The Ports of Northern Chile: A Mining History in Long-run Perspective, 1880 – 2002

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Summary
The existence of mining sources and the necessity of a connection between suppliers and demander’s (in national and international markets), lead that some places play an important role managing their trade movement. In that case, seaport plays an important role due the importance of the sea trade in that kind of commodities (and the geographical characteristics). Their live is extremely joined with the evolution of the product cycle and, only a successful diversification attempts could overcome it, and get a certain regional development (the type of exports varies but role of the seaport doesn’t change). The Chilean case in the long term (specifically the north mining provinces) allow us to observe the evolution of the movement of an important set of seaports during the effects of the Nitrate era, the Cooper era, the evolution of the changing trade policy, the implementation of the Import Substitution policy liked with the industry promotion, also in the north, and the technological change in sea trade and in the mining production. Also, we could analyse the evolution of the population in a part of that seaports, and some industrial magnitudes in that regions. I want to focuses in the description of the goods movement in the seaports of North-Chile (the coasting trade in both directions, in weight and value, the imports and also the exports), during 1880 – 2002, and to test the impact of a sort of different variables that could affect their evolution and the development of the regional economy (commodities price, trade policies, regional industrialization, population or trade diversification).

1 Introduction
The changes in the regional localization of the economic activity in Chile from end of 19th century to the present day have been very important, and the commerce has played in them an important role. The existence of a big amount of mineral resources in the north and central part of the country, the development of the industrial sector followed by a fort process of urbanization, coverall in the second third of 20th century, has generated the necessity to articulate a complex commercial flow in which the foreign and inner trade is combined. Simultaneously, the geographic and orographic configuration of the country has implied that a considerable amount of the commerce has been made through the sea2,

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1 This paper is a first draft of the investigation that I am making for my doctoral thesis called “La distribución regional de la actividad económica en Chile y su impacto sobre el desarrollo” (in process). This investigation has been supported by the project SEJ2005 – 02498 / ECON (MEC, Spain), supervised by J. Catalan, and also BEC2003-00190 (MCYT, Spain), supervised by A. Carreras, I am so gratefuly to the comments of C. Yáñez, A. Carreras-Marín and A. Herranz. The usual disclaimers apply.
2 Even now, over 90% of total foreign trade is maritime. In the first two thirds of the 20th century the inner trade was also maritime, because the terrestrial trade wasn’t important until 1960. The rail road trade was usually transversal (to the next seaport), specially in the analysed zone. Badia-Miró,2004.
therefore, its study, is a good approach for the total of the commercial flows inside the country.

The objective of our study wants to focus in a specific area of the country; the north part of Chile with important mining deposits throughout the 20th century, which has determined a specific productive and commercial structure, besides to generate important effects on the distribution of the population. These mining exports make possible the insertion of these provinces in the world-wide markets, and the possibility of import directly, a set of manufactured products from the industrial countries, usually in the seaports linked to big cities, although in others we only acted as an extractive centres. The changes in the worldwide markets of raw materials had a direct impact in the harbour localization through the configuration of its exports (sometimes it reinforce the exports, other times reorient their commercial flow from outside to the interior, and sometimes, some harbours appear or disappear).

Our study is centred in the ports of the Chilean Norte Grande and Norte Chico (provinces of Tarapacá, Antofagasta, Atacama and Coquimbo). In concrete we are talking about thirty-four ports with coastal commerce, twenty of which have foreign trade during all over the period (see table 1), distributed along the four provinces.

The data used to analyse the harbour commerce was the total of exits and entrances in

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3 Nitrates until 1930 (the big expansion was at the end of the 19th Century); and after 1930, copper until nowadays. Other exports like Silver and gold were also important.
value for the set of ports of the zone, for foreign and domestic trade. In domestic trade we also work with tonnage. Simultaneously, we have observed the structure of that commerce in several years, while that has been possible (whereas for the exports we have been able to study the commercial structure until the decade of the 90’s, for the domestic trade we have to stop at in the middle of the trip, around 1960, having tried to show some ideas of what it is happening at the present time from tonnage data). We also want to observe the impact that the dowry of natural resources has on the evolution of the industry and the population; we have added to the study, the data of industrial occupation by sectors and provinces, and the population in all over the country and in our provinces (total and urban population).

The period’s study goes from the end of the 19th century, just after the finish of the War of the Pacific and the annexation of the two Northern provinces by Chile, to our days. The outer sector has suffered many changes along the 20th century. The first one, a period of development guided by the exports, with strong bumps caused by the variation in prices of the raw materials. This experience was followed with an intense process of industrialization guided by the state (IGS), where the outer sector played a secondary role, although necessary as a supplier of the sources to buy the necessary inputs for the development. At the same time is applied a protectionist political tariff for the promotion of the regional development, which have determining effects in the location of determined industries in the zone of study, fruit of the creation of Free Trade Zones. That development oriented to the domestic market forms new commercial relations in the region which are truncated steeply when the country is opened to the outside, in 1973. From mid 70’s until the 80’s, the total opening to the outside causes an accelerated process of de-industrialization that made a new economic reality in the country; the industrial sector stooped being the motor of the development and played a secondary or, even tertiary role. The export of raw materials and half-finished products recovered the impulse that was lost some decades before.

The paper has been structured of the following way; a first section permit us to observe the global evolution and by types of products of the exits and entrances of the commerce, by ports (foreign and domestic trade). A second section allows us to relate these results with the evolution of the industry and the population throughout the 20th century. A third part joins the results of previous sections, looking for connections between the configuration of a determined commercial structure of the ports, the spatial location of the industry and the population; in the same section we consider a model that wants to obtain the main factors which caused the evolution of the added behaviour of the domestic trade in the long term (the productive structure, the population, or the own commercial configuration, inner or outer). We finished with the conclusions.

2 Harbour location and mining exports

The impact of the commercial openness (or the reduction of the transport costs) to the location of the economic activity and in the industrial sector, has been widely studied. It

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5 The location of the automotive industry in Arica after 1960 is extremely correlated with its Free Trade Zone and the desire of a regional development in this area, of the Chilean Government. Gywne, 1984
has not happened the same with the impact that the variation of commercial policies had made to the evolution of the commerce (understood as a part of own production which is not destined to consume), and how it affects the possibility that certain zones offer their products to the rest of the country, to the foreigner, or the insertion in the domestic and international markets. Did the productive and commercial specialization allows to increase the commercial flow? Did not? Did the importance of the port or the region undergo significantly in that context? Did difficulties to export orient the commerce towards the rear area? Did the greater capacity to export reverts in a greater capacity to import?, or this went to others parts of the country?. There are so many questions to answer.

We have based the division of the analysed period on the different foreign trade cycles as it was indicated in the previous section. A first period of progressive participation in the world-wide markets in the context of which is known as the First Globalization, when the availability of resources demanded in the world-wide markets was higher (coverall the nitrates but also the copper), link the industrialized countries with Chile and, in special, our zone of study. We spoke about access to the world-wide markets and not about economic liberalization because this point is already under discussion for the high tariff levels in the region. The second period, between the end of I World War and the Great Depression, when the country recovers the access to the world-wide commerce, after the collapse that supposes the Great War; this recovery is based on not too solid positions for the appearance of substitutes for the traditional exports, that reduces the competitiveness of Chilean products (chemical products and fertilizers, coverall in Germany). The Great Depression supposes a strong blow for the economy of the country because of the fact that the foreign dependencies transmit the world crisis to the rest of the economy. The exit became in a new context where the IGS appeared as an alternative to the previous model of development; the economy is oriented to foment the industry as a motor of the development, and the levels of exports and imports take years in recovering, although for the production was quicker; the increase of effective protection in certain sectors takes to the configuration of a new economic reality, with strong effects on the productive and commercial structure (directly with the Free Trade Zones, indirectly when protecting sectors over others, and even discouraging them). The institutional and economic crisis of the 70’s ends a stage which had generated, in their final part, too imbalances that cause forts instabilities in the economy (inflation, unemployment). The steep commercial opening in the 70’s and 80’s drown another reality; there were a deep process of de-industrialization together with an impulse in certain sectors (raw materials and semi-manufactured products), where the comparative advantage remains after the tariffs were dismantled. The debt crisis in the 80’s and the problems with the balance of payments, drive the country to new reforms to reach their stabilization, with the promotion of certain sectors with easy insertion in the world-wide markets. The signing of numerous commercial treaties in the 90’s reinforces their bet to open itself to the world as a development strategy.

Our following step wants to analyse the behaviour of different variables of commerce; we

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7 The First Globalization is the period before 1913, which fit in with the period of maximum flows of goods, capital an people, among the different parts of the world O’Rourke, Kevin H. and Williamson, J.,1999.
8 Para mayor detalle ver Coatsworth &Williamson,2004
9 Chile junto a Cuba son los dos países que tienen un impacto negativo más agudo producto de la crisis provocada por la Gran Depresión Bulmer-Thomas,2003
10 During this period, everybody believes that the road to the development was through the industry; is not only a Latin America characteristic. Cardenas &Ocampo, Jose Antonio and Thorp, Rosemary,2000.
11 A good quantitative analysis of the region in Hofman,2000.
12 Cardenas &Ocampo, Jose Antonio and Thorp, Rosemary,2000
initiate the study with the evolution of the coastal commerce of entrances and exits. We start from an added vision of the data, and then continue to a more detailed study with data by ports (in value and in tonnage due to the non-existence of a complete series of data value in the last decades). The detailed analyses about the structure of the commerce have been limited to the years in which the data in value were offered because the statistical detail disappears when it was offered in weight (in that case we only know the proportion of solids, existing bulks and liquids). The second part of the section consists in the study of the foreign trade data (exports and imports), considering aggregates of the country and provinces to follow with a more detailed study of ports; in both cases the data are offered in value. The benchmark points to study the composition of the commerce for the coastal navigation data have been 1904, 1913, 1929, 1938 and 1953, whereas for the foreign trade we also have 1982 and 2002.

We start working with the entrances of coastal navigation in value; we have data from 1892 to 1962 although not as a continued series. The total values show a quite similar behaviour between the total of the country and the total of our zone; before the Great Depression the weight of this one is upper to 60% of the total, percentage that decreased during the second third of 20th century, coverall in the 50’s and the 60’s, concentrating at the end less than 20%. The evolution of total shows an increase during the first third of the 20th century and a strong fall during the Great Depression (recovery the same values took 20 years). By provinces, an initial dominion of Tarapacá finished already in the first decade of 20th century, is followed by the dominion of Antofagasta, province whose weight in the total of zone increased during the second third of the century (more than the 50%). The mining cycles seem to be related to those series; while the main products of export were the nitrates, the coastal commerce was very important in the regiono, but when the main product was the copper, the situation changed and the entrances were reduced substantially.

![Illustration 2: Coasting trade. Inflow in percentage of total value ($1915) of northern provinces in Chile, total inflow of the country and the analysed zone, 1894 – 2002.](image)

In the detail by ports, the bigger ones followed the tendency that we observed in the evolution by provinces: Antofagasta and Iquique (the most important with 50% of total entrances in the zone), Coquimbo, Arica and Tocopilla (in a certain distance), and at the end of the 19th century we also found Taltal and Caldera. The changes in the coastal
navigation during the Great Depression caused that several ports let had a constant flow of
merchandise (of 28 ports, a half of it disappeared in 1930, and in other 6 ports the flow began to be discontinuous in the 50’s and the 60’s, disappearing at the end).

Talking about the commercial structure, in 1904, we observe the existence of two types of ports; those that have great entrances of nourishing products (vegetables, drinks and similar) and some entrances of manufactured products, which are the most important ports (Pisagaua, Iquique, Antofagasta, Tocopilla, Taltal or Coquimbo); and those that we considered strictly as a mining ports (Tongoi and Guayacán). In 1913, the commercial structure was similar as in 1904: big entrance of nourishing products and drinks in most of the ports (very high percentage) and big manufactured entrances in which were near populated zones, and with a greater movement of cargo (values that went up to around 10% or even more)\textsuperscript{13}; in the other type of ports (strictly miners) only remained Guyacán and appeared Gatico (although in that case, there was a strong nourishing product entrance). In 1929 some harbours hadn’t got any flow, due to the effects of the stagnation in the 20’s (Carrizal Bajo, Pichidangui, Peña Blanca, Puerto Osasco y Guayacán)\textsuperscript{14}; other characteristics of the period were the important entrances of manufactured products and equipment goods. In 1938, one decade after the fall of the total value of coastal navigation, and while the entrances are even stagnant, we observed as other ports, four in particular, let have commercial flow (Junin, Caleta Buena, Gatico and Coloso)\textsuperscript{15}; Arica, Tocopilla, Antofagasta and Coquimbo were the great ports (all of them exporters), whereas the ports of Atacama do not show a so noticeable hierarchy (balance between Chañaral and Caldera); about the commercial structure, in the great ports this were similar to the previous one (predominance of the nourishing and vegetable products, and important entrances of industrial products (coverall textile, chemical and diverse manufactures); on the other hand, several of the sub ports had a high level of manufactured entrances, although with different characteristics: whereas Punta Lobos and Guanillos, in Antofagasta, had manufacturing entrances similar to the great ports, with textile products

\textsuperscript{13} En this group we found the ports of Arica, Gatico, Antofagasta, Mejillones, Paposo, Carrizal Bajo and Peña Blanca (Iquique hadn’t got an important manufactured entrance, possibly this was made through Arica).

\textsuperscript{14} Some of them were mining ports even in coastal commerce.

\textsuperscript{15} The ports which had no flow in 1929 were in Atacama and Coquimbo, but the ports which disappear in 1938 were in Tarapacá y Antofagasta.
and diverse manufactures; the entrances in Huasco and Guanillos, on the other hand, respond to other factors, with great entrances of chemical products in Huasco and machinery and tools for the industry in Guanillos. In 1951, the last benchmark with value data, we observe other four ports with a minimum commercial flow (Pisagua, Caleta Buena, Laguna Verde y Punta Lobos); in the other ports the commercial structure was quite similar as the others before, predominance of nourishing products and important weight in manufacturing products, coverall of textiles, chemistries and diverse manufactures (only in Cruz Grande the manufacturing products entrances were higher, coverall by the chemical agent entrances, metallurgical industries and useful machineries).

In order to complete the study of the coastal navigation entrances until the end of the century, we have to resort to the data in weight; but this is not useful before 1930 because it is not available in the statistical sources. In the period when both data coexist, the loss of weight of the coastal commerce of the zone in the set of the country is confirmed, in a
context of expansion of the total commerce. This series show an important stagnation until the 90's, when the total of the country had a significant increasing (bending its total magnitude). In the provincial context, the last part of the century shows Antofagasta as the main important, Tarapacá in the middle zone decreasing in percentage, and Coquimbo and Atacama, as the less important with a non-change evolution.

As we can see in illustration 5, during the last part of the century, Antofagasta was not the main port until 1995, which role were played by Tocopilla and, at some moment, Huasco; it is certain that the difficulty for not being able to work in data in value before, prevents us to know the real meaning of this situation (the structure of the entrances had been similar in the years before, when we had data). Unlike the 1950 data, the ports of Coloso and Guayacán showed flow of merchandise in quite excellent values.

Illustration 6: Coasting trade. Outflow in percentage of total value (§ 1915) of northern provinces in Chile, total inflow of the country and the analysed zone, 1894 – 2002.

For the analysis of the exits of coastal navigation, we will follow the same structure that we have followed for the entrances; we observed as the exits in value are much more stable that the entrances (it seems to be that the purchase capacity due to the mining exports had an important effect on the entrances of coastal commerce). The exits seem to follow an independent pattern of the outer sector, responding more to the competitive reality of the rear area. On the evolution of the provinces data (see illustration 6) Tarapacá played an important role at the beginning of the 20th century, situation which was reverted with the Great Depression (later than in the entrances), and at the end of the period related to the special status of Arica. The exit from Coquimbo are important all over the period, almost a third of the total of the region (at the same level that Tarapacá in the 30's, in the 40's and the 50's). The exits of Antofagasta are the more important before 1930, in clearing increase over the loss of weight of Atacama, the province with smaller exits.

By ports, the most important are Coquimbo, Antofagasta and Iquique, with a quite stable in weight throughout the period, although it seems that Antofagasta was improving its position in the decades of 40 and 50. The importance of Coquimbo is remarkable, leader in

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17 An example of that was the higher values in Tarapacá in the final years due to the creation of the Free Trade Zone, which permitted the foreign entrance of some products which were redirected to others parts of the country.

18 Its noticed that this province provided the world and it was provided by it, but it also was an entrance for a lot of products which were redirected to the rest of the country.
the region, at least until the decade of the 30, although it maintains their weight until the
decade of the 50. The evolution of Tarapacá’s entrances, in the 50’s were explained by the
entrances in Arica (and the creation of the Free Trade Zone in the city). The commercial
structure of the harbours, in 1904 had an strong presence of exits of the manufacturing
sector in provinces of the Great North (industrial oils and others), a mining product
specialization on a part of the ports of Atacama, and an agricultural product specialization
in the ports of Coquimbo (that will be repeated all over the period). In 1913 we can observe
quite similar results as the previous ones, except in Antofagasta where took place an
increase of the exits of mining products which went to the domestic market. In 1929, the
differences between provinces were remarkable, while the ports of the Great North had the
exits concentrated in manufactured and mining products, the ports of the Small North sold
to the rest of the country products of agriculture and alimentary industry. In 1938, the
mining exits had been reinforced and the importance over the manufacturing products; the
ports of the province of Atacama changed and they adopted a commercial structure much
more similar to the their neighbour (importance of the mining and certain weight of the
manufactures with a reduced presence of cattle and agricultural products); whereas, the
ports of Coquimbo (and with it we basically talk about the port of Coquimbo) dealt with
agricultural products. In the last benchmark we cannot observe the direct changes
provoked by the start of the Free Trade Zone in Arica but it shows the result over the
commerce, of the application of IIS politics during the previous twenty years: it was
remarkable in Tarapacá for the reorientation of the exits towards manufactured products
(coverall in the exits of chemical agents, metallurgical and diverse manufactures); Antofagasta and Atacama followed with a quite similar structure, important exits in
mining products and increases in the exits of nourishing products\(^{19}\) over manufactured;
finally, the ports of Coquimbo decreased their exits of nourishing products and increased
the exits of manufactured\(^{20}\). This structure shows different commercial structure due the
capacity of specialization of northern ports of the country (the climate conditions in the
Great North disables the agricultural specialization\(^{21}\), but the mining sources made possible the specialization in manufactures for the domestic market, whereas the Small
North, much more apt to specialize in nourishing production). On the other hand, the
results of the IIS had no effects in the ports of the zone with an increase in the

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\(^{19}\) Due to the increase in the drinks and liquors sector.

\(^{20}\) Due to the increase in the other manufactures sector.

\(^{21}\) Only in the 60’s the fish industry will be important.
Finally, we have to resort to the tonnage data to complete the last part of the period, before the 50's. We either do not have data by products and ports so the most qualitative analysis is restricted to it. We observe in this graph the stagnation of the exits in a growing context of total tonnage. In addition, the balance which we observed in value was broken in favour of the ports of the provinces of the Small North. After the ascent and the slope of the ports of Tarapacá in the 60's, Coquimbo and Atacama became the dominators in the 70's and 90's, playing a role of agrarian product supplier of the more populated zones of Chile.

By ports, the predominance that had had Coquimbo in all the zone disappeared in favour of other subports like Guayacán or Huasco (in the Small North) or Patillos and Tocopilla (in the Great North); this fact reinforce the argument of the specialization of these ports as a agrarian product suppliers, more or less elaborated, of the urban centre of the country (the manufactures were located in the great cities which were associate to big ports).

Comparing the data of absolute values of entrances and exits, we noticed that the zone is an important demander for the rest of the country\(^{22}\) (three times more entrances than exits) with the exception of the last years coinciding with the irruption of the Free Trade

\(^{22}\) The argument of the importance of the North of the country as a demander of products of the other part of the country, which made an important contribution to its development (strong backward linkages), is broadly developed.
Zones. By ports, the great majority had greater entrances than exits and there were only few exceptions (Mejillones, Arica in the first part of the period, Huasco, Coquimbo or Los Vilos\(^{23}\)).

Illustration 10: Percentage of total exports by province of origin, 1890 – 2002.

The second part of the chapter is centred in the study of the outer sector, both imports and exports in value. In the total exports series (all the country and the zone) we could see the strong correlation between the two curves as a result of the importance of that provinces in the total exports of the country. By provinces, illustration 9 shows the impact of the mining cycles: the early predominance of Tarapacá associated to the first cycle of the nitrate exports, which finished steeply in the first decade of 20\(^{\text{th}}\) century; the ascent of Antofagasta in the second cycle of nitrate exports and the increase of the cooper’s mining, with exports which surpass 70% in many cases; was in the second mining cycle when Atacama had some relevance, although without any continuity after the economic liberalization of the 80’s and the 90’s. Finally, in the 90’s we observe a rise in the exports of Tarapacá.

By ports, the story is so simple, three ports almost explain the totality of the exports of the zone: Iquique in the first 20 years until the first decade of the 20\(^{\text{th}}\) century due the importance of Tarapacá associated to the first cycle of the nitrate exports; Antofagasta, playing a domination role from the 30’s (here is concentrate more than a half of the total exports of the zone); Chañaral, acording with the height of the province of Atacama in the middle of the 40’s, and Tocopilla until the decade of the 70.

\(^{23}\)This three ports in Atacama and Coquimbo are examples of that differential structure between both zones (some guided to the foreign markets, and others to the domestic ones).
As far as the commercial structure of the ports, this offers few doubts; more of 90% of the exports up to 1970 were the mining product heading; only Coquimbo, with much less weight than the rest of provinces, had relatively high exports of nourishing products in 1929, and this was being reduced in 1938 (it is a case of extreme coincidence with the commercial guideline followed by the domestic commerce). In the 1980 data, the high exports of mining products remained stable, but the incorporation of certain degrees of elaboration or semi-elaboration on it, modifies the formal structure with higher presence of manufactured goods, but only in the ports linked with big industrial centres (Arica, Iquique and Antofagasta), the rest of ports (Tocopilla, Chañaral and even Coquimbo which lost his nourishing product specialization) directly export not elaborated mining products.

The import shows a totally different vision of foreign trade. In addition, the impact of active commercial policy and the application of certain regional development policies (as the creation of the Free Trade Zone in Arica) had important effects.

The evolution of the ports grouped by provinces already offers a vision of all the period; the first part of history is the same as always, initial predominance of Tarapacá until the first decade of the 20th century, then, the capacity of purchase of the province was surpassed by Antofagasta). This one concentrated most of the imports during the second third of the century, but towards the decade of the 50's, Tarapacá recovered some positions when the start of the Free Trade Zone, was created in Arica. This situation lasts until the decade of the 90's, when the economic liberalization of the country made the entrances by Arica no longer so competitive and permit the recovery of the entrances of Antofagasta (their ports end up concentrating near 80% of the entrances of the zone). The rest of ports of the Small North played a quite discreet role with imports that never surpass 10% of the total.
If we analysed the evolution by ports, we see a more interesting situation than in the previous case. To the ports of Iquique and Antofagasta, we add the port of Tocopilla (with Antofagasta, both explain the totality of the harbour movement of the province), Arica with a great importance from the 50’s and, at the end of the 80’s, concentrated all the imports of the province (Iquique disappear during the decade of 80’s and 90’s24). In the south, the ports of Coquimbo and Chañaral concentrate most of the imports of the provinces in the Small North25.

The commercial structure has varied remarkably throughout the period. In 1904, part of the imports by Iquique was concentrated in industrial oils and the machines and tools; we can see the same structure in the ports of Antofagasta and Coquimbo, adding the imports of mineral products, coverall combustible. As far as the ports of Atacama, the industrial oil entrances are much more acute representing 70% of the total imports. In 1914 also the industrial oils, play an important role in all the ports. In 1929 the imports were remarkably diversified with important textile product entrances in the ports of the Small North, whereas the machineries and equipment became a determining element in Atacama; as far as Coquimbo, the alimentary product entrances and transport material were the more important sectors, in which the area will be specialized until 1951. In 1938, the main imports in all the ports were the mining products. In 1951 the imports of chemical and alimentary industries appeared strongly in Tarapacá and Atacama. Also the manufactured product imports were higher (1950 was the end of the IIS and the imports of intermediate goods to establish an own manufactured industry was very important). The North Zone of the country received direct aid for their development (not only domestic but a big share of it), and the zones of mining extraction also modernize their extractive sector to increase to their productivity and, at the same time, make some link towards the rest of the productive sectors. In 1971, the imports of machinery also had an important weight in the commercial structure of the ports (upper to 30% of the total), next to higher entrances of vehicles for the installation of assemblies plants in the Free Trade Zone (18% of the imports of Arica were automobiles). Finally, the effects of the commercial openness in the 70’s seems to affect the manufactured product imports in the ports of Tarapacá, whereas in Antofagasta and Coquimbo the imports were few more diversified with the presence of a significant

24 We can’t talk about an internal substitution process because the weight of the province in the zone, dismisses.
25 We should remember that the foreign trade commerce is made by few ports than the coastal navigation.
percentage of nourishing and mineral product imports. The 2002 data only shows us that a big share of the imports was general cargo, about we cannot say anything.

The exports are clearly superior to the imports in all the zone and all the periods, in total and local values, except in three of them: Arica, the front door of certain imports which goes directly to Bolivia and, after 1960, the most important Free Trade Zone of Chile; Coquimbo, also with strong imports over the exports (the city of La Serena - Coquimbo is an important urban centre, with strong capacity of purchase); the other port was Mejillones, only in the final part of the period and seems to be the result of the deviation of entrances to Antofagasta, for the proximity between the two ports).

3 Industrial location and evolution of the population

The size of the industrial sector in the region has been historically far below of the size of the populations, of the country, and even far below the share of commerce in the province over the total of the country. When we compare the evolution of the zone over the country, we observe two different periods, before and after 50’s. Whereas in the first one, tendencies were similar, after the 1951 census, an important industrialization took place in some of the countries, opposite to a general de-industrialization in the country\textsuperscript{26}.

\textit{Table 1: Industrial employment in Chile and the Northern Provinces, 1911 - 1997.}

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<tbody>
<tr>
<td>Total country</td>
<td>72,752</td>
<td>150,544</td>
<td>92,788</td>
<td>206,711</td>
<td>351,801</td>
<td>299,550</td>
<td>409,585</td>
</tr>
<tr>
<td>Total zone</td>
<td>4,282</td>
<td>7,545</td>
<td>4,116</td>
<td>6,955</td>
<td>22,246</td>
<td>25,254</td>
<td>37,692</td>
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The internal structure for provinces evidences a strong presence in the alimentary sector, the textile, even in the chemical sector in Antofagasta, Atacama and Coquimbo, and in metal sector in Tarapacá and Antofagasta. In the following decades the metals assume a greater importance in all the provinces with the exception of Tarapacá. After the Great Depression the situation had been modified substantially, after a generalized fall in the industrial occupation. In 1968, the industrial occupation in the textile sector had disappeared, although the occupation remained in the food sector, and increased the occupation in the sector of the machinery and the transports (the most important one) in the four provinces, product of the reinforcement of the industry during the two previous decades (the great manufactured industries of the north were created at the same time of

\textsuperscript{26} Positive growth during the years of the openness of the commerce, 1973 – 1979, and upper rates after.

the transformation in the exports, from no transformed mineral products to the more elaborated ones). In the 70’s, the de-industrialization along the country for the commercial liberalization from 1973. The result was an increase of the weight of the food sector (in Tarapacá and Coquimbo, due the productive specialization in the fishing sector and drinks); in Antofagasta and Atacama, the more mining provinces, were maintained a high industrial occupation in the sectors of metallic products and products of machinery and transport. In 1997 the structure was similar enough to the previous one, but with greater percentages in the most part of the sectors (metallic products and products of machinery and transport in the mining provinces of Antofagasta and Atacama, and nourishing products in Coquimbo); only Tarapacá underwent some variations with the diminution of occupation in the food sector, an increasing in the metallic sector. Also the strong presence of the chemical products in Antofagasta, for de demands of the mining products.

The evolution of the population in the last shows the fort migratory process towards the regions of the north of the country in the decades of the 19th century and the beginning of the 20th century (important increases in Tarapacá and Antofagasta is opposed to the stagnation in Atacama and Coquimbo). After 1910, a long stagnation in the region began until the decade of the 50’s, moment at which the impulse of the mining of copper and the industry (specially from 1960), exerts a positive effect on the growth of the population, superior to the growth of the set of the country.

The population does not follow the same impulse that we have observed in the commerce and the industry; the long process of promotion of the industrialization between the 30’s and the 70’s, does not seem to have its parallelism in the behaviour of the population, which was stagnated with the exception of Antofagasta, which grew dragged along by the capital.

About the urban population, we clearly see two differentiated zones; the Great North on the one hand, with rates of urbanization that surpass the 90% at the end of the period (fruit of the geographic situation of the region where the location in great cities is the most efficient form, whenever the mining operations allowed it); by the other side, the Small North, with inferior percentage to those of the average of the region and the country, rather less shows the existence of a structure of concentrated population in the great cities by the existence of a greater diversity in the implantation of the territory (the climatic and geographic conditions therefore allow it).

| Table 2: Total Population by provinces, 1885 - 2002. |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Tarapacá       | 54,314          | 120,527         | 113,331         | 174,399         | 273,427         | 428,594         |
| Antofagasta    | 33,636          | 113,323         | 178,765         | 243,387         | 341,203         | 493,984         |
| Atacama        | 64,143          | 63,968          | 61,098          | 149,758         | 183,071         | 254,336         |
| Coquimbo       | 187,988         | 190,867         | 198,336         | 336,000         | 419,178         | 603,210         |
| Total zone     | 340,081         | 488,685         | 551,530         | 903,544         | 1,216,879       | 1,780,124       |
| Total          | 2,479,085       | 3,184,610       | 4,215,021       | 8,382,463       | 11,108,535      | 14,922,250      |

27 We are talking about twenty years of null growth.
28 While than nitrates exploitations were dispersed in the space (being the offices, his investment centres ), the mining of copper was much more concentrated, making easy the creation of big cities ( Calama and Antofagasta are obvious examples).
arguments (Iquique and Arica in Tarapacá, and Antofagasta and Calama – Chuquicamata for Antofagasta), while the provinces of Norte Chico only have a great City ( Coquimbo – La Serena and Copiapó). But not all of them are next to the sea, only Arcia, Iquique, Antofagasta and Coquimbo are ports. Other cities associated to ports, but less important, are Pisagua (only at the end of the 19th century), Mejillones, Taltal, Caldera, Carrizal Bajo, Chañara, Huasco, and Los Vilos. We have no evidence of other big cities associated at our ports until 1960. This result, confirms the existence of some ports with one function, export raw materials and import the few products which are necessary for it extraction, with no linkages towards the rest of the economy.

4 Determining factors in the harbour location

The impact that the commercial policy exercises to the commerce is very large; the variations in foreign trade can affect the domestic commerce by a lot of ways; a modification in some barriers to trade (either for reduction in transport costs or in tariff barriers) can promote the competitiveness of those regions with absolute or comparative advantages or comparisons in given products, improving his insertion in world markets and in the rest of the domestic market. The opposite effect, the existence of bigger difficulties in world markets, makes necessary for the firm the specialization to increase his competitiveness, or they can choose for centre on the domestic market (provided by a higher protectionism level), either maintaining the industrial structure of production, or specializing at those sectors in the ones that they could been more competitive. This insertion could be explained for the resources of raw materials, Heckser-Ohlin effects or comparative advantages; even we could talk about the external economies or Marshallian. In the first case we can consider the effect of the existence of a pool of workers, big amounts of raw materials, ... demanded for the international markets; the second type of factors wants to study of the benefits due to the scale economy.

The next step is analyse the demand factors linked to our main objective, the domestic commerce; we will focus in internal factors and in the capability of attraction that these can exercise; with the entrances we will correlate these factors to the characteristics of their own region, while in the way outs we will incorporate the effects generated by nearby provinces, corrected by distance.

Our objective is to analyse the behaviour of the way outs of coastal navigation in value, in terms of the foreign trade (total value and structure), of the industrial production of the region, of own purchase power, and for the population (urban and total).

29 Only when the firm has enough size to provide the demand’s growth. When the production is limited, they sell it to the main market.
30 A broadly description for the creation and deviation of commerce in an economic integration process (or diminution of the trade barriers as our case), could be found in Krugman, P. y Obstfeld, M.,2003, p. 246.
31 Marshall,1963, chapter X, he introduce us the elements which act as a positive effect for the concentration of the economic activity, the External Economies includes some elements like the benefits for have similar suppliers, for have a pool of skilled workers, and for the knowledge spillovers.
32 While the international trade theories want to connect the factor resources with the evolution of foreign trade, in this other theories they want to link the factor resources with the evolution of the population; there are many works on it like Ellison,1999, Kim,1995 and Kim,1999. The natural resources and the comparative vantages explain an important part of the industrial location in the long run. Opposite to this authors Roses,2003 can’t found any relevance for the Spanish case.
33 In this direction, although in papers of localization of the economic activity, the supplier factors could be called as the Home Market Effect, where localizations with bigger demand of a certain product, make some unbalanced effects over production, favouring the specialization in this sector, due the scale economies; is the beginning of a intense feedback between them, as Myrdal says. Myrdal (1968),1968. An exhaustive paper of this variable, their effects, an empirical analysis and their conclusion is Head &Meyer,2003.
The importance of the study of domestic commerce is justified for the information that this provided us on the integration of the domestic market, the productive specialization of given zones and the effects of it on the population.

\[ \Delta SalCh_{t+1} = f (X_{t+1}, Y_{t+1}) \]

We want to explain the way out of domestic commerce as a simple function of supplier and offer. Some offer factors could be the export capacity of the port and the natural resources endowment (we have seen the higher percentage of natural resources in total exports of the region), and the existence of an industrial sector guided to the production of consumer goods that are transported to the most populated zones of the country (Central Zone); from among the demand factors we found population’s size (total population and urban population), his importing capacity related to the purchase power which generates exports, but also on the existence of ports than re-direction foreign trade toward others zones of the country (like free zones), and of some levels of industrial activity which want inputs as part of the final product which will be sold in the zone.

Of whole it we obtain the model:

\[ \Delta Sal_{t+1} = \alpha_1 + \alpha_2 * \Delta EXP_{t+1} + \alpha_3 * \Delta IMP_{t+1} + \alpha_4 * OCUPIND1_{t+1} + \alpha_6 * POB_{t+1} + \epsilon_{t+1} \]

Having applied logarithms on data, we presented the results in board 3.

We have accomplished the esteem for different periods, for the ones that we have data (1904, 1913, 1929, 1938 and 1951). We worked with the totals of imports and exports for ports (in constant values of 1990); the industrial occupation by sectors from industrial polls, OCIND1, and the population, as from population’s Polls. It is certain that some limitations in the availability of sources has impeded the study and digging into analysis the commercial opening of the 70’s and 80’s, but we think that the period of first globalization, the effects of the Great Depression and the period of IIS, are enough reasons that justify it.
For the estimation (1) we have considered the model (1) between 1904 and 1929, in the First Globalization, whereas for the estimation (2) we have chosen the same model, although in the later period, 1929 - 1951. In both cases, it has been considered correcting the heterocedasticity. The model shows some results that allow us to seat better the arguments with which we have worked, although the values are not conclusive (low values in the R^2). The only significant variable for all the period is that one which is related to the increase of the imports, and it seems to exist a certain relevance between the behaviour of the exits of coastal commerce with the existence of an input stream of imports (redistribution effects that can be given inside or outside the province). The existence of certain levels of industrial occupation, as a sign of specialization of the province is not significant enough after 1929, whereas if is relevant in the previous period, although with negative sign, that is to say, the industrial specialization does not favour integration of the domestic market because it does not foment the existence of a flow of exits towards the rest of the country. The variables of population and corrected population have not been significant in any of the periods, ruling out the possible existence of demand factors.

5 Conclusions

The evolution of the activity of the Northern ports of Chile has suffered the evolution of the mining cycles of the country and the world-wide markets. The appearance and disappearance of some little harbour in Tarapaca and Antofagasta were often related to the Nitrate exports, in the beginning, or cooper exports, later (only exports of raw materials with low flow of coastal commerce). The other ports, the big ones linked with urban cities (overcoat in the cooper period), had a more diversified evolution; big exports, firstly of raw materials, but at the end of the 50’s, exports of some metallic and semi-manufactured products (also from minery). The difference is also in the other face of the commerce, the domestic one, big flows of ongoings and outgoings, firstly linked with the demand, of the own population, of food, textiles and drinks, which became an important backward linkage for the industry of non-durable goods of the rest of the country. Secondly, the outgoings were linked to a process of redistribution of the foreign trade to the other parts of the country (reinforced by the Free Trade Zone of Arica, which became an important element on the evolution of the imports along the country). The own industrial and agrarian production (only semi-manufactured products) was important, in terms of commerce to the rest of the country, in Coquimbo which cause an special commercial structure with a higher importance of the agrarian products.

Bibliography


