“Dynamic effects of FTA’s for Chile: How much to expect?”

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Abstract

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1 Introduction

The past few years Chile has engaged in several Free Trade Agreements (FTA's). Often enough economists argue that trade liberalization is "good per-se" since it increases competition, promotes efficiency for the economy and, in the end, improves general welfare for the consumer. However most of the time there is not enough serious analysis of the real effects of these policies. As most economic policies, there are both winners and losers. Some sectors/households will probably benefit more then others and hence will be very supportive of the increase in trade. On the other hand, some other sectors/households may not perceive much at all, or even worse; they may confront negative effects from a free trade agreement. In order to anticipate these effects it is necessary to analyze these agreements using good economic analysis.

Furthermore, today a FTA is more than trade, or so is it often argued. Since tariff barriers have been reduced in the past decades, the main barriers to trade are now non-tariff barriers, such as phyto-sanitary, restrictions and distortion in agricultural markets, issues related to trade in services, intellectual property protection, etc.. Measures on investment, either through special investment chapters in FTAs or within investment promotion and protection agreements, are also fundamental in evaluating the impact on the domestic economy. Investment is a milestone in the development path of a country and will affect the dynamics of any long-term analysis.

Therefore, when negotiating a FTA, a set of economic policies and measures are taken simultaneously and the impacts spill over the whole economy. Cause-effect chains are difficult to identify and positive and negative impacts can balance or reinforce themselves, being impossible to determine in a partial analysis contexts.

Some OECD countries, regional unions (EU) and multilateral institutions have developed Sustainability Impact Assessment Methodologies and frameworks, where economic tools for integrate evaluation are presented. Thus, both USA and EU use to apply computable equilibrium models to study the impacts of their FTAs (De Miguel & Nuñez, 2001). Computable General Equilibrium (CGE) models have a long tradition analyzing trade issues in static and dynamic frameworks, both from a national and a global contexts. In the eighties, the CGE models were used as an instrument for the analysis of trade policies and strategies, mainly in the developing countries. Nowadays, CGEs have become a standard method for the analysis of a wide variety of policies: trade, taxation, structural changes, foreign exchange, social, environmental, etc.

CGE models can also give some lights on the current discussions about how to obtain more benefits of an economic opening and integration to the global economy. Timing and process matters. Unilateral tariff reductions, bilateral FTA, regional agreements, "additive regionalism", open regionalism, etc. are different strategies with different consequences for the development path of a country (Harrison et al. 2002, ECLAC 2002). This paper will contribute to this discussion.

In the following chapter, CGE dynamic models and some applications to FTA assessment will be briefly presented. The characteristics of the dynamic version of the ECOGEM-Chile model are discussed in chapter 3. Chapter 4 shows some results. The paper concludes with some recommendations

2 Review of Literature

2.1 Dynamic Models

Although most models applied are static, interest for long-term forecast and analysis of trends enhanced the development of dynamic CGE models. Dynamic models incorporate explicitly the accumulations processes of an economy (in particular, investment), increasing the predictive capability. Nevertheless, they increase the complexity of the assessment, adding the trends of the economic variables to the their inter-relations in an specific moment of time. Accumulation and distribution processes determine the final result. Therefore, there is a trade-off between sectors` desegregation and dynamic specification (Pereira & Shoven, 1998). Dynamic CGE's are based on the neoclassic growth models, where optimum inter-temporal path of consumption is determined, therefore of savings.

Steady-State models are the simplest. Rate of growth of all relevant variables, in per capita terms are zero. Thus, in practical terms, they are static models where steady state conditions with respect to investment are satisfied. Recursive dynamics models assume that agents are myopic; therefore, they do not incorporate future in their current decisions. Each period is solved independently, although the evolution of the capital stock links one period with another. The model present two part: a static component, which solves the intra-period equations, and a dynamic module determining the relations between periods and allowing inter-temporal changes in relevant variables and parameters. This feature allows simulating different transitional paths from the initial situation of the economy to the final one, making possible the analysis of different public policy exercises. The model ECOGEM-Chile belongs to this group of models and dynamic equations are presented in chapter 3. Forward-looking CGE models allow inter-temporal optimization processes where agents foresee future and there is certainty. Empiric evidence suggests that agents incorporate some expectation about the future in their decision although they never maximize an infinite utility. Recursive models can also satisfy inter-temporal optimality under certain conditions and, if new technologies are introduced, they can be superior (Stephan, 1993). Depending on their structure, the algorithm to calibrate the model may differ. Recursive models prefers Gauss-Seidel Algorithm (GREEN model: Burniaux et al. 1992), meanwhile forward looking models use a Fair-Taylor type algorithms (G-Cubed model: Mckibbin et al 1992). Both GAMS and GEMPACK packages incorporate them (Brooke et al. 1992, Codsi et al 1992).

Dynamic effects compound initial output welfare effects over the medium-run, and can magnify income gains and losses. How much accumulations effects will supplement static ones depends on

a number of factors, including marginal product of capital and underlying savings behavior. Thus, log-run implications of income, saving and investment changes are assessed.

Most applications with dynamic models are focus on international trade and foreign policies, tax reforms and fiscal policies, and growth strategies, mainly related to investment; meanwhile structural adjustment issues, poverty and income distribution have less weight. Environmental issues and, in particular, environmental and trade relations are increasingly studied.

2.2 Trade related Models:

Different topics are analyzed in trade-related dynamic CGE models: impacts from unilateral trade liberalizations (Zarazaga 2000), migration in a contexts of trade liberalization (Cogneau & Tapinos 1995), regional trade integrations (Park, 1993), trade reforms (Diao et al 1998), Agriculture and trade (Storm 1997), external penalties (Canes 2000), environmental impacts of trade agreements (Gale 1994) and trade and environment linkages (Vennemo 1997). Dynamic impacts of trade liberalizations are extensively explored in trade literature (Baldwin et al 1999, Smith 1977, Srinivasan et al 1980). Several studies of the Uruguay Round have also incorporated variations on this mechanism.

Several trade related applications with CGE models, static and dynamic, have been discussed in Chile. Harrison et al (2001, 2002) used a multi-sector multi-country CGE model, named GTAP (Global Trade Analysis Project), to compare different trade policy options. Different forms of integration between Chile and Mercosur and Chile and NAFTA are considered –custom union, free trade area- and compared to multilateralism. The article starts defining Chile´s strategy of negotiating bilateral free trade agreements with all of its significant trading patterns as "additive regionalism". It concludes that, due to preferential market access, additive regionalism is likely to provide Chile with gains that are many multiples of the static welfare gains from unilateral free trade. Holland et al (2002) assess imperfect labor mobility, urban employment an agricultural trade reform (considers price bands of selected commodities) using a GTAP framework. Some dynamic CGE models have also been applied to assess trade in Chile. The Sustainable Impact Assessment (SIA) of the trade aspects of negotiations for an Association Agreement between the European Commission and Chile (2002) also includes a GTAP-type CGE model for the evaluation of the initial economic effects. Beghin et al. (2002) assess the growth, trade and environment nexus in a comprehensive framework applying the TEQUILA model. NAFTA and MERCOSUR scenarios are simulated. This a highly disaggregated model, both in sector and in trade partners although it is not a multi-country. ECOGEM-Chile model is an adapted version of this one. GTAP-framework, being multi-country, can be more accurate to assess feedbacks among trade-partners, although there is a trade-off with a detailed assessment of intra-country impacts. *Coeymans and Larraín (1994)* carried out a study of the consequences of Chile joining NAFTA. The model is set up for a small and open economy, and includes six productive sectors and 3 regions that trade with each other (Chile, U.S., Rest of the World or ROW). Data used for this study comes mainly from the I/O table of 1986. The results indicate that an agreement

between Chile and the U.S. would generate a new pattern of trade composition with the U.S. and that in general, a series of benefits would follow the agreement. This final model includes a feature to model foreign investment dependant from country-risk premium. The hypothesis is that when an agreement is signed the will send a signal to the market of Chile's reliability and therefore reduce risk premiums. This would consequently increase foreign investment in Chile. However this model was solved only statically, and dynamic allocation was not modeled.

FDI and closure rules

There is some evidence that suggests that an important feature in modeling trade agreements is the effects of foreign direct investment (Coeymans and Larrain, 1994). Most models that take this into account are multi-region models that need a "rule" to allocate financial resources between countries. In a fully competitive market, capital should be allocated to equal the relative rate of return across sectors and regions, taking into consideration other factors such as risk premiums.

The problem here is to account for differences in FDI across countries, that not always respond to relative rates of return only. A few models that have taken this into account. The MIRAGE model developed by CEPII (Hedi Bchir et. al., 2002), incorporates a feature distinguishing two types of investment. The first is composed by local and foreign investment that is allocated according to relative rates of return to capital and is determined endogenously, whereas the second is constituted by FDI exogenously allocated to specific sectors. A second model that deals with the issue of FDI is the GTAP model that may allocate investment through a "global" bank according to several rules. In practice these "rules" have been set in a relatively poor way, since the CGE models do not include financial markets.

Non tariff barriers (SIA)

Trade measures being negotiated in a FTA go further than just tariff reductions. In most industrial sectors tariffs are the main element of protection; nevertheless, in sectors as agriculture, forestry, etc, tariff quotas, technical barriers (among them sanitary and phyto-sanitary regulations), differences in product and process regulations among trade partners are even more important. Issues related to trade in services also matters. When modeling a trade agreement, it is expected to describe its full impact, including all these types of measures. Generally an equivalent reduction in existing protection due to all trade-related measures is estimated. Thus Planistat (2002) included tariff reductions, market access, rules related measures and sanitary and phyto-sanitary issues in the assessment of EU-Chile FTA (for example, in mining and forestry, protection reduction was caused by rules-related measures; meanwhile in agriculture, fisheries or food, tariff and sanitary issues were the measures behind). Therefore, to analyze the full economic benefits an a FTA and to develop mitigating and enhancing measures it is necessary to include all trade measures in the model explicitly or implicitly.

2.3 Trade Policy in Chile 1990-2003

For over three decades Chile has engaged in serious liberalization of the economy. Regarding trade, Chile has set three complementary strategies as its trade policy, so called "Open Regionalism". These are (a) Unilateral opening; (b) Bilateral Negotiations; and (c) Multilateral Negotiations. The first strategy has consisted in reducing tariff from 15% in 1990 to the current level of 6% for all products regardless of it origin or value[1].

Additionally Chile has signed Free Trade Agreements with several countries as part of its bilateral strategy. The countries and regions are: Mexico, Canada and the USA; Central America, European Union, European Free Trade Association and South Korea. There are also other agreement of economic complementation with: MERCOSUR, Bolivia, Colombia, Peru, Cuba and Venezuela.

On the third side of the Chilean strategy, Chile is an active member of several discussion groups such as WTO through the CAIRNS group, APEC and OECD. Mainly in the CAIRNS group Chile advocates for eliminating farm subsidies in the US and the EU.

3 The Dynamic ECOGEM Model for Trade Policy Analysis and Data

The Dynamic ECOGEM model is a CGE model based on the CGE model developed by Beghin et al (1996). It a dynamic recursive model from which the static component of the model can be found in O'Ryan et.al. (2003). The basic assumptions of the static model that are also part of the dynamic version, include the following: a static model with multiple sectors, labor differentiation, income-group differentiation, trade partners, and specified productive factors, among other features. It is a neoclassical model, which is savings driven. It incorporates energy-input substitution to reduce emissions, as is common, because the emissions are related to the use of different inputs as well as to production and consumption levels. Production is modeled as CES nested function with constant returns to scale, while consumption assumes an ELES function, that includes savings as future consumption. The foreign sector is modeled with the Armington assumption (through CES/CET nested functions in two levels) that domestic production and imports are imperfect substitutes, whereas the domestic production is also an imperfect substitute for exports. For both cases imperfect substitution is also assumed for products from/to different regions. Other final demands (government expenditure, investment expenditure and transfers are assumed as fixed shares).

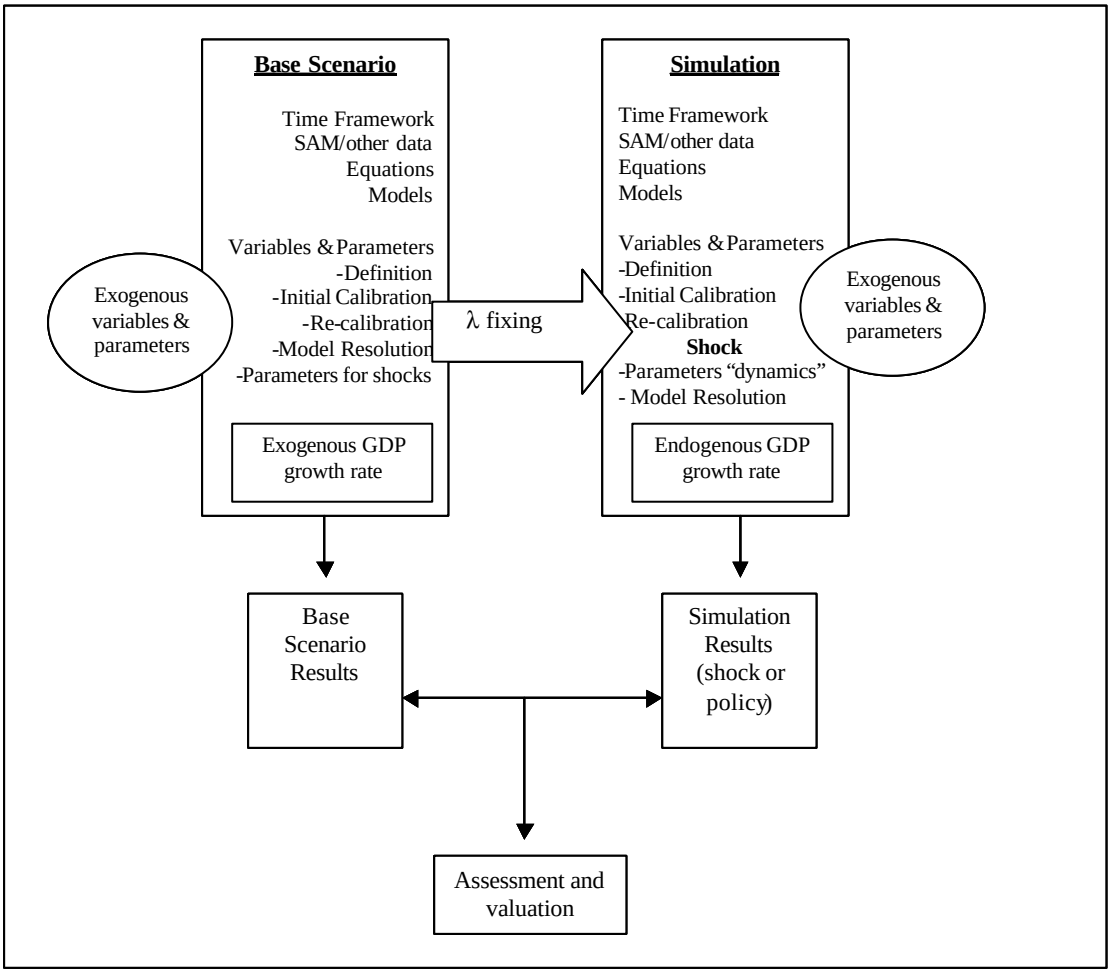
The dynamics in the model are accomplished by including a behavioral equation for investment, which is the key variable that links one period to another. Savings (Investment) in period T is

[1] Exceptions of course are products with FTA's already negotiated (MERCOSUR, Mexico, Canada, USA and the EU).

allocated as new capital in period T+1. Investment is allocated across sectors until the relative rate of return is equalized between sectors, unless a given sector is reducing it output. It that particular case the sector may disinvest part of it capital depending on the disinvestments elasticity. The other relevant variables in the dynamic model are the GDP growth rate, population growth rate and labor productivity growth rate. The variables are exogenous variables in the base case scenario, and they are endogenized for the consequent simulations, except the population growth which is always exogenous.

Growth in the model is assumed *à la Hicks* since labor productivity and GDP growth determines capital productivity endogenously. A summary of how the scenarios are solved is included in the following figure.

Figure 1: Running the model



Data and Initial Trend

For the present paper we use the 1996 social accounting matrix (SAM) for the Chilean economy (O'Ryan et. al., 2002). This matrix has 73 sectors, 20 types of labor, 10 households and 30+ trading partners. However, in order to understand the interrelations between variables, and the adjustment process during the shocks in the dynamic framework, we have aggregated this matrix to 25 sectors, 2 types of labor, 5 households and 5 trading partners. These are presented in the following table.

Table 1: Model Aggregation

Sectors		**Labor**	**Households**	**Trade Partners**
Agriculture	Feedstock	Qualified	1st Quintile	USA
Fruits	Textiles	Unqualified	2nd Quintile	European Union
Livestock	Shoes		3rd Quintile	Rest of America
Forestry	Wood products		4th Quintile	Japan
Fish	Furniture		5th Quintile	Rest of the World
Copper	Paper			
Other Mining	Chemical Industry			
Meat	Manufactures			
Dairy	Energy			
Conserves	Construction			
Sea Food	Commerce y Services			
Oil	Transport			
Sugar				

The "business as usual" (BaU) scenario simulates the growth of the Chilean economy throughout 2020. As it has been mentioned in the previous section, several assumptions must be made over the following variables: growth of GDP, labor force, population and labor productivity; as well as the share of foreign savings over GDP.

4 Analyzing Chile's Trade Policy in a CGE framework

In this section we analyze different scenarios for the Chilean economy using different trade policies to compare the effects of different trade policy strategies. The first scenario consists in evaluating a unilateral trade liberalization. The next scenario analyses a Free Trade Agreement between Chile and the EU as an equivalent of bilateral negotiation. The third scenario consists in simulating both FTA's with the EU and USA. Finally the fourth scenario includes an FTA with EU and USA, and an increase in Foreign Investment.

The main results show that in the first place the aggregate impacts in all scenarios are quite modest. The biggest variation occurs when additional investment is included and in any case only reaches a modest 3% increase in trade (both exports and imports).

Table 2: Results for Chile 2020

	Unilateral	FTA EU	FTA EU-USA	FTA EU-USA + Inv.
Real GDP	-0,4%	-0,2%	-0,4%	1,4%
Consumption	0,0%	0,3%	0,3%	2,1%
Investment	-1,4%	-0,8%	-2,1%	0,5%
Exports	0,4%	0,1%	0,5%	3,0%
Imports	0,5%	0,5%	1,1%	3,3%

The unilateral tariff reduction generate a decrease in the price of imports. This leads towards an increase in the demand for these products as expected. Two effects will appear at this point. First, as imported inputs are cheaper, some sectors will benefit from this increasing their output. On the other hand, some sectors become less competitive since imports will replace domestic production to some extension. The overall effect is ambiguous, both in production as in exports. An initial impulse towards increasing aggregate exports appears, but it is reduced over time, following the pattern of equalizing domestic and import prices. The effect over the current account is initially negligible, but the loss of competitiveness of domestic producers generate an increasing negative effect in the longer run. This has the same effect over GDP, but the impacts are quite smaller.

The tariff reduction will reduce fiscal income compared with the base case scenario. The reduction of tariff generating income reaches 14%, without any other tax increase. This leads towards a reduction in public savings[2], which negatively affects total investment (-0.7 to –1.4%). There are moderate increases in other revenues but they do not overcome the shortage of revenue from the tariff reduction. This will also affect some specific and sizeable sectors of the economy, such as Construction which will reduce its activity between 0.7 to 1.3%.

The effects on households are positive at the beginning since the aggregate prices are falling. However over the period these get lost as the sectors and salaries adjust (reduces). There are basically no distributive effects even though qualified salary adjusts more than for unqualified labor.

In summary, the growth rates and the GDP level will be slightly lower than the base scenario for two main reasons: the loss of competitiveness of domestic sectors due to lower prices of imported goods; and the negative impact over investment due to a uncompensated loss of fiscal revenue due to lower tariffs, as compared to the base case.

FTA w/EU

In the present case, as this is a bilateral trade agreement, which reduces tariff in from both sides, the trade effects are larger. The current account is positively affected in this case, increasing in over 5% for the first year of the agreement, and keeping these results almost to the end of the period of analysis, where the economy has adjusted towards the new structure. In this case

[2] In Chile, for 1996 there was a surplus in the public budget reaching XX% of GDP.

Chilean exports become more competitive, due to the agreement. Particularly this can be observed for sectors such as fruits, sea food, conserves and chemical products. On the other hand, domestic prices are reduced until the gap is closed due to the lower tariffs. The increase in competitiveness for Chilean exports together with the lower domestic prices that increases absorption generate an increase in exports and production of the winning sectors (e.g. fruit exports increase from 50% in 2005 to 70% in 2015 then slightly adjusting towards 62% in 2020; for total output of the sector the path is 40%, 50% and then 40% again for the same years.

In order to increase production in some sectors new investment is required. However as there is no additional funding sources, and since the fiscal savings are again reduced, the adjustment is done between sectors. Therefore more dynamic sectors will demand resources (mainly capital and labor), from the less dynamic ones, which will reduce their output since they become relatively less profitable. The mining and energy sectors are the most affected. It must be noticed however that the model does not include sector-specific invesment (FDI), and that relative rates of return adjust in the new scenario where these sectors DO NOT benefit from a trade agreement with the EU.

In this case a reduction in tariff revenues arises again, but in this case it is lower (11-12%) since the simulation only considers tariff reduction with the EU. Public saving are thus also negatively affected but to a lower extent than the previous case (10-17% against 15-24% in the previous). This generate a slightly negative effect on investment.

The lower domestic prices together with an increase in wages, specially unqualified labor, has a positive effect over real disposable income for all households an even higher for the poorer groups. Indeed, the poorest quintile of income increases it own in 1.8% against 1% of the richest one. The reflects that the main sectors that benefit from an agreement with the EU are sectors intensive in unqualified labor. All of this has a positive impact on total consumption.

The net effect of increased consumption, exports and imports, together with a slight reduction in total investment leads towards an higher GDP growth path, as compared with the base case, and obviously with the prior simulation. SEE TABLE XXX.

FTA w/ EU and USA

The analysis in this simulation is very similar to the prior case. The effects now are enhanced for some sectors, conserves, textiles and shoes, since these receive a higher price in the US. The latter two have strong increases in exports compared to the base case and against the FTA with the EU (13-17% for textiles and 19% for shoes, some 3 to 10 times higher than the FTA with EU). This generates an increase in production of 5% for each sector. However these newly competitive sectors compete for resources which in the end reduce some of the increases in the other sectors due to the FTA with EU.

The aggregate results show an increase in total exports and imports compared to the prior case, and the current account is also slightly more positive. Total consumption is also higher than both previous simulations, but investment is also reduced further. The explanation is the same than before. The impacts on GDP are initially better, but these are lost in the long-run as the economy adjusts to the new prices. The investment effect is larger in this case.

From the distributive side the impacts are slightly better, since disposable income increases more than in the previous scenario and they are distributed slightly better. This occurs due to positive impacts on both labor and wages for unqualified workers, together with lower domestic prices.

FTA w/ EU and USA plus higher foreign savings

The main difference of this last simulation is that it includes higher investment due to foreign savings/investment. In this case as total savings are higher so is aggregate investment, and therefore in the long-run the economy performs better. In this case as investment is no longer a constraint for new capital, competitive exporting sectors may develop together with less competitive sectors. This generates an increase in GDP between 1 and 2% over the period and of 1.5-3.2% for absorption. The initial impact of the agreement plus the higher external savings will reduce the current account leading towards an increase of imports in the beginning, but reversing towards the end of the period when investment in dynamic exporting sectors have taken place. Consumption in also increased compared to prior simulations. Finally, the impact over households is also more positive in this case with higher wages and lower relative prices. However the distribution tends to be a little more unequal since qualified wages are relatively higher in this case.

5 Conclusions

This paper shows that different agreement have diverse impacts. The most important result though confirms the theory that in Free Trade Agreements pure trade gains are small. Unilateral trade liberalization is not a good idea for two reasons. First, it reduces fiscal revenue, that will affect the economy in one way or another. In this case either another tax will compensate, or else current expenditure, or public investment will be cut-off. In any setting the there will be a negative effect towards some other agent. In the present simulation, we reduce public savings which in turn reduces investment and in the long-run reduces future GDP growth.

Bilateral agreements (pure trade) also have some trouble, specially in the Chilean case since the perceived tariffs abroad both with the US and the EU are very small on average. It must be noted that quotas and scaled taxes were not included at this point. In any case, for both agreements the impacts are still very low, even negative for several variables. The only situation where the economy has important gains is with additional investment. This leads towards important conclusions. If the Chilean government is correct, then the gains from the FTA's will be important in the long run due to more and more foreign firms producing in Chile. However if the theory does

not hold for any reason, then the policy-makers should beware the negative effects due to the small gains in efficiency with lower tariffs.

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