quality of the place where the fixed source is located (i.e. PM (e.g. smoke), NOX and SO2). Additionally, it levies emissions at a global level according to a flat rate (i.e. CO2 emissions).

This tax is applied only for sources using fossil fuels. Therefore, sources using renewable energy or biomass are exempted.[69] According to the UN, this

61 Ley No. 18.502, article 7.

62 Ley No. 18.502, article 6 b).

63 Ley No. 18.502, article 6 a).

64 OCDE, "The climate challenge: Achieving zero emissions" http://www.OCDE.org/about/secretary-general/the-climate-challenge-achieving-zero-emissions.htm Last visit: May 28, 2019.

65 García Bernal (2018), p. 1.

66 Law No. 20.493, Article 1.

67 Ruling from Chilean Tax Authority N° 2899 of 26 of October 2012 (*Servicio de Impuestos Internos*) http://www.sii.cl/pagina/jurisprudencia/adminis/2012/ventas/ja2899.htm Accessed on May 28, 2019.

68 Ley No. 20.780 (tax reform), article 8.

69 Ley No. 20.780 (tax reform), article 8.

covers approximately 40% of the emissions, affecting 94 stationary sources from different sectors.[70]

The carbon tax was paid for the first time in 2018, according to the emissions issued during 2017. Its rate is USD $5/tonne of CO2.[71]

On the one hand, the tax on emissions from fixed sources is an important step forward for Chile. However, it is still perfectible. In this regard, there have been criticisms made by different institutions and authors particularly in relation to its economic and environmental lack of efficiency.[72]

First, the carbon tax rate is low (i.e. $5 USD/tonne).[73] A study has shown that this rate only reduces emissions by 1.32%.[74] This reduction of emissions is far from fulfilling the commitment signed in the Paris agreement.

According to economic simulations based on the Leontief input-output model for the measurement of the tax efficiency and its consequences, the applicable rate to the electricity sector should increase up to $131 USD/tonne.[75] The latter would mean reaching up to levels similar to Sweden, which is the country with the highest tax rates on emissions.[76] On one hand, such a tax rate increase would allow compliance with the Paris agreement commitment. Nevertheless, on the other hand, it would cause significant negative effects for the Chilean economy. The main effect would consist of an increase of 131.24% in electricity prices and 38.73% in the prices of the remaining sectors of the economy.[77] Therefore, the challenge is much more complex than increasing a tax rate.

Secondly, this tax currently only applies to the electricity sector. The energy sector and power generation are the principal polluters and coal is the main fuel used for electricity, doubling its use since 2005.[78] Energy represents 74.4% of the total GHG emissions in Chile.[79] However, this sector is not the only one generating high concentrations of emissions in Chile.

70 Committee of Experts on International Cooperation in Tax Matters, 18th session New York (2019), p. 11 https://www.un.org/esa/ffd/wp-content/uploads/2019/04/18STM_CRP4-Environmental-tax-issues.pdf accessed on May 28, 2019.

71 Ley No. 20.780 , article 8 amended by article 8 of Ley No. 20.899.

72 International Energy Agency (2018), pp. 13-14.

73 International Energy Agency (2018), pp. 13-14.

74 Mardones & Muñoz (2018), p. 2547.

75 Mardones & Muñoz (2018), p. 19

76 Ackva & Hoppe (2018), p. 5

77 Mardones & Muñoz (2018), p. 2560.

78 International Energy Agency (2018), p. 112.

79 Mardones & Muñoz (2018), p. 2547.

Figure 2. Energy related CO2 emissions by sector, 1973-2015.

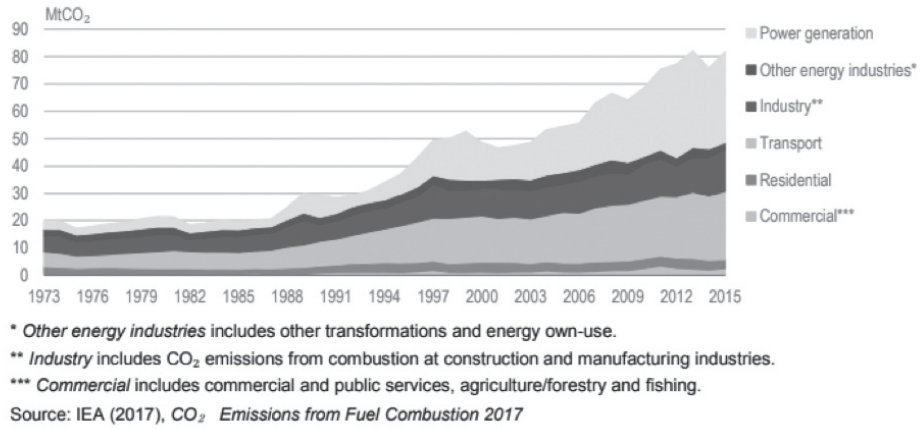


Figure 2 shows that there are several other sectors, such as industry, agriculture, transport, residential and commercial use, which are generating high levels of pollution. Agriculture represents 15.1% of the total CO2 and GHG emissions in Chile.[80] Furthermore, figure 2 identifies as well, that emissions increase every year in all sectors of the economy.

From an economic and environmental efficiency point of view, taxing electricity, in addition to the rest of the polluting sectors may enable obtainment of efficient results.[81] The taxation of the emissions arising from all sectors, at a $30 USD/tonne, would result in a 25% reduction of emissions in comparison to 2007.[82] The latter would be close to the Chilean commitment agreed in the Paris agreement.[83] On the other hand, such an increase would have negative consequences for the agriculture sector.[84] Furthermore, it requires an investment in assessment and collection of these taxes through all sectors.

In August 2018, the current president of Chile proposed a bill of law for the modernisation of the tax system[85]. In January 2020, this bill of law was approved - law number 21.210 of 2020 ("Tax Reform 2020"). Its approval came after almost 18 months of negotiations and revisions after the original reform was submitted in August 2018. This law, although it includes a broader scope than taxation of fixed sources by proposing to tax all fixed sources instead of only turbines and boilers, it does not increase the tax rate or tax additional sectors of the economy. In addition, it proposes a modification of the taxable event subject to exceeding an emissions threshold (100 or more tonnes per year of particulate matter and 25,000 or more tonnes per year of CO2).

80 International Energy Agency (2018), p. 111.

81 Mardones & Muñoz (2018), p. 2561.

82 Mardones & Muñoz (2018), p. 2561.

83 Mardones & Muñoz (2018), p. 2560.

84 Mardones & Muñoz (2018), p. 2561.

85 Mardones & Muñoz (2018), p. 2547.

Although the taxable event is extended, the modification would not generate a substantial change that would allow the reduction of polluting emissions at a local level (particulate matter), nor at a global level (climate change -CO2). This law does not tax additional sectors of the economy to those proposed in the reform in which this tax was first included. It does not increase the rate of the tax on emissions and it proposes a threshold above, which these emissions can begin to be taxed.

3.4.3 Tax on mobile sources (vehicles)

The 2014 tax reform introduced a tax on emissions arising from mobile sources.[86] It levies the sale of new light and medium-weight motor vehicles, according to a formula that takes into consideration the amount of nitrogen oxide (NOx) emissions, kilometre per litre performance and selling price. In addition, the sale of new vehicles is generally subject to VAT.[87]

This tax does not apply to the sale of vehicles used for the transport of passengers, taxis, trucks, pickup trucks (load capacity of 2,000 kilos or more). Nor does it apply to taxpayers subject to VAT, with respect to the acquisition of new pickup trucks (load capacity of up to 2,000 kilos), provided it becomes part of the taxpayer's fixed assets.[88] Additionally, this tax does not levy the sale of tractors and electric cars.[89]

With regard to the positive characteristics of this tax, for the first time mobile emissions are taxed and fuel consumption of the car is taken into account. These characteristics may encourage people to buy cars that are more efficient and incentivises the purchase of alternative sources of energy, such as electricity.

On the other hand, this tax fails to address one of the most polluting sectors such as transport of passengers. The non-application of this tax to heavy vehicles (e.g. transport buses, among others), light passenger transport vehicles and taxis is considered harmful as well, especially considering that GHG emissions in Chile have grown by 23% from 2000 to 2010 and the projection indicates that they will continue to increase. Moreover, emissions from the transport sector are projected to increase by 95% by 2030, which are mainly linked to passenger transportation. Even though the purpose of these exemptions discourage private car use, it has been criticised by the OECD because the passenger transport sector represents an important source of pollution for Chile.[90]

Overall, this tax is a good starting point for Chile. However, its limited scope of application does not maximise its potential, particularly by not taxing heavy vehicles and transporting vehicles, which are one of the main emitters of GHG.

86 Ley No. 20.780, article 3.

87 D.L. No. 825 of 1974 (VAT Law), article 2 number 2.

88 Ley No. 20.780, article 3 paragraph 6-9.

89 Ley No. 20.780, article 3 paragraph 7.

90 OECD (2016), p. 19.

3.4.4 Landfill

Chile does not have a sustainable waste management system. Only 11.8% of municipal waste is currently recycled[91].

Chilean legislation states that municipalities must collect and dispose of garbage and waste.[92]

Municipalities may charge its inhabitants for the cost of such service. Municipal Income Law[93] provides differentiated charging criteria according to extraction volumes and environmental programmes including recycling, all of which is determined by each municipality's regulation. In addition, it includes a general exemption for inhabitants whose housing fiscal value is equal to or less than 225 UTM, as well as the faculty to exempt certain people paying the fee for the service.[94]

The fee explained above it is not considered as a landfill tax, but only a payment for a service rendered by a local council for the collection and treatment of garbage and waste.

The fee charged by the local authority does not differentiate between industrial, mining or local waste. Furthermore, it is not carried out by the national tax authority nor is it supervised by the Ministry of Environment.

Unlike Chile, other jurisdictions have opted for the application of a specific landfill tax. The UK landfill tax is an example, which has achieved both environmental and economic improvement for the country.

Through the Finance Act (1996), the UK introduced a landfill tax in order to discourage landfill and to encourage cleaner and more efficient methods of waste treatment.[95] The taxpayers are landfill operators on the disposal of material at a landfill site. The cost of the tax is passed to businesses and local authorities through a fee for disposing of waste in landfill sites[96] and its rate depends on the type of waste.[97] As of April 2019, the standard rate is £91.35/tonne and the inert rate £2.90/tonne.[98] Such legislation provides some exceptions to the landfill tax such as mining and quarrying.[99]

The landfill tax has brought the UK a double dividend by adding tax revenues and obtaining positive results on reducing pollution arising from landfill. In this sense,

91 Ministerio de Medioambiente de Chile (2019), p. 79.

92 Código Sanitario (Sanitary Code), Article 11(b) and Ley No. 18.695, Constitutional Law of Municipalities, Article 3 (f).

93 Decreto Ley No. 3.063/1979, Ley de Rentas Municipales (Municipal Income Law), Article 5-11.

94 Decreto Ley No. 3.063/1979, Ley de Rentas Municipales (Municipal Income Law), Article 5-11.

95 Finance Act (1996), Part III section 39-71.

96 Finance Act (1996), Part III section 41.

97 Finance Act (1996), Part III section 42.

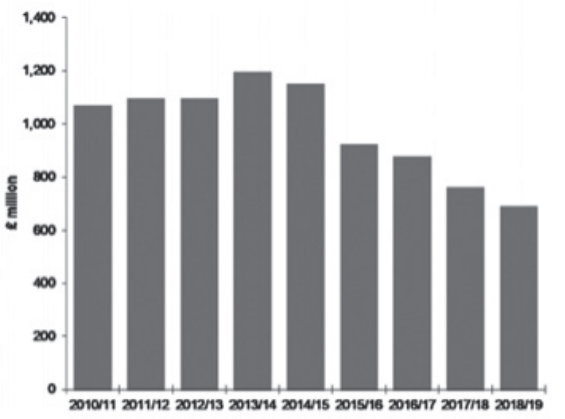
98 HMRC, Landfill tax rate https://www.gov.uk/government/publications/rates-and-allowances-landfill-tax/landfill-tax-rates-from-1-april-2013 Accessed on June 17, 2019.

99 Finance Act (1996), Part III section 44.

the landfill tonnage has decreased from nearly 6,000 tonnes (2011) to less than 2,000 tonnes (2018-2019).[100] According to an HRMC statistics report, such a decrease is due to the increase in alternative and cleaner alternatives of waste treatment, in particular incineration, recycling and composting.[101]

Figure 3 shows that during the year 2017-2018, the UK's revenues from landfill tax were £690 million in comparison to year 2010-2011, in which its revenues were over the £1,000 million. Although the tax rate has consistently increased each year, the revenues have considerably been reduced in the past 6 years because of the alternative waste treatments described above.

Figure 3. Total landfill receipts over the past six financial years.



Source HMRC UK Landfill tax statistics April 2019.[102]

Sweden is another satisfactory example, which achieved a practically unbeatable result of waste treatment. The inclusion of the landfill tax (2000) and its continuous 74%[103] rate increase (2002, 2003 and 2006) ensured that by 2013, 49% of waste was eliminated by incineration, 49% by means of recycling, leaving therefore only around 1%, which is sent to landfills.[104] Moreover, there has been an investment in the reutilization of this waste for energy creation through the incineration process.[105]

100 HMRC (2019), p. 2.

101 HMRC (2019), p. 1.

102 HMRC (2019), p. 1.

103 Milios (2013), p. 10

104 Milios (2013), p. 4.

105 Swedish waste management 2018, Avfall sverige at p. 4 https://www.avfallsverige.se/fileadmin/user_upload/Publikationer/Avfallshantering_2018_EN.pdf

3.4.5 Taxes on the mining industry

Net income arising from economic activities in Chile - such as mining, among others - is subject to First Category Tax ("IDPC"), which taxes income from capital, commercial, industrial, mining and service companies, among others. Additionally, the mining industry is subject to the following two specific taxes: payment of concessions or rights of extraction and exploration and a specific tax on mining profits[106].

The concessions or rights of extraction and exploration levies individuals or companies, carrying out explorations or extractions of minerals according to the amount of hectares of land.[107] The mining concession is an annual payment. Its amount is equivalent to one tenth of a UTM[108] for each complete hectare, in the case of exploitation; and to one fiftieth of a UTM for the same extension, in case of exploration.

Finally, the specific tax on mining profits affects individuals or companies whose sales during the respective fiscal year exceeded 12,000 metric tonnes of fine copper. Its progressive tax rate ranges from 0.5% to 5%.[109]

According to the OECD, both the mining concession and the specific tax on mining profits are still low.[110]

Notwithstanding the foregoing, the main concern arises from an environmental point of view. In this regard, neither the general CIT nor the two specific taxes applied for this activity take into consideration the "*polluter pays principle*",[111] as they do not levy negative externalities. The CIT tax rate only focuses on the net income; the mining concession levies the number of hectares of land explored or exploited and the specific mining tax the sale of metric tonnes of fine copper.

IV. ALTERNATIVE OR COMPLEMENTARY INSTRUMENTS FOR ENVIRONMENTAL PURPOSES

The objective of this chapter is to critically analyse other measures or instruments for environmental purposes, which may be included in addition or as an alternative to ERTs. It also identifies, from an environmental point of view, the tax preferences currently used in Chile. In addition, it includes examples of other jurisdictions that could contribute to the development of such policies in Chile.

106 D.L. No. 824 Ley sobre Impuesto a la Renta.

107 Chilean Mining Code, Article 142.

108 See note 57.

109 Ley No. 20.026 specific tax on mining activity, article 1.

110 OECD (2016), p. 31.

111 OECD (2016), p. 31.

4.1 Tax preferences

Several OECD countries use more than one instrument to achieve their environmental goals. ERTs include environmental negative externalities in the prices of products and services. Other instruments, such as tax preferences (also called tax incentives) use the modification of prices as well.

Tax preferences utilize the taxation system to modify prices in a favourable way, in order to promote consumers and producers towards the use/production of products and services, which are considered environmentally beneficial.[112]

Tax preferences are a kind of subsidy. This is because their implementation involves the non-receipt of an income by the government.

There are different types of tax incentives for environmental purposes. The most commonly used are the reduction of tax rates, exemption of taxes, tax credits against personal income tax, tax credits against corporate income tax and special depreciations.[113]

4.1.1 Political attractiveness versus efficiency of the measure

From a political point of view, the inclusion of tax benefits is quite popular, as these allow direct savings to the electorate (consumers and businesses), unlike ERTs, which are sometimes unpopular.

On one hand, ERTs increase the costs of products and services to discourage their production and consumption, so this mechanism may be seen as an undesirable punishment. On the other hand, tax incentives are perceived as a reward granted to those who have desired environmental behaviour. All things considered, there is an important political attractiveness in the inclusion of these benefits or subsidies.[114]

Notwithstanding, the OECD has strongly recommended being careful with the incorporation of tax benefits for environmental purposes. These instruments are recommended for certain cases, as they have a significant number of limitations that may generate undesirable effects from both an economic and environmental point of view in comparison to ERTs.[115]

4.1.2 Particularities and limitations of tax preferences in contrast to ERTs

As well as other types of subsidies, tax preferences are subject to several limitations, which call into question their environmental and economic effectiveness.

ERTs and tax preferences both modify market prices for environmental purposes. However, it has been argued that tax preferences are not a direct substitute for ERTs, as they work in a dissimilar way.[116]

112 Greene & Braathen (2014), p 5.

113 Greene & Braathen (2014), pp. 12-13.

114 Greene & Braathen (2014), p. 12.

115 Greene & Braathen (2014), p. 12.

116 Greene & Braathen (2014), p. 18.

The OECD's empirical evidence demonstrates that a well-implemented ERT, which increases the price of a product or a service, by including the value of the externality, is the most cost-efficient instrument.[117] ERTs ensures that consumers and industries take into consideration the externality in their decisions, as they have to pay for it. Therefore, there is an economic "incentive" to reduce the activity or products that generate such externality. Generally, households and industries will choose the lowest-cost available and this is a concept called static efficiency.[118]

Unlike tax preferences, ERTs encourages consumers and industries to invest in low emission and less polluting alternatives, as they are cheaper. In addition, they are mechanisms of promotion of innovation and development of cleaner technologies: a concept known as dynamic efficiency.[119]

Additionally, tax preferences may indirectly cause the increase of pollution because of the "rebound effect" phenomena. The latter mainly because, as tax preferences makes products or services become cheaper, indirectly there will be an incentive for consumers and industries to use it more.

The OECD's research gives the following example for this: "*If cars become more fuel-efficient, each kilometre of travel becomes cheaper, and users may respond by increasing the number of kilometres they drive*".[120] Therefore, in such cases the tax preference may encourage indirectly to pollute more.

However, this example only applies in certain cases and is not the general rule but it is still important to bear it in mind when designing environmental instruments.

Finally, tax preferences are expenditures for governments; meanwhile ERTs are a way to increase its revenues.

4.1.3 Positive characteristics of tax preferences

According to the OECD,[121] by 2014 there were more than 711 subsidies for environmental purposes. It identified 290 tax reductions for these purposes in 21 OECD countries.[122]

ERTs are proven to be more cost-efficient than tax preferences.[123] However, such affirmation does not mean that tax preferences should be avoided. Instead, the objective is to bear in mind their limitations when including them as instruments to tackle pollution and climate change.

117 Greene & Braathen (2014), p. 19.

118 Greene & Braathen (2014), p. 19.

119 Greene & Braathen (2014), p. 19.

120 Greene & Braathen (2014), p. 26.

121 OECD (2017b).

122 Greene & Braathen (2014), p. 13.

123 Greene & Braathen (2014), p. 19.

A particularly interesting characteristic of tax preferences is the possibility of creating positive externalities. It refers to the possibility to create social benefit through the encouragement of an activity through a subsidy to a party.[124] Examples are subsidies for investigation in research and development of new technologies ("R&D").[125] Another example of positive externalities are subsidies, through financial support to landowners, who include a higher standard than the regular ones for protecting and preserving the environment, for purposes of providing an ecosystem open for communities, water purification, wildlife, etc.[126] Finally, special beneficial tax treatments towards donations for environmental purposes are also seen as a positive externality, which may be addressed through tax preferences.

The inclusion of tax benefits as instruments to protect the environment can be beneficial, if well designed. In order to do this, first it is necessary to identify an issue or problem that needs to be solved. Secondly, set an objective and a deadline for measuring this objective. In this regard, it has been shown that many subsidies granted years ago have been inefficient or unnecessarily prolonged. If a subsidy is not cost-efficient, it should be revoked. In addition, it is important to publish information and make citizens aware of the benefits that these instruments would bring.

The incorporation of tax benefits must take into consideration the particularities of the tax system in which they will be incorporated. Ideally, to avoid high administrative costs the OECD advises having simple and objective parameters. Otherwise, it can generate tedious and expensive administrative work.[127]

4.1.4 Tax preferences in Chile

In Chile, there are different categories of tax preferences and investments in environmental policies. Among others, there are a small number of subsidies on energy (gas and heating), tax credits for solar water heating systems, investments in R&D, some exemptions from emissions tax and an implicit support for fossil fuel.

- *Subsidies on energy (gas and heating)*

Generally, there are no subsidies on energy in Chile. However, Magallanes region is an exception, as it has a special gas subsidy due to its cold temperature and far south location.[128] Such subsidy consists on a more favourable gas tariff for the Magallanes' households, which goes up to USD 1,950 per customer approximately.

According to the IEA, such subsidy is extremely high. Instead, the organisation proposes to invest that sum in energy efficiency for the region.[129]

124 Greene & Braathen (2014), p. 20.

125 Greene & Braathen (2014), p. 20.

126 Greene & Braathen (2014), p. 21.

127 Greene & Braathen (2014), p. 6.

128 Decreto Ley N° 323, of 1931, article 34 amended by Ley N°20.999, article 1 No. 32.

129 International Energy Agency (2018), p. 74.

- Tax credit for solar water heating systems

The Chilean government created a tax benefit applicable, from 2009 to 2020,[130] to solar thermal water heating systems used for low-income households.[131] This subsidy grants a tax credit for construction companies, which build low-income community housing with solar water heating systems producing a minimum of 30% of a household's annual hot water demand.

In addition, the amount invested in the purchase and installation of the equipment is allowed to be deducted from their CIT monthly provisional payments. The deductible amount is progressive ranging from 20% to 40% according to the value of the property (i.e. land and house), the lower the price of the property is, the higher the deduction.[132] In some cases, the construction firms are able to deduct the solar system device installation by 100%.

According to the UN climate change commission, there are more than 3.000 houses using solar water collectors in the central regions of Chile, allowing households to save USD $300 a year.[133]

This tax benefit lasts until 2020. The OECD advises that tax preferences should be established for a fixed period.[134] Considering the above, the limitation of time from 2009 to 2020 is in that same line.

- Investment in R&D

Chile has been historically the lowest investor in R&D in energy technology out of all members of the OECD, spending less than 0.5% of its GDP.[135] Since 2015, Chile started planning to double its budget for R&D for clean energy purposes and through encouraging private sector to invest as well.

Chile has invested in a solar energy program in the desert of Atacama oriented on the future exportation of energy. In addition, Chile invested in a lithium strategy for the creation of a Solar and Mining technology institute financed by public and private entities in a 27-year agreement of cooperation. Since 2010 there are more than 10 centres dedicated to the investigation of energy efficiency.[136]

- Exemptions to the fixed and to the mobile emissions tax

As already mentioned, (chapter IV, 5), electric cars, heavy weight vehicles and transport vehicles are exempt from the mobile emission tax. In addition, fixed source

130 Ley No. 20.365, article 7.

131 Ley No. 20.365, article 1.

132 Ley No. 20.365, article 4.

133 United National Climate Change, "*Best Energy, Solar Hot Water – Chile*" https://unfccc.int/climate-action/momentum-for-change/activity-database/best-energy--solar-hot-water Accessed on June 26, 2019.

134 Greene & Braathen (2014), p. 6.

135 International Energy Agency (2018), p. 173

136 International Energy Agency (2018), p. 167.

emissions are exempt from the fixed emissions tax as long as they use renewable energies or biomass fuel.

The OECD has advised Chile to broaden the vehicle tax to commercial and transport vehicles, taking energy efficiency and amounts of NOx emissions into consideration for its determination.[137] On the other hand, the exemption for the fixed source emission tax using renewable energies goes in the same line of recommendations of the OECD. However, there is still a need to increase its tax rate.

- Fossil fuel indirect subsidy

There is an indirect subsidy for fossil fuels. Their price is determined through a mechanism which reduces the tax rates on petrol and diesel when international fuel prices are above a certain price and raises them when international prices are lower with a cap.[138]

The OECD has advised Chile to examine this mechanism as it works as an implicit or indirect subsidy to fossil fuels.[139]

4.2 Tradable pollution permits system

The main focus of this research are ERTs and tax incentives aimed at protecting the environment. Notwithstanding the above, this chapter examines tradable pollution permits, since this measure has been used by different countries to protect the environment in a complementary way to ERTs and tax incentives. For this reason, it is important to evaluate and analyse its incorporation into the Chilean legislation, especially in light of its inclusion within the Tax Reform 2020.

A tradable pollution permit is a regulation through which a government grants a permit to an entity for carrying out a certain regulated activity, which may have environmental impacts, setting a cap of pollution allowed for carrying out such activity. In the event that the holder of the permit pollutes less than the cap, it may transfer such amount to third parties within a special market of permits.[140]

These types of permits are generally used to regulate the amount of emissions or pollution of a determined activity.

There are several positive characteristics of these measures. The idea of putting a price to pollution or emissions is an incentive to invest in cleaner technologies and to pollute less as there will be a direct saving made. In addition, governments can set in advance an amount of pollution which will be tolerated. Consequently, there is certainty regarding the amount of pollution, unlike other mechanisms that depend on the behaviour or reaction of industries and households toward the implemented measure.

137 OECD (2016), p. 31

138 Ley N° 18.502, article 6.

139 OECD (2016), p. 31

140 European Commission (2016), pp. 1-2.

Reports of the EU commission established that these measures have been cost-efficient, at least for cutting greenhouse emissions, as it forces the actors to find the way to reduce emissions.[141] The EU created one of the first and more developed markets of emission trading systems, which represents three quarters of the world's carbon trading. The GHG covered in the EU emission trading systems are Carbon Dioxide (CO2),[142] Nitrous Oxide (N20)[143] and Perfluorocarbons (PFCs)[144] arising from sectors as power and heat generation, energy intensive sectors, civil aviation and production of nitric and aluminium among other metals.

In terms of GHG emissions from power stations and fixed installations, the EU commission has issued a report stating that these are being reduced by 1.74% from 2013-2020, so by 2020 GHG emissions will be 21% less than in 2005.[145] This is the principal measure used for reducing the GHG emissions in the EU. The challenge that now faces the EU is to reduce emissions by 43% by 2030, in comparison to 2005.[146]

The OECD on the other hand, firmly believes that emissions trading systems should be auctioned for considering this measure as effective and it recommends no free allocations of permits.[147] Furthermore, recent studies of the OECD provide that these measures can only work under well-designed and large markets, which is not always easy to achieve, especially for developing countries and emerging economies.[148]

Furthermore, OECD reports also argue that these measures have to be compared with ERTs results in practice, in order to determine which are more effective.

Finally, it provides that trading systems may perform better than ERTs in case is essential to reach a particular level of pollution, which is possible to be determined in advance. In terms of the trade of the permit price, it will only be known at the moment of the trade; meanwhile the price of the tax is known in advance. It argues that knowing the price of the tax in advance may work as an incentive that might help the actors to reduce the amount of pollution and therefore its expenses.[149] Consequently, ERTs may be a stronger incentive for improving the environment than trading systems.

141 European Commission (2016), pp. 1-2.

142 See European Commission (2016), pp. 1-3. "Power and heat generation • Energy-intensive industry sectors including oil refineries, steel works and production of iron, aluminium, metals, cement, lime, glass, ceramics, pulp, paper, cardboard, acids and bulk organic chemicals • Civil aviation".

143 European Commission (2016), pp. 1-3.

144 European Commission (2016), pp. 1-3.

145 European Commission (2016), pp. 1-2.

146 European Commission (2016), pp. 1-2.

147 OECD (2017), pp. 12-13.

148 OECD (2017), pp. 12-13.

149 OECD (2017), pp. 12-13.

4.2.1 Carbon market in Chile

The Tax Reform 2020 includes the creation of a local carbon market for taxpayers subject to CO2 emissions tax.[150] This policy provides the possibility for taxpayers to allow the offset of the CO2 emissions through its trading within a local market. These operations will be under the regulation of the Ministry of Environment.

The creation of a carbon market can bring environmental benefits. Chile will be one of the pioneers in the region for these types of policies.

Nevertheless, the Tax Reform 2020 establishes that the Ministry of Environment will determine, by means of an administrative resolution, all details of the carbon offset market. This gives rise to doubts about its functioning and its effectiveness.[151]

Specifically, it would be interesting to clarify certain details that would be essential for the proper functioning of the project. In the first place, there is a need for research validating that Chile's internal market could achieve the desirable effect of tradable CO2 emissions. Additionally, trading such permits regionally should be evaluated, considering that Mexico and Brazil also have their own carbon markets. In this sense, OECD research has affirmed that these types of policies may be easier to achieve in the case that trade is carried out within large markets, such as the EU emission trading market.[152]

Secondly, there is no information on the maximum percentage of emissions that can be offset by each taxpayer. Neither if those emissions can be offset between entities of any sector or just within entities of the same sector. This lack of detail in the Tax Reform 2020 generates uncertainty as to what the incentives would be for promoting investment in research and technologies for environmental purposes.[153]

In this regard, UN ECLAC's report for tradable carbon permits in Latin America provides that the "offset" system, which is the method proposed in this tax reform, is a valid alternative that in case of an appropriate implementation may encourage the investment in the reduction of GHG in an efficient way.

Furthermore, the report also affirms that the offset method of cap-setting and trade enables this credit of emissions to be bought, not only from the same sector, which has the pre-established cap of emissions, but also from other sectors which do not have such a cap. In order to validate the credit, the proponent must demonstrate that the reductions are real and additional to any regulatory requirements (i.e. they are the result of a practice other than business-as-usual, and permanent).[154] In this

150 Bill of law No. 107-366 of 2018 (modernization of the tax system), article 16 No. 10, which adds additional final paragraphs to article to Ley No. 20.780, article 8.

151 Centro Democracia y Comunidad (2018), pp. 78-79.

152 OECD (2017), pp. 12-13.

153 Centro Democracia y Comunidad (2018), pp. 78-79.

154 Brandt & Westendarp (2014), p. 24.

regard, the Tax Reform 2020 affirms that the Ministry of Environment will have a register of authorised external auditors who are duly trained to validate reductions in CO2 emissions.[155]

Finally, the Tax Reform 2020 does not mention if there are plans to include an offset from other GHG emissions different from CO2, such as Nitrous Oxide (N20) and Perfluorocarbons (PFCs).

Overall, the inclusion of a cap and trade system in Chile as a complement to the rest of the measures already implemented may become an efficient tax policy for environmental purposes. However, still there is not enough information to determine the efficiency of its design.

V. RECOMMENDATIONS FOR CHILE

Chile has made important steps forward towards the protection of the environment from both a local and a global point of view.

In terms of ERTs, as from the 2014 tax reform,[156] Chile became a pioneer in Latin America on the taxation of emissions. Regarding tax preferences, it grants tax incentives for energy efficiency purposes and also contributes with significant investments in R&D. Additionally, the Tax Reform 2020 proposes improvements to the emissions tax by broadening its scope of application.[157] Furthermore, it creates a local market for the trade of carbon emissions.

Whilst recognising the country's progress, the author believes that this tax system needs to be enhanced in order to achieve efficiency and a real impact on the improvement of the environment. Likewise, goals and recommendations should be ambitious yet realistically achievable.

The recommendations described below do not propose to earmark revenues arising from ERTs. The author believes it is an inefficient use of public resources from a long-term point of view, mainly because the inflexibility of earmarking may be counterproductive.

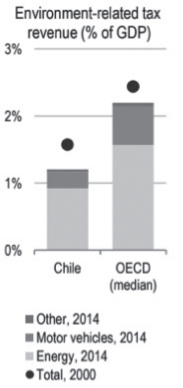
Regarding the percentage of GDP coming from environmental taxes, the OECD's research demonstrates that Chile's ERTs revenue continues to be below the average of OECD members. Figure 4 shows that it represents only 1.2% of its GDP, whilst the average of OECD members is 2.2%. This means that there is room for increasing the tax burden on environmental taxes.

155 Bill of law No. 107-366 of 2018 (modernization of the tax system), article 16 No. 10, which adds additional final paragraphs to article to Ley No. 20.780, article 8.

156 Ley No. 20.780, amended by Ley No. 20.899.

157 Bill of law No. 107-366 of 2018 for the modernization of the tax system.

Figure 4. ERTs revenues (% of GDP)



Source: OECD (2017), Green Growth Indicators Database[158]

Considering the above, this work proposes recommendations for ERTs as well as for other environmental measures, which are described in the next section.

This work recognises that the design of taxes must be complemented by a numerical and economic simulation. However, these recommendations are made under a legal and environmental perspective rather than from an economic point of view, as the latter exceeds the scope of this work.

5.1 Recommendations on ERTs

5.1.1 Mining taxes

Chilean legislation has gradually increased the taxation of mining activity.[159] However, the design of the three taxes applied to this sector does not take into account its negative externalities. The applicable taxes only levy net profits (CIT),[160] the amount of hectares granted for mining exploration or exploitation (concessions of extraction and exploration)[161] and the sales of fine copper (specific tax on mining profits).[162]

These taxes should also include the social cost of its negative externalities. The latter may encourage the mining sector to invest in R&D for environmental purposes, incentivising this industry to generate less pollution. At the same time, it may increase Chile's tax revenues. Consequently, the additional revenues arising from the taxation of these externalities may enable the reduction of other distortionary taxes.[163]

158 Source OECD (2017), Green Growth Indicators Database http://dx.doi.org/10.1787/888933671679

159 Law 20.026 specific tax on mining activity, article 1.

160 Decreto Ley No. 824 of 1974, Article 14 B and 14 B (Chilean Income tax law).

161 Chilean Mining Code, Article 142.

162 Ley No. 20.026 specific tax on mining activity, article 1.

163 Pearce (1991), pp. 938-948.

It is important to point out that the mining activity is a sensitive area for the Chilean economy. Therefore, in order to avoid an FDI reduction in the mining sector, the indicated measures could gradually be included over an extended period of time.

5.1.2 Specific tax on fuels

The specific tax on fuels was originally included as a way to increase Chile's revenues for its reconstruction after the 1985 earthquake.[164] The objective was achieved a few years after. Therefore, 34 years later, Chile needs to design its taxes according to the new challenges it faces, which, among others, is the protection of the environment and reduction of pollution.

The specific tax on fuels does not address negative externalities. The fuel price stabilisation system is a demonstration of this,[165] which reduces the tax rates on petrol and diesel when international fuel prices are above a certain price, and raises them when international prices are lower with a cap. This mechanism, instead of taxing externalities to discourage demand, operates as an indirect subsidy to fuels.[166]

Additionally, it provides a tax rate which is four times higher for gasoline (6 UTM/m3) than for diesel (1.5 UTM/m3), even though the latter is more polluting than the first.[167]

Chile should consider amending this tax, making diesel more expensive than gasoline and ending the stabilisation price method.

5.1.3 Taxes on emissions

The taxation of fixed and mobile emissions has been a step forward for Chile. However, both taxes can be enhanced in order to truly protect the environment and be more effective, rather than acting as a mere symbolic measure.

Regarding the tax on fixed sources, the IEA's research demonstrates that its design and rate (USD $5/tonne)[168] can only reduce emissions by 1.32%.[169] This reduction is far from Chile's commitment agreed in the Paris agreement.[170] In addition, this tax only levies emissions from the energy sector, even though the transport, agriculture, mining and forestry sectors, amongst others, are also responsible for the emissions generated by Chile.[171]

On the other hand, there are investigations that have determined that the significant increase in the tax rate to the energy sector would bring considerably negative effects for the economy.[172]

164 García Bernal (2018), p. 2.

165 Ley N° 18.502, article 6.

166 OECD (2016), p. 31.

167 Ley N° 18.502, article 6, a) and b).

168 Ley No. 20.780, article 8 amended by Ley No. 20.899.

169 International Energy Agency (2018), pp. 13-14.

170 Gobierno de Chile (2015), p. 12

171 Mardones & Muñoz (2018), p. 2547.

172 Mardones & Muñoz (2018), p. 2560.

In this respect, Chile should start by taxing most of the sectors generating GHG emissions, rather than only the energy sector, and additionally raise its tax rate gradually. Consequently, the tax rate could be lower and spread through different sectors and actors and therefore the economy would not be significantly affected. The key point is to find a balance between protecting the environment to fulfil or be as close as possible to fulfilling the commitment of the Paris Agreement and to protect the economy without submitting to risky consequences.[173]

Regarding the mobile emission tax, which levies the sale of new vehicles according to a formula, which takes into consideration the fuel consumption performance, and emissions of the vehicle, there are also a few recommendations.

Currently this tax does not levy heavy vehicles (e.g. transport buses, etc.), transport vehicles or taxis.[174] The foregoing despite the fact that the transport sector and heavy weight vehicles are particularly more polluting than regular vehicles, which are currently the only cars subject to this tax. On the other hand, not taxing electric cars is a significant advancement.

In this sense, Chile should broaden the scope of this tax by including all types of vehicles described above, excluding electric cars. Finally, the determination of the tax should take the efficiency of the car more into consideration.[175]

5.1.4 Landfill tax

One of the most deficient aspects of environmental policies in Chile is its waste management. Almost all waste is sent to landfill instead of being recycled or incinerated.[176]

The inclusion of a landfill tax may encourage Chilean households to create less waste. Companies may be stimulated to invest in R&D for efficient processing of its waste, which may include recycling, incineration and composting. It is essential to apply the "polluter pays" principle and charge the polluter for its negative externalities to discourage landfill. In this regard, the UK and Sweden's policies have given successful results.[177]

In addition, on the one hand, the introduction of landfill tax would increase government's revenues and, on the other hand, it may enable the reduction of other distortionary taxes.[178]

Finally, there is a risk of illegal dumping because of the application of this tax. However, the author believes that the technical capacity of the Chilean tax authority working in collaboration with municipalities for the assessment, collection and prevention of tax avoidance should be efficient, as has occurred in other jurisdictions.

173 Mardones & Muñoz (2018), p. 2560.

174 Ley No. 20.780, article 3.

175 Ley No. 20.780, article 3: "Tax determined in UTM = [(35 /urban performance (km/lt)) + (120 x g/km of NOx)] x (Sale price x 0,00000006)".

176 OECD (2016), p. 24.

177 OECD (2014), p. 4.

178 OECD (2018), p. 64.

5.2 Recommendations on other measures

5.2.1 Tax preferences

A well-implemented ERT should be more cost-efficient than a tax preference.[179] However, it is also true that tax preferences may work efficiently as a complementary measure.

The success of tax incentives will depend on their design's efficiency. In this regard, it is important to identify a problem, set an objective and determine a particular tax incentive to solve it. All of this must be done within a certain period of time and must be constantly assessed.

Chile has included successful and well-designed tax preferences for solar thermal water heating systems and recently included tax incentives for purposes of encouraging R&D in energy efficiency.

The recommendations for Chile regarding incentives are to consider them as a complement to the current and proposed ERTs described in this research.

Specifically, Chile should re-evaluate the indirect incentive on the specific tax on fuels. Additionally, it should create a tax incentive for waste management focused on recycling and incineration for purposes of energy generation. In this regard, the concept of positive externality[180] is significant, as it may encourage households and companies for a cleaner and more efficient waste management. Finally, the subsidy for gas destined for the region of Magallanes could be gradually eliminated and that expenditure could be used for improving energy efficiency and energy infrastructure in that region.[181]

5.2.2 Carbon market

The Tax Reform 2020 proposes the creation of a local carbon market in Chile, which will work according to the offset method.[182] However, the details of such system will be determined by the Ministry of Environment through an administrative ruling, which has not been issued yet. Therefore, there is still not enough information.

However, in any case it can be recommended to evaluate if the Chilean market will be able to be efficient and achieve the objectives it has set itself. Otherwise, Chile should evaluate whether to join the rest of the Latin American countries that use this system in a common market or not. The OECD's research affirms that these measures can only work under well-designed and large markets, which is not always easy to achieve, principally for developing countries and emerging economies.[183]

179 OECD (2017), p. 7.

180 Greene & Braathen (2014), p. 20.

181 International Energy Agency (2018), p. 74.

182 Bill of law No. 107-366 of 2018 for the modernization of the tax system, article 16 No. 10

183 OECD (2017), pp. 12-13.

VI. CONCLUSION

Climate change and environmental protection are one of the greatest challenges of this century.

From a local point of view, the air pollution in Chile is at a critical level and is very harmful to the health of its inhabitants. From a global perspective, this country is not a major contributor of GHG. However, Chile and the rest of the Latin American countries are extremely susceptible to suffering the damage and consequences generated by climate change.

According to the principle of common but differentiated responsibilities, every country must take action to face the challenges of climate change according to its technical and economic capacities. Also, the most developed countries should provide additional assistance to developing countries. Taking this into account, Chile committed to reduce its emissions by 30% (or 45% in the event of receiving additional aid) in the Paris agreement.

The international community has recommended tackling climate change and pollution by various means that may be complementary.

One of the most effective ways of doing this is through ERTs. In addition, the inclusion of a carbon market or cap and trade system and tax incentives for renewable and efficient energy has been recommended. Notwithstanding the foregoing, technical organisations involved in the design of tax policies, such as the OECD, the EU economic commission and the IEA, have pointed out that the good results of cap and trade and tax incentives should not be taken for granted, since they do not always have the expected results. Generally, ERTs end up being more effective from both an economic and environmental perspective. However, such measures should not be discarded but rather evaluated economically through studies and integrated, if necessary, as a complement to ERTs.

This research shows that Chile is on the right path by implementing ERTs, making it one of the pioneers in the region. This is clearly a good starting point.

However, while such taxes should deliver an environmental improvement, it would not be significant enough. Not even the Tax Reform 2020, which includes new policies such as the creation of a carbon market, about which there are no details yet, would grant the sufficient and ambitious measures needed for tackling climate change and local pollution.

Moreover, Chile is far from fulfilling its commitment under the Paris agreement and is not managing to eliminate its local pollution. That is why, without detracting from the inclusion of ERTs in Chile, the author firmly believes that an additional effort is required, which is hoped to be achieved in the near future.

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