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Has the Chilean Neo-Liberal Experiment Run Out of Fuel? A View on Specialisation, Technological Gaps and Catching-Up

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Abstract - Due to an extraordinary growth performance during the last two decades the Chilean neo-liberal model of development, based on the exploitation of the country's static comparative advantages, has turned into a benchmark for most developing countries.
The aim of this paper is to discuss the long term sustainability of the Chilean neo-liberal model of development. We present new empirical results obtained by using CAN2000 as well as input-output analysis that describe the Chilean model of development during the period 1986-1998. On the basis of these stylised facts, a simple ricardian-evolutionary model is developed in order to offer an interpretative framework to discuss the conditions under which Chile could maintain the current catching-up process in the long run. The main conclusion is that, with the recent ceasing of the push effects of the neo-liberal policies, it is unlikely that an increase of the export volume, given its structural characteristics, will be sufficient to this end. Indeed, an increase of the country's sectoral industrial interdependence and an improvement of its international specialisation pattern towards goods with higher technological content and higher income elasticity of world demand are necessary conditions for maintaining the current catching-up process in the long run.

Jel Classification: F14, O14, O54

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1. Introduction

Following the *coup d'etat* in September 1973, Chile has started implementing neo-liberal structural reforms thus being the first Latin American country to do so. The new set of rules introduced by the reforms deeply affected the functioning of the economy. A different trade regime, aiming at opening up the economy and liberalising trade via the removal of most trade barriers, has been introduced and massive privatisation of large public firms has taken place. A process of deregulation of labour and financial markets has begun and the government adopted a more limited role in the development process resulting in, first of all, the abandonment of active industrial and technological policies (Ffrench-Davis, 2001).

Between the mid 80's and the 90's Chile experienced an impressive export growth and a strong catching-up process; indeed, the average growth rate of export was 9% while that of the GDP was almost 6% per year (Ffrench-Davis, 2002a). The neo-liberal reforms resulted in an export-led growth model that is often mentioned as the cause of such an extraordinary economic performance (Meller 1996; Guiterrez de Pineres and Ferrantino 1997, Sach, Larrain and Warner 1999).

The Chilean case is remarkable for at least two reasons. The first one is related to the prolonged debate concerning the best economic policy package that would allow a high long-term growth for developing countries. In particular, the Chilean experience has been considered by international economic institutions (e.g. World Bank and IMF) and by most of the scholars writing on the subject as a successful example of the good economic results a country adopting neo-liberal policies can attain. Indeed, since the mid 80's Chile has become the star performer of the Washington Consensus[1] and a benchmark for several developing countries in the world (Agosin 1997; Albala-Betrand 1999).

The second reason concerns the academic debate. The Chilean case appears to be another instance of a developing country experiencing an impressive rate of growth in an unprotected set-up for international trade, characterized by an export vector consisting almost exclusively of natural resource-based products and standardized commodities with a low income elasticity of demand and a production structure suffering from a strong de-linking[2] process (Frigolett 1994; Albala-Bertand 1999; Ffrench Davis, 2002b).

During the last 15 years the literature discussing the long term sustainability of the Chilean neo-liberal model of development has flourished (see, for example, Sunkel 1995; Diaz and Ramos 1998; Mouguillasky 1999; Sach, Larrain and Warner 1999). This paper discusses this issue by focusing mainly on two aspects. First, we shall examine the effects that the current international specialisation pattern exerts on the country's capability to maintain a sustained catching-up process. Then, we shall concentrate on the question whether the Chilean model provides any future prospect for industrial development and technological sophistication, allowing for the reduction of the technological gaps with respect to the international frontier, being this one of the main conditions for long term sustainable economic growth (Albala-Bertand 1999).

The paper is organised as follows. In Section 2, we analyse the evolution of world demand for Chilean exports during the period 1986-1998. By using CAN methodology, a study of the Chilean international specialisation and competitiveness is presented. We shall also briefly discuss the issue of the augured beginning of the "*segunda fase exportadora*". In Section 3, using the input-output (I-O) analysis we shall compute the magnitude of the substitution process of foreign producers for domestic ones as suppliers in the domestic market and its effect on the domestic sectoral linkages during the period 1986-1998. In addition, we shall measure the effect of changes in the composition of the export vector on the imports and labour income shares of the value added (VA). Based on the obtained qualitative and quantitative results, section 4 develops a slightly modified version of the model presented in Cimoli (1988, 1994) in order to offer an interpretative framework to discuss the relationship between the Chilean international specialisation pattern, technological gaps and export growth as well as the conditions under which Chile could maintain the actual catching-up process. Section 5 concludes.

2. Trade specialisation and competitiveness

2.1. Some stylised facts

According to recent analyses of the Chilean economy, one of the main domains where it is possible to appreciate the positive results of the major structural changes induced by the neo-liberal reforms is the country's external performance. Several studies have stressed the

successes Chile reported: increased export and diversification of both the products and the export markets (Meller 1996, Macario 2000).

Nevertheless, these analyses differ dramatically in identifying the sources of the impressive export growth rate (over 9% per year) during the period 1986-1998.

Ffrench-Davis (2002b) argues that the two main factors explaining the Chilean export performance during the last 15 years are (i) a depreciated exchange rate and (ii) the implementation of a sound macroeconomic management to maintain the macro-environment stable. Indeed, the importance of the exchange rate depreciation in inducing export growth and diversification is supported by the econometric results presented in Moguillansky and Titelmann (1993). But, as suggested by Agosin (1999), export growth led to overall growth only when the steep exchange rate depreciation was paired with a reasonable interest rate.

In his comprehensive analysis of the export growth during the 90s, Meller (1994) emphasises the role that a wide set of sectoral and trade policies (i.e. drawbacks, export subsides) played in determining the Chilean export success. Ffrench-Davis (2001) suggests that the positive relationship between reforms and export performance is much more complex than it is usually argued (see, for example, Sachs, Larrain and Warner 1999; Guiterrez de Pineres and Ferrantino 1997). Indeed, the effects of structural (neo-liberal) reforms on export performance are by no means easy to measure because of the considerably different (and increasingly pragmatic and unorthodox) ways in which the reform episodes have taken place since 1973.

In general, data on export growth between the mid 80's and the mid 90's have been interpreted as an unprecedented success supporting a remarkable improvement of the Chilean strategic position and an increase of the country's international competitiveness. Furthermore, export growth has been considered capable of leading to overall economic growth.

In most recent analyses this optimism has turned into a more cautious view. In fact, the diversification process has not been as deep or the entry into new markets as fast as expected (Ffrench-Davis 2002b). As shown in Figure 1, during the period 1986-1998, the value of the Chilean export grew at an impressive rate but its composition did not change significantly. Indeed, in 1998, 85% of total export was still represented by basic (low value added) products (ECLAC 2000a). Moreover, since the mid 90's, the number of exporting firms has not

increased considerably (Ffrench-Davis 2002a). In addition, this export growth rate seems to be unsustainable due to the low level of investments (Mouguillanky, 1999).

[Figure 1 about here]

As it is immediate from Figure 2, the diversification process, that undoubtedly characterised the first phase of the export boom, has not been sufficient to bring about the expansion of the production of goods with higher technological content or value added. In fact, even though the share of the mineral sector in total exports decreased, it still represents the single major share (45%). The natural resources-based (NR) industry has significantly increased its share while the labour-intensive and the science-based sectors are still almost irrelevant.

[Figure 2 about here]

2.2. The CAN2000 methodology

Most of the literature on the Chilean export growth concerns the dynamic of the volume and the changes occurred in its composition (see, for example, Ffrench-Davis and Saenz 1995, Meller 1996, Macario 2000). Differently from this branch of studies, in this section we shall analyse the changes that have taken place in the competitiveness of the Chilean export during the period 1985-1998, concentrating on the analysis of both the dynamics of the Chilean exports and that of the world demand.

For this purpose, in the following analysis we will use CAN2000, the database and software for Competitiveness Analysis of Nations developed by ECLAC (United Nation Economic Commission for Latin American and the Caribbean) (ECLAC, 2000b). The CAN2000 database rests on the COMTRADE database, the official trade database maintained by the United Nation Statistical Office. It contains data on the value and volume of the export of all the World Bank countries for the period 1985-1998.

CAN2000 is a methodology based on descriptive statistics, in line with the concept of revealed comparative advantages. Using information about the structural composition of the export vector, the country's market shares and the import market demand dynamics, CAN2000 builds up the *Competitiveness Matrix*. This matrix offers a description of both the dynamic quality of the specialisation pattern of a country and its competitive position by linking the

level of competitiveness of the country (defined as the country's world market share) with the relative dynamics of the sectoral world demands.

According to the taxonomy on which the *Competitiveness Matrix* is built, each exporting sector of a country is classified, between two points in time, on the basis of (i) the variation of the country's market share in the corresponding sectoral world market and (ii) the share that the world demand for that sector represents in total world demand.

[Table 1 about here]

When the country's world market share in a given sector is increasing, the sector is labelled as "*Rising Stars*" or "*Waning Stars*", depending on whether that sector is *dynamic* or *stagnant* at the world level (see below). *"Missed Opportunities*" and "*Retreats*" categories include those sectors for which the country's market share is decreasing and that are characterised by dynamic and stagnant world demand, respectively.

The CAN typology defines a sector as *dynamic* if the sector's share in the world demand has increased during the period under consideration (or, equivalently a sector that has undergone above average growth of world trade (imports) over the considered period). Similarly, a sector is defined as *stagnant* if the share of the sector in the world demand has decreased between the base year and the final year. These two definitions can be restated by saying that, during the period in exam, the share that sector *i* represents in world import demand has increased (decreased) more than the other sector's shares did on average[3].

This point deserves some additional remarks. While the CAN definition classifies a sector as dynamic or stagnant in relation to its weight in world import demand, the latter definition introduces a comparison among the relative dynamics of world import demand for different sectors. In this way, we are able to re-interpret the concept of dynamic and stagnant sectors as a proxy for sectors characterised by high or low-income elasticity of demand, respectively.

Following Fajnzylber (1991), we can term a country *efficient* if, on average, it gains market shares, and *well positioned* if she exports mostly dynamic goods. Clearly, the ideal situation is to be both efficient and well positioned (i.e. to have a high percentage of exports belonging to the *Rising Stars* category). On the contrary, a situation of vulnerability can be represented by an export pattern characterized by rising market shares in stagnant sectors (i.e. vulnerable countries have a high percentage of exports belonging to the *Waning Stars*

category). The main idea is that being internationally competitive (e.g. gaining market shares) in a dynamic sector is qualitatively different from being successful in a stagnant sector. Indeed, according to Fajnzylber (1989) there are two distinct ways of being competitive, one more and the other less conducive to development. The first is based on the continuous incorporation of technological progress (*authentic competitiveness*). On the contrary, the latter is based on the continuous lowering of real wages, the depredation of natural resources, or the subsidising of exporting firms (*spurious competitiveness*). The more a country specialises in dynamic sectors, the higher is the probability that its competitiveness is authentic and the model of growth is sustainable in the long run.

2.3. CAN analysis of the Chilean export pattern, 1985-1998

Table 2 shows the Chilean *Competitiveness Matrix* computed for the period 1985-1998[4]. The category *Rising Stars* accounts for 16.5% of the exports. Within this category, three products represent almost the total of the section: wine (1121), fruit (0579) and fish (0354, 0342). These products are the only *Rising Stars* products of Chilean exports and they account for the 11.5% of the total. Copper and derivative products, representing 45% of export; are included in the category of *Waning Stars*. Grapes (0577), which accounts for almost 5% of Chilean exports, belongs to this category too.

[Table 2 about here]

The table shows that a remarkable increase in competitiveness has characterised almost all-exporting sectors. In some cases, the success has been striking. Notably, the Chilean market share in the world market of wood (2460), increased from 0.29% to 7.99% during the period 1985-1998. Similar tendencies are traced for wine (1121) and fresh fruit (0579). Nonetheless, it can be observed that almost 60% of Chilean exports are included in the *Waning Stars* category. Using the Fajnzylber's terminology Chile is *efficient* but *not well positioned*: she has gained market shares in several sectors but most of them are characterised by stagnant world demand. In addition, these results suggest that the Chilean competitiveness is probably not authentic[5].

In the following, we will make use of the CAN typology to test in a naive but clear-cut way the thesis of "*la segunda fase exportadora*". With the expression "*segunda fase exportadora"* we refer to a process of technological and quality up-grading that the Chilean

exporting sectors were expected to spontaneously experience starting from the beginning of the 90's (see for example Meller 1996, Macario 2000).

The aim of this exercise is to offer a description of the dynamics of the Chilean competitiveness in order to explain the slowing down of the export growth that has characterised the last part of the 90s (Ffrench-Davis, 2002b). To this end, two sub-periods are considered: 1985-90 and 1990-98.

[Table 3 about here]

[Table 4 about here]

The *Competitiveness Matrix* reported in Table 3 shows that 82.6% of the Chilean export had gained market shares between 1985 and 1990. This percentage increases to 90% considering the period 1990-1998. However, this pattern displays a structural fragility when examining how these gains are distributed according to the trend in world demand. In fact, comparing Table 3 and 4, it also emerges that between 1990 and 1998 Chilean exports characterised by dynamic demand decreased - from 66.3% to 18.8% (as a percentage of the total Chilean export). Indeed, in 1998, most of the Chilean exports (81.2%) were addressed to stagnant markets[7]. Such results show clearly that the Chilean international specialisation pattern did not change in order to take advantages of the opportunities offered by the increase in world trade and that the "*la segunda fase exportadora*", if any, has been very short (see also Ffrench-Davis, 2002a)[6].

3. Industrial structure, export performance and the balance of payment constraint

There has been a great deal of debate about the long-run effects of neo-liberal reforms on the industrial structure among the scholars writing on the Chilean case. There is little doubt that the reforms provided strong inducement to export. However, due to some (temporary) misleading policies, they tended to give conflicting signals to the producers at least until 1982. Liberalisation had a positive impact on the natural resource-based (NR) sectors, while the absence of selective industrial policies and the little formal and informal technological effort

by Chilean firms have prevented the upgrading of more complex manufactures (Pietrobelli 1994; Stumpo 2000; Ffrench-Davis 2001).

Significant empirical evidence supports the view that the existence of a large and articulated industrial sector seems to be a necessary condition for a steady growth path. In addition, there is also support for the hypothesis that sectoral domestic linkages developed by the exporting sectors essentially determine the growth possibilities of a country characterised by an export-led growth model (Chenery et al. 1986).

The main aim of this section is to verify if the *de-linking* process that has affected the Chilean economy after the implementation of the structural reforms is still going on and how it has evolved during the period 1986-1998[7].

3.1. A simple Input-Output Analysis[8]

To describe the changes occurred in the Chilean production structure during the period 1986-1998 we start from the latest input-output table available: *La Matriz de Insumo Producto para la Economia Chilena de 1986* (MIP 86). The MIP 86 contains the Make Matrix and the Use - or Absorption - Matrix. Since both are hybrid tables (i.e. commodity by industry tables), we have to adjust them if an input-output model has to be obtained. Following Frigolett (1994), we have aggregate the 75 sectors originally present in the Input-Output tables into 25 sectors and we have adopted the industry technology assumption[9] to obtain the Adjusted Input-Output Absorption matrix.

The 1986 commodity-by-commodity Domestic Leontief Inverse matrix[10], derived from the Adjusted Input-Output Absorption matrix, captures, in each of its cells, the total direct and indirect demand increase in domestic input requirements of commodity *i* caused by a unity increase of the final demand for commodity *j*. The last two rows of the matrix report the total and the net impact on the production structure caused by a unitary increase in the final demand for commodity *j*. The higher this value, the higher is the total multiplicative effect that sector *j* has on all the others sectors when its demand increases by unity.

Starting from the 1986 Domestic Leontief Inverse matrix, we have *estimated* the 1998 Domestic Leontief Inverse matrix[11] using 1998 national account data to compute an adjustment factor measuring the substitution of the foreign for domestic production[12] and

assuming that the 1998 production functions for all sectors could be approximated by the 1986 ones[13].

As a first step of our analysis, we compute the *Multipliers Difference.* The *Multipliers Difference* is defined as the difference between the total multiplier associated to each sector according to the estimated 1998 Domestic Leontief Inverse matrix and the correspondent total sector multiplier calculated using the 1986 Domestic Leontief Inverse matrix (i.e. it is the difference between each column sum of the $(I - A_d)^{-1}_{98}$ and the correspondent column sum of the $(I - A_d)^{-1}_{86}$). Each of these computed values tells us about the difference between the 1998 and the 1986 increase of the direct and indirect intermediate domestic input demands to satisfy a unit increase of the demand for each sector.

The main result emerging from this analysis is that all the computed *Multipliers Difference* are negative: this means that the multiplier effect on the domestic production structure associated to demand growth decreased between 1986 and 1998. In Table 5, we rank the sectors according to an increasingly negative *Multipliers Difference*. We could interpret these results as a measure of the effects that trade liberalisation had on the composition of the supply structure. In particular, the fact that a unity increase of the demand has a weaker effect on the domestic production structure can be interpreted as the *substitution process* of domestic producers by foreign ones entering as new suppliers in the domestic market. It is interesting to note that, confirming the results of other studies (see for example, Garcia-Huidobro 1999), the most affected sectors are the manufacturing ones and among them the clothes textiles industries.

[Table 5 about here]

The behaviour of the exporting sectors is essential for the understanding of the Chilean case. To this end, two exercises for the evaluation of the effects of changes occurred (i) in the composition of the export vector and (ii) in the structure of the total domestic supply on the multipliers associated to the value-added (VA) components are here presented.

3.2. Export and Value Added Multipliers, 1986-1998

Change in the export vector composition. . The measure of the impact of an increase in the export demand on the VA components can be obtained from the product between the Domestic Leontief Inverse matrix and the value added components per unit of output:

$$Vx = V\left(I - A_d\right)_i^{-1} f_d^e$$

where V is the value added per unit of output matrix, where imports have been included as a primary input in order to evaluate the global pressure on the balance of payments created by each component of the final demand**,** $\left(I - A_d\right)_i^{-1}$ is the Domestic Leontief Inverse matrix for year *i* and f_d^e is the export vector component of the domestic final demand, expressed in percent share (i.e. the vector represents the structure of exports).

As a first step we calculate the multipliers associated to each component of the VA, both for the 1986 and 1998 export vectors, using the 1986 Domestic Leontief Inverse matrix. The idea is to compare the multipliers' effect generated both by the 1986 vector and by the 1998 one, given the 1986 share of the domestic and foreign producers in the domestic supply. Using the 1998 export vector with the 1986 supply structure is obviously only a theoretic exercise: the aim is to isolate the effect of the change in the composition of the export vector from the change in the domestic supply composition as cause of the variation of the multiplicative effect of the export vector on the VA components.

Table 6 shows that the changes occurred in the export vector composition between 1986 and 1998 have increased the requirement of imported inputs per unit of export. At the same time, the impact of a unity increase of export on the labour income component of the VA has decreased.

The explanation of these results can be found in the process of modernisation of the exporting sectors through the import of new capital goods. Indeed, most of them are capital-intensive sectors and, in addition, most of the profits are devoted to the payment of rents for the use of natural resources (land, forest, etc). This is confirmed by the fact that the multiplicative effect of a unity increase of exports is significantly higher on profits than on labour income. Moreover, this holds true for both the 1986 and the 1998 export vectors.

[Table 6 about here]

As a second step of the exercise we calculate the multiplier effect, on the different components of the VA, caused by a unity increase of export, by using now the *estimated* 1998 Domestic Leontief Inverse matrix. The results are reported in Table 7.

In this exercise we are now considering the estimated 1998 domestic supply structure of the Chilean economy (that differs from the 1986 one because foreign firms entered the Chilean market and gained market shares). The results indicate that the 1998 export vector generates a less virtuous circle in the economy than the one the 1986 exports vector was theoretically expected to induce. In particular, the computed labour income multiplier is lower and the import multiplier higher.

[Table 7 about here]

We could conclude that, whether the *substitution process* (captured using the *estimated* 1998 Domestic Leontief Inverse matrix) is considered or not, the 1998 export vector has a lower multiplier effect on the domestic production structure with respect to the one that the 1986 vector would have. Indeed, this would suggest that the transformation pattern of the domestic industrial structure is characterised by a *dis-linking* process affecting not only the manufacturing sectors, producing for the domestic market, but also the exporting sectors.

Change in the composition of the supply. The aim of the second exercise is to analyse the effects that a change in the share the domestic producers represents in the total supply (i.e *the substitution process*) had on the multipliers associated to the VA. Indeed, we shall measure the economic losses - in terms of lower multiplicative effects generated by a unity increase of export - caused by the entry of foreign producers in the domestic market**.** The variable *Difference* reported in Table 8 is computed as the difference between the two multipliers, associated to each component of the VA, calculated by using the 1986 Domestic Leontief Inverse matrix and the estimated 1998 Domestic Leontief Inverse matrix. Thus, given the export vector, the variable *Difference*[14] tells us about the effect of the *substitution process* on the multiplicative effect of a unity increase of the export vector. We can see that the sign of the variable *Difference* with both the 1986 and the 1998 export vectors is, for each component of the VA, the same The effect of the entry of foreign producers is an increase in the import multiplier and a decrease in the labour income multiplier.

[Table 8 about here]

The important result is that the negative effects of the *substitution process* are bigger in the case of the 1998 export vector: the variable *Difference* computed using the 1998 vector is bigger than the one computed using the 1986 vector for the import component and it is smaller for both the labour income and the profits components. This means that the 1998 export vector is less capable then the 1986 one to induce a virtuous circle in the Chilean economy.

Summarising our results we can say that the 1986 production structure was characterised by low multiplicative effects associated to an increase in domestic demand (see also Frigolett 1993 and Albala-Bertrand 1999). This structural weakness has been reinforced by the change in the export structure and by the substitution process of local producer by foreign producers. These results support the interpretation, suggested by Pietrobelli (1994), of the restructuring process of the Chilean industrial sectors caused by the implementation of the neo-liberal structural reforms as a process of *regressive transformation.* In particular, our results indicate that the industrial structure is increasing its fragility (the linkages between the domestic sectors are weakening) and there is an increasing pressure on the balance of payment (less labour and more import per unit of export).

In the following section, the qualitative and quantitative results emerged so far will be taken as the stylised facts and the starting point assumptions of a theoretical model. A slightly modified version of the ricardian-evolutionary North-South model presented in Cimoli (1988, 1994) will be developed in order to discuss the conditions under which Chile could maintain the actual catching-up process in the long run.

4. Bringing the pieces together: a simple Ricardian model

4.1. The model

Assume a continuum of goods which can be ordered by a real index on an interval $[0, z_1]$ in terms of their increasing technological intensity, where z_1 is the total number of commodities produced by Chile and the OECD countries (the latter considered all together as the foreign country)[15]. The range of commodities is divided into two sets: $[0, z_0]$ and $[z_0, z_1]$, where $z_1 > z_0$ and z_0 and $z_1 - z_0$ are the number of ricardian and innovative commodities produced, respectively. The ricardian commodities can be produced either by Chile or by the foreign country (see below) while the innovative ones can be produced only by the foreign

country. We shall develop the model in the most simple way by assuming that both z_1 and z_0 are fixed.

The ricardian commodities will be produced and exported by Chile or by the foreign country according to relative production costs (denominated in a common unit), which are explained by the technological gap in producing each commodity[16]. The function $\Pi(z) = \frac{\pi(z)}{\pi^*(z)}$, defined over the interval $[0, z_0]$, where $\pi(z)$ and $\pi^*(z)$ represent the input productivity of the foreign and the home country, respectively, in producing *z*, and $\Pi(0) < 1$, $\Pi(z_0) > 1$, $\Pi'(z) > 0$. Thus, the function $\Pi(\ ) = \frac{\pi}{\pi^*}$ ranks the ricardian commodities in terms of an increasing foreign-home technological gap. In other words, we are assuming that the home economy is more efficient in the production of the commodities with low levels of technological intensity. This feature of the model fits very well the Chilean case. Indeed, as shown in Section 2, most of the Chilean exports are natural resource-based products – i.e. with low level of technological content. Assume now that labour is the only factor of production and that profits are zero in both regions[17]. Let w^* and w denote the exogenously given (i.e. historically and institutionally determined) Chilean and foreign wage rate. Commodity z will be produced in the foreign country if $\frac{w}{\pi(z)} < \frac{w^*}{\pi^*(z)}$. When this inequality holds as an equality, it defines the borderline commodity $\tilde{z}$ which determines the relative international patterns of specialisation. The dynamics of $\tilde{z}$, is described by the following equation:

$$\hat{\tilde{z}} = \Psi\left[\left(\hat{w} - \hat{w}^*\right) + \left(\hat{\pi}^* - \hat{\pi}\right)\right] \tag{1}$$

where $\hat{w}$, $\hat{\pi}$ and $\hat{w}^*, \hat{\pi}^*$ are the per cent changes in wage and labour productivities in the foreign country and in Chile and Ψ is the *technological gap multiplier* defined as:

$$\Psi = \frac{\partial \tilde{z}}{\partial W} \frac{W}{\tilde{z}} \tag{2}$$

The dynamics of the relative international specialization pattern is explained by the differences in technological capabilities - approximated by the technological gap multiplier - and by the evolution of relative wages and labour productivities for a given $\Pi(z)$ function. In

particular, when Ψ is small (i.e. for a large technological gap), an increase of the relative wage $W = \frac{w}{w^*}$ would provoke only a small change in the home country's international specialisation. According to the previous analysis, there exists a large technological gap for a vast number of commodities between Chile and the developed countries. Thus, we can depict the $\Pi(z)$ function as in Figure 3.

[Figure 3 about here]

4.2. Specialisation, demand and the balance of payments constraint

In order to integrate in the model the asymmetrical effects caused by the dynamics of domestic demand, we define for a given commodity z :

$$\beta^*(z) = \frac{p(z) \cdot m^*[z, w^*, p(z)]}{w^*} \tag{3}$$

$$\beta(z) = \frac{p^*(z) \cdot m[z, w, p^*(z)]}{w} \tag{4}$$

where: $\beta^*(z)$ and $\beta(z)$ are, respectively, the domestic and foreign import expenditure, pressed as shares of income; $m^*(z)$ and $m(z)$ represent the domestic and foreign per capita demands; and $p^*(z)$ and $p(z)$ stand for the home and foreign prices. Differentiating (3) and (4) yields,

$$\hat{\beta}^*(z) = \hat{w}^*(\varepsilon^*(z) - 1) + \hat{p}(z)(1 - \eta^*(z)) \tag{5}$$

$$\hat{\beta}(z) = \hat{w}(\varepsilon(z) - 1) + \hat{p}^*(z)(1 - \eta(z)) \tag{6}$$

where: ε^* and ε are the income elasticity of the home and foreign country import demand, and η^* and η are the price elasticity of the home and foreign country import demand.[18] When the balance of trade equilibrium condition holds, the per cent change in the domestic relative income is:

$$\hat{Y}^* - \hat{Y} = \hat{w}\bar{\varepsilon} - \hat{w}^*\bar{\varepsilon}^* + \hat{w}^*\bar{\eta} - \hat{w}\bar{\eta}^* + \hat{\pi}\bar{\eta}^* - \hat{\pi}^*\bar{\eta} + \left(\frac{\hat{\hat{z}}}{\Psi}\right)M \tag{7}$$

Equation (7)[19] illustrates how the home country's relative rate of growth - compatible with the trade balance constraint - depends on the technological gap multiplier (Ψ), on the changes in the pattern of specialisation $\hat{\tilde{z}}$ and on the differences between the two countries in the: (a) consumption patterns; (b) wage dynamics; (c) productivity gains.

4.3. A graphical representation

Figure 4 shows a family of curves describing equation (8),

$$\hat{Y}^* - \hat{Y} = \hat{w}\bar{\varepsilon} - \hat{w}^*\bar{\varepsilon}^* \tag{8}$$

which is a simplified version of equation (7)[20].

The positive (negative) portion of the vertical axis represents catching-up (falling behind) processes. The negative (positive) portion of the horizontal axis represents patterns of relative international specialisation characterised by higher (lower) domestic weighted average income elasticity of import with respect to that of the foreign country (i.e. $\bar{\varepsilon} - \bar{\varepsilon}^* < (>)0$).

Using this graph, we shall discuss the effects that changes occurred in the country's international specialization pattern, in the export vector structure and in the supply composition (i.e. the *substitution process*), may have on the possibilities for Chile to maintain the current catching-up process in the long-run.

Figure 4 accounts for two different kinds of movements. The first is a movement along a given curve. That is, for a given difference in the rate of growth of wages, a catching-up process could be obtained reducing the difference between the weighted averages of the income elasticity of the commodities imported by the home country. In terms of figure 4, starting from a point in the up-left quadrant, this means moving right-side (i.e. reducing the difference $\bar{\varepsilon} - \bar{\varepsilon}^*$).

The second movement is a parallel shift of a given curve. For a given difference in the income rates of growth, a curve shifting right-side indicates that a reduction of the wage gap is obtained changing the specialization pattern toward commodities characterised by higher income elasticity of import demand and technological content. Conversely, a left-side movement of the curve, meaning an *impoverishment* of the home country's international

specialisation pattern, indicates that the catching up path can be only maintained with an increase in the wage rate gap.

[Figure 4 about here]

Once described the general features of the model, we can turn now to the description of the current Chilean situation. According to our quantitative and qualitative results, we can think about point A as representing the combination of the actual dynamic of the relative income rate of growth and of the international specialization pattern of Chile. In fact, as we have argued, Chile is actually experimenting a catching-up process but, at the same time, its international specialisation pattern is strongly characterised by the export of natural resource based commodities with low technological content and low-income elasticity of world demand (i.e. $\bar{\varepsilon} - \bar{\varepsilon}^* < 0$). At the same time, the results emerging from the CAN and the input-output analysis suggest that the Chilean relative international specialisation is worsening, moving left-side with respect to the horizontal axis of Figure 4 (i.e. $\bar{\varepsilon} - \bar{\varepsilon}^*$ decreases). In addition to this, the fact that the Chilean terms of trade are deteriorating and the results emerging from the Input-Output analysis concerning the multiplicative effects of export growth suggest that, given the actual composition of the export vector, a further increase in its volume would not necessarily sustain a long-term catching-up because of the balance of payment constraint. Thus, in terms of our graph and according to the dynamic of the wage differentials that will prevail, this means that Chile would move from A to point B or C.

The main result suggested by the model is that, if the foreign country constantly increases the number of ricardian commodities it produces or introduces innovative commodities (i.e. $\bar{\varepsilon} - \bar{\varepsilon}^*$ decreases)[21] the catching up process of Chile can be maintained only increasing the wage gap in favour of the foreign country. Thus, in order to continue the catching-up process without increasing the wage gap, Chile must change its specialisation pattern and start producing and exporting commodities with higher technological content and higher income elasticity of world demand (in terms of Figure 3, $\tilde{z}$ should move right-side).

5. Conclusions

The neo-liberal reforms, implemented since the mid 70s, forced the Chilean economy to specialise according to its static natural comparative advantages. The main aim of this paper

was to contribute to the long-lasting debate on the evaluation of the results achieved by these reforms and on the long term perspectives for the Chilean model of development.

The main empirical findings of the paper can be summarized as follows:

i) most of the Chilean exports are characterised by a stagnant world demand (i.e. by a low-income elasticity of world demand) and the augured *spontaneous* process of diversification towards commodities with higher technological content and income elasticity has been very weak. Thus, the dynamic of world demand for its export is one of the main weaknesses of the Chilean export-led model of growth.

ii) the changes in the composition of the Chilean export vector, occurred during the period 1986-1998, increased its multiplicative effect on the imports VA component while decreasing at the same time that on the labour income VA component. Moreover, the industrial structure suffered by an impoverishment of the domestic linkages caused by the replacement of domestic production capacity by foreign producers.

All these features of the current Chilean economy represent the stylised facts on which we developed a simple ricardian-evolutionary model to discuss the conditions under which Chile could maintain the actual catching-up process. Even though the model presented here was highly stylised and restrictive in its assumptions it allowed us to focus and deeply analyse the relationship between specialisation, technological gaps and catching-up. Two are the most important results of our model.

The first result is that, for a given difference in the income rate of growth, the difference between the Chilean and the developed countries' wage rates of growth cannot be improved if the Chilean specialization pattern remains unchanged. The second result is that given the characteristics of the Chilean international specialisation pattern it is unlikely that an increase of the export will be sufficient for Chile to maintain the current catching-up process. What is needed, instead, is a continuous improvement of its relative international specialization pattern.

Indeed, it is clear that the neo-liberal reforms have now run out of fuel. The difficulties of the neo-liberal model of development in producing sustainable long term growth are undoubtedly related to the typology of the sectors the model induced Chile to specialise in and they are now strongly becoming apparent as the first push of the export boom ended.

In conclusion, in order to reduce the existing technological gaps with developed countries and to maintain the current catching-up process it seems necessary to start a second stage of

the industrialization process aiming at increasing the sectoral industrial interdependence and the technological content of the produced goods.

The analysis we have developed in the paper and the policy implications we have derived from the model call for some caveats. This paper has focused on the specialization pattern emerging from the neo-liberal reforms, there is of course a number of additional important elements to consider when evaluating the past history and the future prospects of the Chilean economy. This implies that our results and the policy prescriptions derived have to be necessarily complemented with those emerging from other studies analysing in dept the institutional, political and social spheres and their evolution.

Notes

1 - For a discussion of the Washington Consensus policies package see Williamson (1990) and Stigliz (1998).

2 - With this term we refer to the process of weakening of the linkages among the domestic sectors measured as the decrease of the *domestic* leontevian multiplier associated with a unity increase of the domestic demand for a given sector between two points in time.

3 - The proof of this simple equivalence and all the mathematical definitions and formulas are reported in the Appendix CAN2000.

4 - Table 2 has been constructed considering all the sectors representing at least 0.5% of the 1998 export. The share each sector represents in 1998 total Chilean export is also reported in the table.

5 - The results of the CAN Analysis depend on the base and the final year chosen. Nonetheless, the several exercises we performed considering various time periods have shown a stable pattern in the definition of a sector as stagnant or dynamic.

6 - This exercise has been developed at a high degree of aggregation. In fact, as it emerges from the more disaggregated sectoral study by Katz (2000), there are indeed some sectors that have successfully started a new phase modifying their products in the direction of higher value added and technological content. In any case, our analysis can be considered as a very synthetic but still adequate description of the aggregate behaviour and characteristics of the Chilean export.

7 - For an analysis of the period 1960-1990 see Albala-Bertand (1999).

8 - In the following it is assumed that the reader is familiar with the basics of the standard input-output (I-O) model. For a presentation of the I-O model, with special applications to developing countries, see Bulmer-Thomas (1982).

9 - The industry technology assumption states that each commodity produced by an industry is obtained by using the prevailing producing technology defined for the principal production of such industry. Thus, each commodity by commodity input-output coefficient a_{ij} would be a weighted average of the absorption coefficients b_{ij},

$$a_{ij} = b_{i1} \cdot w_{1j} + b_{i2} \cdot w_{2j} + ... + b_{in} \cdot w_{nj}$$

where the weights are provided by the elements of the Make Matrix. The input-output coefficients in a commodity by commodity table would result from commodity *i* absorbed by all industries which produce commodity *j*, and therefore, the weights w_{ij} represent the market share of industry *i* in the supply of commodity *j*.

Market shares can be obtained from the following:

$$D = M' \cdot (\hat{q})^{-1}$$

where D is the matrix of weights obtained on the industry technology assumption, while M' is the Make Matrix transposed and $\hat{q}$ is the vector of commodity output transformed into a diagonal matrix. The solution to the commodity by commodity input-output coefficient matrix is given by:

$$A = B \cdot D$$

where B is the Absorption Coefficients Matrix.

10 - The Domestic Leontief Inverse matrix is defined as $(I - A_d)_i^{-1}$, where I is the Identity Matrix, *i* the base year and A_d is the domestic technical coefficient matrix. The sectors' codes are reported in Table 5.

11 - Both tables are reported in the Appendix (Table A.1 and Table A.2).

12 - The adjustment factor is the ratio between the 1998 sectoral domestic participation coefficient and the 1986 one. The sectoral domestic participation coefficient is calculated as the ratio between the Gross Domestic Production and Total Gross Supply for each sector.

13 - It is important to explicitly acknowledge the limitation of this methodology. This is a static comparative exercise, carried out at a high level of aggregation and on the basis of the 'extrapolation' of the 1986 Chilean input - output matrix to 1998 by using the technical coefficients of the base year with the final demand vector of the last year. Using the technical coefficients of 1986 entails saying that the final demand vector of 1998 is satisfied using production functions of the initial year, i.e. not taking into consideration the fact that new and better production facilities entered the economy throughout the period. The exercise can describe the impact of the new demand vector, i.e. changes in the structure of GDP but it cannot capture the technical progress 'vintage' effect.

14 - The variable *Difference* is obtained as follows. Given the export vector, for each component of the VA, we calculated the difference between the multiplier associated to the 1998 supply structure (i.e. the *estimated* 1998 Domestic Leontief Inverse) and the one obtained using the 1986 supply structure (i.e. the 1986 Domestic Leontief Inverse).

15 - The assumption that different products can be ranked by some proxy of technological intensity is largely supported by empirical evidence. See, for example, Reinert (1994).

16 - Note that for each product the technological gap in producing it may also depend on the difficulties to imitate the production process of the competing country.

17 - With both labour and capital inputs, and assuming that the labour force is homogenous in both the home and foreign country, the ricardian commodities can be ranked in terms of increasing efficiency of the capital input. Thus, the results obtained from this simplified model also apply in those cases where there are capital inputs and positive profits and there is no *"reswitching of commodities"*. See Dosi, Pavitt and Soete (1990).

18 - Cimoli and Di Maio (2002) show that the Chilean terms of trade have been deteriorating during the period 1970-2000. Since the transfer of productivity gains through the lowering of export prices reduces the possibilities of sustainable long term growth and increases the pressure on the balance of payment, here emerges another possibly relevant weakness of the current Chilean specialisation pattern.

19 - For the derivation of eq. (7), see Appendix Model.

20 - Note that the terms of equation (7) that we are not considering in equation (8) are the ones capturing the terms of trade movement (see note 18) and the changes in the current technological gap function. As will be explained in the following, the results we will obtain in this section would be only reinforced considering all the terms in equation (7).

21 - The term $\bar{\varepsilon} - \bar{\varepsilon}^*$ may decrease for two different reasons. In terms of Figure 3, the first one is a change in the shape and position of the $\Pi(\cdot)$ function (i.e. a change in the relative productivities) determining a new $\tilde{z}$. The second is the shifting right-side of z_1 (i.e. the foreign country introduces new innovative goods).

1. APPENDIX CAN2000

a) CAN Formulas

The following notation is adopted:

M: the value of world import demand in time period t

M_i: the value of world import for sector i in the period t

M_j**:** the total export value of county j in period t

M_{ji}: the export value of sector i originated in country j

b) The CAN typology

In the *Competitiveness Matrix*, the four positions are defined as:

Rising Stars

$$\frac{M_i^{fy}}{M^{fy}} > \frac{M_i^{by}}{M^{by}} \quad \text{et} \quad \frac{M_{ij}^{fy}}{M_i^{fy}} > \frac{M_{ij}^{by}}{M_i^{by}}$$

Waning Stars

$$\frac{M_i^{fy}}{M^{fy}} < \frac{M_i^{by}}{M^{by}} \quad \text{et} \quad \frac{M_{ij}^{fy}}{M_i^{fy}} > \frac{M_{ij}^{by}}{M_i^{by}}$$

Missed Opportunities

$$\frac{M_i^{fy}}{M^{fy}} > \frac{M_i^{by}}{M^{by}} \quad \text{et} \quad \frac{M_{ij}^{fy}}{M_i^{fy}} < \frac{M_{ij}^{by}}{M_i^{by}}$$

Retreats

$$\frac{M_i^{fy}}{M^{fy}} < \frac{M_i^{by}}{M^{by}} \quad \text{et} \quad \frac{M_{ij}^{fy}}{M_i^{fy}} < \frac{M_{ij}^{by}}{M_i^{by}}$$

Note: $(\,)^{by}$ stands for beginning year; $(\,)^{fy}$ stands for final year

c) The distinction between dynamic and stagnant sectors as a proxy of the income elasticity of world import demand for a sector.

Following the CAN typology, a sector i is defined as *dynamic* if it increases its share in the world import demand during the period under consideration. In this section, we will prove

that this definition is equivalent to say that world imports of that sector have increased faster than the sector average of import growth**.**

We will give a proof that if (A) is true (e.g. sector *i* is *dynamic* according to the CAN typology), (B) holds (e.g. the world import of that sector have increased faster than the average). Assuming *n* sectors this means that:

$$\text{If } \frac{M_i^{fy}}{M^{fy}} > \frac{M_i^{by}}{M^{by}} \quad \textbf{(A)} \qquad \text{then} \qquad \frac{M_i^{fy} - M_i^{by}}{M_i^{by}} > \frac{\sum_1^n M_i^{fy} - \sum_1^n M_i^{by}}{\sum_1^n M_i^{by}} \qquad \textbf{(B)} \qquad (*)$$

Proof: *ad absurdum*

$$\frac{M_i^{fy} - M_i^{by}}{M_i^{by}} < \frac{\sum_1^n M_i^{fy} - \sum_1^n M_i^{by}}{\sum_1^n M_i^{by}}$$

$$\frac{M_i^{fy}\sum_1^n M_i^{by} - M_i^{by}\sum_1^n M_i^{by} - M_i^{by}\sum_1^n M_i^{fy} + M_i^{by}\sum_1^n M_i^{by}}{M_i^{by}\sum_1^n M_i^{by}} < 0$$

summing up the opposite terms, it yields:

$$\frac{M_i^{fy}\sum_1^n M_i^{by} - M_i^{by}\sum_1^n M_i^{fy}}{M_i^{by}\sum_1^n M_i^{by}} < 0$$

if (C) is negative, then it will be less than (D) too

$$\frac{M_i^{fy}\sum_1^n M_i^{by} - M_i^{by}\sum_1^n M_i^{fy}}{\sum_1^n M_i^{fy}\sum_1^n M_i^{by}} < 0$$

$$\frac{M_i^{fy}}{\sum_1^n M_i^{fy}} < \frac{M_i^{by}}{\sum_1^n M_i^{by}}; \qquad \text{and, to conclude,} \qquad \frac{M_i^{fy}}{M^{fy}} < \frac{M_i^{by}}{M^{by}}$$

Since the relationship $(*)$ is true, we can use this result to transform the dichotomy stagnant/dynamic demand, into an operationally more useful dichotomy: less elastic/more elastic world import demand for sector *i*. In fact, if we divided term (B) by the percentage

variation of world income, it yields a proxy of the income elasticity of demand for sector *i*. Thus, if the sector is dynamic it means that the world demand of import of goods produced by sector *i* is more dynamic than the average of the other sectors

2. APPENDIX MODEL

2.1) Derivation of equation (1)

Defining $W = \frac{w}{w^*}$ and $\Pi = \frac{\pi}{\pi^*}$ we can write

$$\tilde{z} = \tilde{z}\left[W(t), \Pi(z,t)\right]$$

Differentiating with respect to *t* we obtain

$$\frac{d\tilde{z}}{dt} = \frac{\partial \tilde{z}}{\partial W}\frac{\partial W}{\partial t} + \frac{\partial \tilde{z}}{\partial \Pi}\frac{\partial \Pi}{\partial t}$$

Dividing by $\tilde{z}$ and multiplying and dividing by $W\Pi$ we have

$$\hat{\tilde{z}} = \frac{W}{\tilde{z}}\frac{\partial \tilde{z}}{\partial W}\left(\hat{w} - \hat{w}^*\right) + \frac{\Pi}{\tilde{z}}\frac{\partial \tilde{z}}{\partial \Pi}\left(\hat{\pi}^* - \hat{\pi}\right)$$

where $\frac{\partial W/\partial t}{W} = \hat{w} - \hat{w}^*$ and $\frac{\partial \Pi/\partial t}{\Pi} = \hat{\pi}^* - \hat{\pi}$.

Defining

$$\Psi \equiv \frac{\partial \tilde{z}}{\partial W}\frac{W}{\tilde{z}} = -\frac{\partial \tilde{z}}{\partial \Pi}\frac{\Pi}{\tilde{z}}$$

we finally obtain

$$\hat{\tilde{z}} = \Psi\left[\left(\hat{w} - \hat{w}^*\right) + \left(\hat{\pi}^* - \hat{\pi}\right)\right] \qquad (1)$$

2.2) Derivation of Equation (7)

Define

$$\Gamma^*\left(\beta^*, \tilde{z}, z_1\right) = \int_{\tilde{z}}^{z_1} \beta^*(z)dz \qquad \text{and} \qquad \Gamma\left(\beta, \tilde{z}\right) = \int_0^{\tilde{z}} \beta(z)dz$$

We can now write the expression for total import and total export for the home country. These are, respectively

$$M^* = Y^*\Gamma^*\left(\beta^*, \tilde{z}, z_1\right) \quad \text{and} \quad X^* = Y\Gamma\left(\beta, \tilde{z}\right)$$

The equilibrium condition reads

$$\dot{M}^* = \dot{X}^*$$

$$\dot{Y}^* + \frac{\partial \Gamma^*\left(\beta^*, \tilde{z}, z_1\right)/\partial t}{\Gamma^*\left(\beta^*, \tilde{z}, z_1\right)} = \dot{Y} + \frac{\partial \Gamma\left(\beta^*, \tilde{z}\right)/\partial t}{\Gamma\left(\beta^*, \tilde{z}\right)}$$

that can be rewritten as

$$\dot{Y}^* - \dot{Y} = \frac{\partial \Gamma\left(\beta^*, \tilde{z}\right)/\partial t}{\Gamma\left(\beta^*, \tilde{z}\right)} - \frac{\partial \Gamma^*\left(\beta^*, \tilde{z}, z_1\right)/\partial t}{\Gamma^*\left(\beta^*, \tilde{z}, z_1\right)}$$

After some algebra we obtain

$$\begin{aligned}\hat{Y}^* - \hat{Y} = {} & \hat{w}\frac{1}{\Gamma}\int_0^{\tilde{z}}\left(\varepsilon(z)-1\right)\beta(z)dz - \hat{w}^*\frac{1}{\Gamma^*}\int_{\tilde{z}}^{z_1}\left(\varepsilon^*(z)-1\right)\beta^*(z)dz + \hat{w}^*\frac{1}{\Gamma}\int_0^{\tilde{z}}\left(1-\eta(z)\right)\beta(z)dz + \\ & - \hat{w}\frac{1}{\Gamma^*}\int_{\tilde{z}}^{z_1}\left(1-\eta^*(z)\right)\beta^*(z)dz + \hat{\pi}\frac{1}{\Gamma^*}\int_{\tilde{z}}^{z_1}\left(1-\eta^*(z)\right)\beta^*(z)dz - \hat{\pi}^*\frac{1}{\Gamma}\int_0^{\tilde{z}}\left(1-\eta(z)\right)\beta(z)dz + \\ & + \frac{\beta(\tilde{z})}{\Gamma}\left[\frac{\partial\tilde{z}}{\partial W}\frac{\partial W}{\partial t} + \frac{\partial\tilde{z}}{\partial \Pi}\frac{\partial \Pi}{\partial t}\right] + \frac{\beta^*(\tilde{z})}{\Gamma^*}\left[\frac{\partial\tilde{z}}{\partial W}\frac{\partial W}{\partial t} + \frac{\partial\tilde{z}}{\partial \Pi}\frac{\partial \Pi}{\partial t}\right]\end{aligned}$$

where ε^* and ε are the income elasticity of the home and foreign country import demand, and η^* and η are the price elasticity of the home and foreign country import demand. This equation can be rewritten as

$$\hat{Y}^* - \hat{Y} = \hat{w}\bar{\varepsilon} - \hat{w}^*\bar{\varepsilon}^* + \hat{w}^*\bar{\eta} - \hat{w}\bar{\eta}^* + \hat{\pi}\bar{\eta}^* - \hat{\pi}^*\bar{\eta} + \frac{\hat{\tilde{z}}}{\Psi}\Psi_z\frac{\beta(\tilde{z})}{\Gamma} + \frac{\hat{\tilde{z}}}{\Psi}\Psi_z\frac{\beta^*(\tilde{z})}{\Gamma^*}$$

where

$$\bar{\varepsilon} = \frac{1}{\Gamma}\int_0^{\tilde{z}}\left(\varepsilon(z)-1\right)\beta(z)dz \qquad \bar{\varepsilon}^* = \frac{1}{\Gamma^*}\int_{\tilde{z}}^{z_1}\left(\varepsilon^*(z)-1\right)\beta^*(z)dz$$

$$\bar{\eta} = \frac{1}{\Gamma}\int_0^{\tilde{z}}\left(1-\eta(z)\right)\beta(z)dz \qquad \bar{\eta}^* = \frac{1}{\Gamma^*}\int_{\tilde{z}}^{z_1}\left(1-\eta^*(z)\right)\beta^*(z)dz$$

Finally, substituting $M = \tilde{z}\Psi\left(\frac{\beta}{\Gamma} + \frac{\beta^*}{\Gamma^*}\right)$ we get

$$\hat{Y}^* - \hat{Y} = \hat{w}\bar{\varepsilon} - \hat{w}^*\bar{\varepsilon}^* + \hat{w}^*\bar{\eta} - \hat{w}\bar{\eta}^* + \hat{\pi}\bar{\eta}^* - \hat{\pi}^*\bar{\eta} + \left(\frac{\hat{\tilde{z}}}{\Psi}\right)M \qquad (7)$$

Table A.1: **1986 Domestic Leontief Inverse Matrix**

CP	01010	01020	01030	02000	03010	03020	04010	04020	04030	04040	04050	04060	04070	04080	04090	05000	06000	07000	08010	08020	09000	10000	11010	11020	11030	12000
01010	1,10566	0,00381	0,11886	0,01145	0,00091	0,00099	0,17480	0,00975	0,01516	0,00534	0,00313	0,00156	0,00330	0,00269	0,00353	0,00067	0,00539	0,01157	0,00235	0,00065	0,00170	0,00013	0,00349	0,01142	0,00793	0,00794
01020	0,00064	1,00522	0,00341	0,00192	0,00019	0,00022	0,02456	0,00145	0,00126	0,00054	0,00047	0,00029	0,00092	0,00064	0,00053	0,00013	0,00029	0,00327	0,00052	0,00014	0,00035	0,00001	0,00087	0,00344	0,00185	0,00144
01030	0,09378	0,02542	1,09191	0,01027	0,00138	0,00159	0,17554	0,01400	0,08701	0,03472	0,00369	0,00322	0,00338	0,00346	0,00696	0,00090	0,00658	0,01098	0,00256	0,00119	0,00303	0,00007	0,00402	0,01041	0,00603	0,00759
02000	0,00186	0,00090	0,01217	1,18224	0,00049	0,00053	0,09042	0,00454	0,00422	0,00126	0,00264	0,00066	0,00139	0,00115	0,00135	0,00033	0,00075	0,00558	0,00163	0,00029	0,00060	0,00003	0,00169	0,00519	0,00234	0,00340
03010	0,00232	0,00156	0,00118	0,00234	1,10955	0,02868	0,00241	0,00144	0,00185	0,00175	0,00524	0,00518	0,09737	0,03776	0,00976	0,00330	0,00897	0,00137	0,00259	0,00065	0,00068	0,00143	0,00052	0,00132	0,00312	0,00220
03020	0,05951	0,01787	0,01721	0,01841	0,07041	1,06727	0,03050	0,01738	0,01837	0,02115	0,12786	0,14984	0,09530	0,03442	0,06921	0,09574	0,05800	0,01156	0,02596	0,00322	0,00487	0,00171	0,00599	0,01751	0,01501	0,01186
04010	0,01915	0,00819	0,15410	0,03810	0,00360	0,00390	1,16628	0,05438	0,02447	0,01208	0,01318	0,00524	0,01430	0,01055	0,01304	0,00249	0,00619	0,04966	0,00968	0,00267	0,00545	0,00021	0,01585	0,05444	0,01816	0,04145
04020	0,00226	0,00195	0,00211	0,01222	0,00712	0,00511	0,00702	1,31804	0,03849	0,01109	0,00878	0,00733	0,00455	0,01105	0,05266	0,00357	0,00560	0,00512	0,00446	0,00541	0,00330	0,00027	0,00338	0,01025	0,01654	0,00961
04030	0,00484	0,01528	0,00306	0,01116	0,00121	0,00128	0,00532	0,00392	1,09351	0,00304	0,00199	0,00224	0,00243	0,00480	0,02178	0,00103	0,06135	0,00773	0,00226	0,00061	0,00297	0,00005	0,00312	0,00201	0,00952	0,00152
04040	0,00468	0,00430	0,00606	0,00903	0,00624	0,00763	0,02587	0,01719	0,01168	1,17132	0,01491	0,04495	0,00932	0,01523	0,03167	0,00581	0,01141	0,01481	0,00929	0,01980	0,02937	0,00023	0,02493	0,01778	0,01807	0,02523
04050	0,14027	0,07177	0,07550	0,13428	0,08671	0,07787	0,08119	0,08038	0,11559	0,09301	1,10031	0,08460	0,05088	0,06637	0,10273	0,05247	0,06031	0,05941	0,19991	0,01328	0,02482	0,00407	0,02456	0,08111	0,07901	0,04939
04060	0,00200	0,00248	0,00169	0,00126	0,01416	0,00811	0,00839	0,00209	0,00264	0,00189	0,00395	1,04635	0,00297	0,00597	0,00723	0,00288	0,12254	0,00163	0,00302	0,00089	0,00070	0,00021	0,00265	0,00402	0,00367	0,00307
04070	0,00475	0,00637	0,00458	0,01108	0,01523	0,01130	0,01171	0,00733	0,01160	0,00923	0,01152	0,01076	1,08548	0,20520	0,07581	0,00613	0,06116	0,00569	0,01209	0,00335	0,00224	0,00064	0,00247	0,00520	0,01595	0,01162
04080	0,01526	0,02668	0,01522	0,04369	0,04190	0,02696	0,02902	0,01373	0,01252	0,01683	0,01553	0,01181	0,03313	1,04222	0,01666	0,01528	0,11521	0,01668	0,03985	0,01370	0,00705	0,00261	0,00663	0,01869	0,06834	0,04555
04090	0,00022	0,00021	0,00031	0,00328	0,00043	0,00045	0,00114	0,00134	0,00117	0,00059	0,00038	0,00089	0,00056	0,00134	1,00036	0,00101	0,01236	0,00091	0,00082	0,00085	0,00091	0,00003	0,00375	0,00096	0,00350	0,00318
05000	0,01644	0,00977	0,01491	0,00934	0,09301	0,05040	0,02741	0,03000	0,03434	0,04464	0,02193	0,06046	0,05496	0,03657	0,02964	1,39981	0,02002	0,02454	0,01812	0,01514	0,01508	0,00798	0,02573	0,02726	0,03000	0,05159
06000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	1,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000
07000	0,10290	0,07661	0,07153	0,07908	0,03927	0,04775	0,08027	0,11513	0,07453	0,08630	0,05378	0,06493	0,04741	0,08005	0,08728	0,02732	0,02993	1,06308	0,09717	0,02671	0,02834	0,00255	0,02644	0,08384	0,10528	0,05810
08010	0,04740	0,05938	0,06507	0,04723	0,04925	0,09196	0,06879	0,03037	0,11994	0,09937	0,04284	0,04910	0,04696	0,04124	0,03805	0,02683	0,03357	0,11731	1,08929	0,03335	0,02019	0,00116	0,01362	0,02142	0,04093	0,02911
08020	0,00293	0,00348	0,00253	0,00372	0,00362	0,00407	0,00574	0,00733	0,00970	0,00864	0,00482	0,00732	0,00569	0,00910	0,00989	0,00383	0,00450	0,01006	0,00857	1,01647	0,01207	0,00013	0,00824	0,01202	0,01481	0,02570
09000	0,02986	0,02398	0,02870	0,03626	0,06295	0,05996	0,07138	0,07683	0,08352	0,08431	0,05464	0,07031	0,05763	0,07534	0,07337	0,05121	0,06841	0,10944	0,05290	0,06793	1,10100	0,00200	0,05535	0,06236	0,09579	0,07607
10000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	1,00000	0,00000	0,00000	0,00000	0,00000
11010	0,00049	0,00030	0,00038	0,00026	0,00055	0,00027	0,00084	0,00438	0,00100	0,00097	0,00063	0,00111	0,00048	0,00144	0,00096	0,00041	0,00042	0,00049	0,00050	0,00117	0,00063	0,00002	1,00278	0,00033	0,00149	0,00125
11020	0,00005	0,00005	0,00005	0,00012	0,00011	0,00014	0,00010	0,00020	0,00008	0,00008	0,00010	0,00006	0,00007	0,00007	0,00006	0,00004	0,00004	0,00020	0,00037	0,00041	0,00020	0,00000	0,00014	1,00664	0,00264	0,00065
11030	0,00336	0,00413	0,00498	0,00240	0,00664	0,00527	0,00457	0,00404	0,00600	0,00595	0,00303	0,00403	0,00396	0,00503	0,00328	0,00431	0,00228	0,00910	0,03589	0,00504	0,00495	0,00103	0,00573	0,00999	1,03207	0,02277
12000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	1,00000
total	**1,66064**	**1,36972**	**1,69554**	**1,66913**	**1,61494**	**1,50171**	**2,09325**	**1,81524**	**1,76865**	**1,71409**	**1,49537**	**1,63225**	**1,62244**	**1,69171**	**1,65581**	**1,70549**	**1,69528**	**1,54018**	**1,61979**	**1,23293**	**1,27049**	**1,02656**	**1,24195**	**1,46763**	**1,59206**	**1,49031**
	0,55497	0,36450	0,60362	0,48690	0,50538	0,43444	0,92698	0,49720	0,67513	0,54277	0,39505	0,58590	0,53696	0,64950	0,65545	0,30567	0,69528	0,47710	0,53050	0,21646	0,16950	0,02656	0,23916	0,46098	0,55999	0,49031

Table A.2: **Estimated 1998 Domestic Leontief Inverse Matrix**

CP	01010	01020	01030	02000	03010	03020	04010	04020	04030	04040	04050	04060	04070	04080	04090	05000	06000	07000	08010	08020	09000	10000	11010	11020	11030	12000
01010	1,08136	0,00274	0,08982	0,00817	0,00053	0,00062	0,13285	0,00578	0,01098	0,00378	0,00212	0,00101	0,00222	0,00170	0,00222	0,00041	0,00474	0,00822	0,00154	0,00042	0,00120	0,00009	0,00244	0,00802	0,00572	0,00549
01020	0,00056	1,00515	0,00299	0,00178	0,00016	0,00019	0,02396	0,00112	0,00114	0,00048	0,00041	0,00024	0,00084	0,00054	0,00043	0,00011	0,00025	0,00312	0,00047	0,00012	0,00033	0,00001	0,00081	0,00327	0,00176	0,00131
01030	0,09067	0,02471	1,08639	0,00890	0,00105	0,00129	0,16807	0,01078	0,08395	0,03328	0,00310	0,00266	0,00278	0,00275	0,00569	0,00069	0,00617	0,00959	0,00204	0,00098	0,00268	0,00005	0,00345	0,00898	0,00507	0,00641
02000	0,00154	0,00076	0,01058	1,17955	0,00036	0,00041	0,08773	0,00338	0,00374	0,00103	0,00240	0,00051	0,00116	0,00091	0,00102	0,00025	0,00065	0,00502	0,00139	0,00024	0,00052	0,00002	0,00150	0,00458	0,00204	0,00292
03010	0,00129	0,00074	0,00055	0,00105	1,10782	0,02730	0,00122	0,00069	0,00105	0,00095	0,00350	0,00331	0,09383	0,03156	0,00687	0,00201	0,00780	0,00079	0,00125	0,00030	0,00044	0,00135	0,00026	0,00065	0,00138	0,00100
03020	0,03604	0,01013	0,00867	0,00890	0,04447	1,04285	0,01655	0,00823	0,00924	0,01168	0,08303	0,09725	0,06086	0,01779	0,04244	0,06263	0,04602	0,00609	0,01294	0,00163	0,00258	0,00102	0,00322	0,00961	0,00735	0,00608
04010	0,01609	0,00687	0,13577	0,03283	0,00254	0,00296	1,14603	0,04091	0,02002	0,00992	0,01103	0,00401	0,01195	0,00811	0,00971	0,00184	0,00525	0,04360	0,00783	0,00214	0,00464	0,00016	0,01382	0,04770	0,01519	0,03614
04020	0,00068	0,00060	0,00066	0,00453	0,00259	0,00184	0,00251	1,12513	0,01475	0,00414	0,00326	0,00265	0,00158	0,00408	0,02048	0,00126	0,00215	0,00188	0,00149	0,00207	0,00123	0,00010	0,00124	0,00389	0,00623	0,00359
04030	0,00369	0,01210	0,00223	0,00869	0,00082	0,00091	0,00392	0,00259	1,07438	0,00229	0,00146	0,00165	0,00178	0,00359	0,01716	0,00073	0,05997	0,00607	0,00164	0,00044	0,00233	0,00004	0,00242	0,00149	0,00737	0,00105
04040	0,00329	0,00321	0,00441	0,00680	0,00455	0,00591	0,02100	0,01214	0,00906	1,14533	0,01199	0,03732	0,00721	0,01198	0,02591	0,00450	0,00954	0,01221	0,00703	0,01673	0,02490	0,00016	0,02102	0,01460	0,01456	0,02088
04050	0,10272	0,05308	0,05308	0,09940	0,06308	0,05682	0,05497	0,05104	0,08392	0,06776	1,07297	0,06007	0,03495	0,04627	0,07359	0,03753	0,05052	0,04346	0,15021	0,00929	0,01816	0,00298	0,01776	0,05993	0,05699	0,03519
04060	0,00132	0,00184	0,00111	0,00074	0,01112	0,00629	0,00642	0,00130	0,00190	0,00133	0,00281	1,03703	0,00204	0,00448	0,00549	0,00206	0,12111	0,00117	0,00215	0,00066	0,00051	0,00016	0,00207	0,00307	0,00268	0,00227
04070	0,00187	0,00239	0,00184	0,00428	0,00746	0,00580	0,00580	0,00341	0,00692	0,00502	0,00666	0,00630	1,05849	0,14367	0,05264	0,00295	0,05231	0,00263	0,00529	0,00131	0,00098	0,00025	0,00110	0,00208	0,00602	0,00469
04080	0,00651	0,01224	0,00655	0,01998	0,01911	0,01215	0,01277	0,00523	0,00529	0,00740	0,00652	0,00467	0,01468	1,01866	0,00687	0,00666	0,10971	0,00753	0,01817	0,00633	0,00320	0,00120	0,00297	0,00842	0,03166	0,02105
04090	0,00010	0,00010	0,00015	0,00182	0,00021	0,00023	0,00061	0,00064	0,00062	0,00031	0,00019	0,00048	0,00029	0,00072	1,00016	0,00055	0,01217	0,00050	0,00044	0,00047	0,00051	0,00001	0,00212	0,00053	0,00195	0,00177
05000	0,01420	0,00851	0,01321	0,00719	0,09041	0,04826	0,02470	0,02463	0,03197	0,04241	0,01888	0,05665	0,05140	0,03195	0,02578	1,39772	0,01861	0,02344	0,01593	0,01460	0,01455	0,00788	0,02511	0,02588	0,02766	0,04989
06000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	1,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000
07000	0,09991	0,07589	0,06774	0,07586	0,03581	0,04539	0,07389	0,09867	0,07024	0,08370	0,05062	0,06144	0,04381	0,07585	0,08226	0,02505	0,02846	1,06196	0,09486	0,02610	0,02787	0,00242	0,02569	0,08269	0,10252	0,05565
08010	0,04248	0,05644	0,06053	0,04315	0,04462	0,08715	0,06242	0,02391	0,11337	0,09377	0,03703	0,04220	0,04134	0,03569	0,03209	0,02285	0,03115	0,11354	1,08453	0,03207	0,01897	0,00100	0,01238	0,01891	0,03721	0,02630
08020	0,00272	0,00341	0,00233	0,00345	0,00339	0,00396	0,00554	0,00643	0,00970	0,00869	0,00469	0,00725	0,00552	0,00895	0,00981	0,00378	0,00448	0,01040	0,00859	1,01726	0,01264	0,00012	0,00858	0,01242	0,01510	0,02674
09000	0,02671	0,02218	0,02596	0,03269	0,06028	0,05809	0,06806	0,06561	0,08062	0,08237	0,05147	0,06682	0,05418	0,07104	0,06890	0,04948	0,06712	0,11031	0,04987	0,06882	1,10288	0,00186	0,05572	0,06137	0,09378	0,07485
10000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	1,00000	0,00000	0,00000	0,00000	0,00000
11010	0,00044	0,00026	0,00033	0,00018	0,00048	0,00022	0,00076	0,00372	0,00088	0,00090	0,00058	0,00105	0,00042	0,00135	0,00081	0,00038	0,00039	0,00046	0,00043	0,00115	0,00061	0,00001	1,00276	0,00028	0,00140	0,00119
11020	0,00004	0,00005	0,00005	0,00011	0,00010	0,00014	0,00010	0,00017	0,00007	0,00007	0,00009	0,00005	0,00006	0,00006	0,00005	0,00004	0,00004	0,00020	0,00036	0,00041	0,00020	0,00000	0,00014	1,00664	0,00264	0,00065
11030	0,00308	0,00397	0,00473	0,00211	0,00636	0,00502	0,00418	0,00335	0,00566	0,00567	0,00269	0,00365	0,00360	0,00463	0,00287	0,00409	0,00214	0,00896	0,03582	0,00500	0,00492	0,00103	0,00569	0,00988	1,03198	0,02270
12000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	1,00000
total	**1,53734**	**1,30736**	**1,57970**	**1,55213**	**1,50734**	**1,41380**	**1,92404**	**1,49885**	**1,63950**	**1,61228**	**1,37751**	**1,49829**	**1,49499**	**1,52634**	**1,49327**	**1,62756**	**1,64075**	**1,48115**	**1,50428**	**1,20854**	**1,24686**	**1,02192**	**1,21228**	**1,39490**	**1,47826**	**1,40780**
	0,45598	0,30221	0,49331	0,37258	0,39952	0,37095	0,77801	0,37371	0,56512	0,46695	0,30454	0,46126	0,43650	0,50768	0,49311	0,22984	0,64075	0,41919	0,41974	0,19128	0,14398	0,02192	0,20952	0,38826	0,44628	0,40780

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Table 1

The Competitiveness Matrix

	Stagnant Sectors	Dynamic Sectors
Country's Market Share Increases	*Waning Star*	*Rising Star*
Country's Market Share Decreases	*Retreats*	*Missed Opportunities*

Table 2

Chilean Competitiveness Matrix, 1985-1998

	Waning Stars			*Rising Stars*	
6821	Copper and copper alloys, refined or not, unwrought	25,35	0579	Fruit, fresh or dried, n.e.s.	3,35
2871	Copper ores and concentrates; copper matte; cement copper	10,37	1121	Wine of fresh grapes (including grape must)	3,26
0575	Grapes, fresh or dried	4,95	0342	Fish, frozen (excluding fillets)	2,99
2517	Chemical wood pulp, soda or sulphate	4,12	0344	Fish fillets, frozen	1,72
2482	Wood of coniferous species, sawn, planed, tongued, etc.	2,63	5121	Acyclic alcohols and their halogenated	1,53
0574	Apples, fresh	1,86	0341	Fish, fresh (live or dead), or chilled	1,04
2460	Pulpwood (including chips and wood waste)	1,35	6822	Copper and copper alloys, worked	0,71
0343	Fish fillets, fresh or chilled	1,27	0546	Vegetables, frozen	0,69
2879	Ores and concentrates of other non-ferrous base metals	1,16	0980	Edible products and preparations, n.e.s.	0,67
2890	Ores and concentrates of precious metals;	1,13	0372	Crustaceans and molluscs, prepared, n.e.s.	0,59
5221	Chemical elements	0,96			
2815	Iron ore and concentrates, not agglomerated	0,87			
0360	Crustaceans and molluscs, whether in shell or not, fresh	0,76			
7821	Motor vehicles for the transport of goods or materials	0,56			
0585	Fruit juices (including grape must) and vegetable juices	0,56			
5232	Metallic salts and peroxysalts of inorganic acids	0,55			
0440	Maize (corn) , unmilled	0,52			
	Total share in Chielan export	**58,99**		***Total share in Chilean export***	**16,59**
	Retreats			*Missing Opportunities*	
0814	Flours and meals, of meat, fish, crustaceans or molluscs,	2,60	2929	Other materials of vegetable origin, n.e.s.	0,52
6811	Silver (including rolled silver), unwrought, unworked	0,67			
2471	Sawlogs and veneer logs, of coniferous species	0,62			
2816	Iron ore agglomerates (sinters, pellets, briquettes, etc.)	0,59			
	Total share in Chilean export	**4,48**		***Total share in Chilean export***	**0,52**

Source: CAN2000, sector classification by the SITC, rev.2, 4 digits

Table 3

Chilean Competitiveness Matrix, 1985-1990, all sectors

		Stagnant Sectors	Dynamic Sectors
	Share	**33,6**	**66,3**
Market Share Gains	**82,6**	23,9	58,8
Market Share Loss	**17,3**	9,7	7,5

Table 4

Chilean Competitiveness Matrix, 1990-1998, all sectors

		Stagnant Sectors	Dynamic Sectors
	Share	**81,2**	**18,8**
Market Share Gains	**90,1**	75,6	14,5
Market Share Loss	**9,9**	5,6	4,3

Source: CAN2000, SITC, revision 2, 4 digits

Table 5

The Substitution Effect, 1986-1998

Code	Sector	Multipliers Difference
10000	Housing	- 0.004637703
09000	Financing establishment	- 0.023634800
08020	Telecommunications	- 0.024385604
11010	Education	- 0.029668773
06000	Construction	- 0.054527917
07000	Trade, Restaurants and Hotels	- 0.059037143
01020	Fruit production	- 0.062356446
11020	Health	- 0.072727353
05000	Electricity, gas and water	- 0.077926527
12000	Public management	- 0.082517743
03020	Other mining (2)	- 0.087910059
04040	Paper and derivatives Production	- 0.101809947
03010	Copper mining	- 0.107597622
11030	Other service	- 0.113798356
08010	Transport	- 0.115516601
01030	Other agrarian production	- 0.115841558
02000	Fishery	- 0.117002950
04050	Chemical, plastic, and petroleum industries	- 0.117856556
01010	Agrarian production, except fruit production	- 0.123294059
04070	Basic Metallic Industries	- 0.127445919
04030	Furniture, accessories and wood industries	- 0.129145281
04060	Non metallic mining products	- 0.133959358
04090	Other mining (1)	- 0.162539078
04080	Metallic products, machinery and equipment Industries	- 0.165376950
04010	Food, beverages and tobacco industries	- 0.169211033
04020	Clothes and textiles Industries	- 0.316399309

Source: the Authors on the basis of the MIP86.

Note: the codes refers to the sector classification used by the Banco Central de Chile

Table 6

The VA components multipliers using the 1986 *Domestic Leontief Inverse* matrix

	1986 export vector	1998 export vector	Difference
Imports	0,20117594	0,21311332	0,01193738
Labour Income	0,24205934	0,24122850	-0,00083084
Profits	0,39366299	0,38849240	-0,00517059
Depreciation	0,13385472	0,12519169	-0,00866303
Indirect Taxes	0,02924701	0,03197408	0,00272707

Source: the Authors on the basis of the MIP86

Table 7

The VA components multipliers using the 1998 *Estimated Domestic Leontief Inverse* matrix

	1986 export vector	1998 export vector	Difference
Imports	0,24757433	0,26054019	0,01296587
Labour Income	0,22818482	0,22701337	-0,00117145
Profits	0,37098232	0,36532156	-0,00566076
Depreciation	0,12690126	0,11809737	-0,00880390
Indirect Taxes	0,02635726	0,02902750	0,00267024

Source: the Authors on the basis of the MIP86

Table 8

Comparing Production Structures, 1986-1998

1986 Export Vector

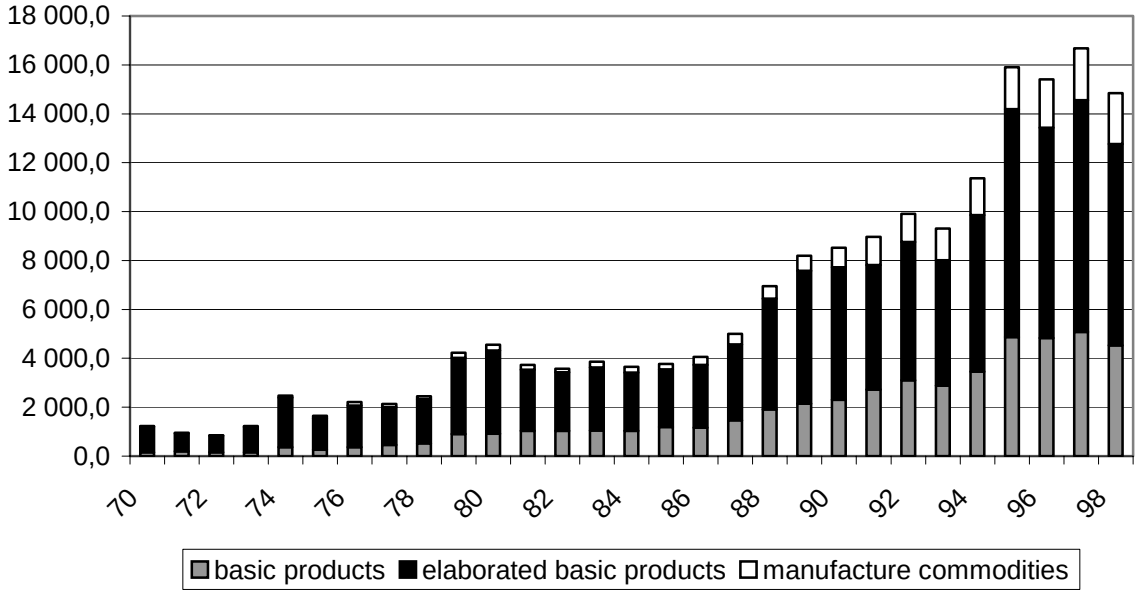
Supply Structure	Imports	Labour Income	Profits	Depreciation	Indirect Taxes
1986	0,20117594	0,24205934	0,39366299	0,13385472	0,02924701
1998	0,24757433	0,22818482	0,37098232	0,12690126	0,02635726
Difference	*0,0463984*	*-0,0139*	*-0,0227*	*-0,007*	*-0,0029*

1998 Export Vector

Supply Structure	Imports	Labour Income	Profits	Depreciation	Indirect Taxes
1986	0,21311332	0,24122850	0,38849240	0,12519169	0,03197408
1998	0,26054019	0,22701337	0,36532156	0,11809737	0,0290275
Difference	*0,0474269*	*-0,0142*	*-0,0232*	*-0,0071*	*-0,0029*

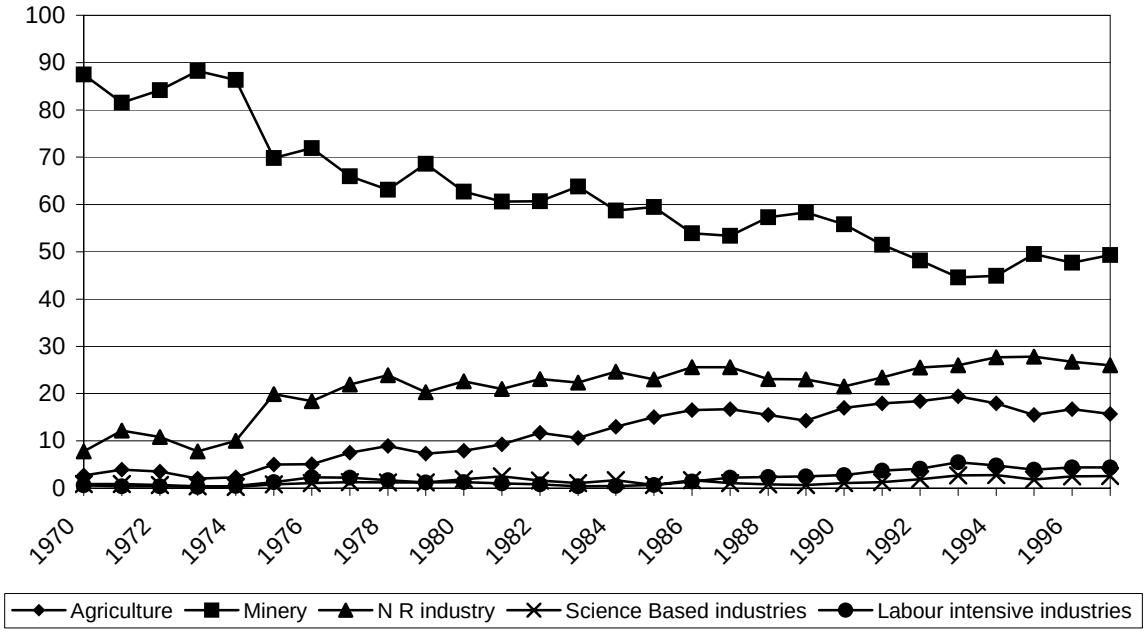
Source: the Authors on the basis of MIP86

Figure 1
Value of Chilean Export (classified, goods), 1970-1998, (million dollars)



Source: ECLAC (2000a)

Figure 2
Chilean Export Composition (goods), 1970-1997, (shares)



Source: Stumpo (2000)

Figure 3

The Technological Gap Function

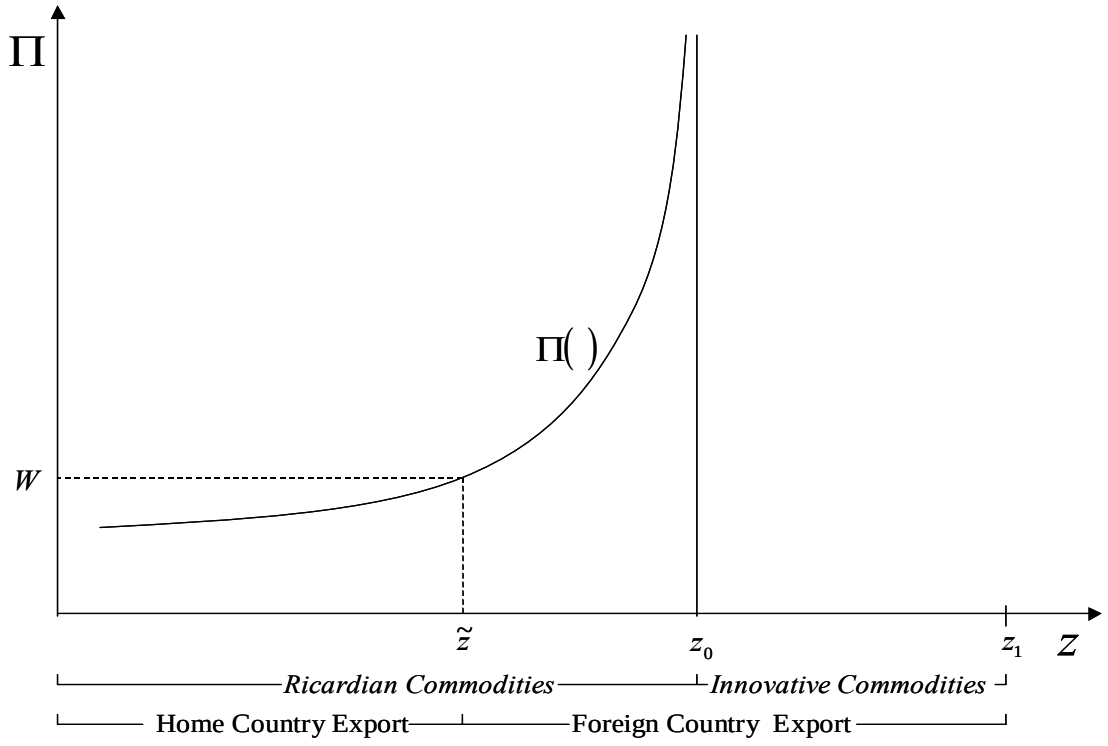


Figure 4

Catching-Up and Falling Behind Possibilities