An Assessment of Output Performance in Northern Cyprus*

Hakan Mihci and Devrim Karaman**

Abstract:

This paper mainly attempts to investigate empirically the Northern Cyprus output performance by using a panel data method for the period 1977-2005. A supplementary aim is to assess the impact of export orientation on the Northern Cyprus output level. Empirical results suggest that investment, employment and export variables significantly and positively affect the sectoral production increases in Northern Cyprus. Among other variables, exports of goods and services exert considerable affects on the sectoral production in the case of Northern Cyprus economy. Therefore, it can be suggested that a production structure mostly dependent on foreign demand makes it easier to overcome the restrictions originating from the insufficiency of the domestic market through creating new employment opportunities for highly qualified labor force and additional production capacity with productive investments. Moreover, exports have the potential to rise total factor productivities, and hence, to improve output expansion of the country further. In short, one may propose that outward orientation seems to be relevant in achieving higher levels of output in the case of the Northern Cyprus economy.

Keywords: Economic development and growth, island economy, Northern Cyprus economy, panel data analysis

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1. Introduction

Although pioneering studies had been done in the early 1960s (Robinson 1960; Kuznets 1960; Demas 1965), the 1980s witnessed an upsurge in the evaluation of the growth and development processes of small island economies (Dommen 1980; Jalan 1982; Hein 1985; Dolman 1985). Until the 1980s, the view that small island economies confront many structural problems in their growth processes dominated the literature. This view mainly depended on the constraints on scale economies originating from smallness, which in turn led to higher unit production costs, and hence, created obstacles to the sustainable growth process. In the middle of the 1980s, World Bank economist T. N. Srinivasan challenged this common view underlying the high and rapid growth performance of many small economies. He argues that smallness is neither a necessary nor a sufficient condition for low and slow growth rates in countries (Srinivasan, 1986). Srinivasan's approach itself has been challenged, as authors have proposed that the structural problems of small island economies not only originate from their smallness but also from their geographical isolation (Briguglio 1995; Milner and

** **Hakan Mihci**
Hacettepe University, Department of Economics
06800 Beytepe, Ankara, Turkey
e-mail: hakan@hacettepe.edu.tr

Devim Karaman
North Cyprus Development Bank, Project Evaluation Department, Leftkosa (Nicosia), North Cyprus
e-mail: karamandevrim@hotmail.com

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Westeway 1993).

Furthermore, small island economies are in a very difficult position with respect to two main industrialization strategies. Because of the insufficiency of their domestic markets, these economies cannot pursue import substituting industrialization policies. This insufficiency can force the countries to implement export-oriented industrialization strategies. On the other hand, export-oriented industrialization policies have serious weaknesses in small island economies due to factors such as high transportation costs and the instability of foreign demand. In the literature, however, the emphasis is on export-orientation, since it is argued that insufficient domestic demand can only be substituted with foreign demand, thus partly removing the constraints on scale economies (Alesina and Spolaore 1997; Armstrong and Read 1995). In fact, most small island economies showing high growth performance are those which successfully implemented export-oriented industrialization strategies, and which are geographically close to centre countries (Streeten 1993).

Alongside its peculiar structural characteristics, the Northern Cyprus economy can also be considered within the framework of a small island economy. Northern Cyprus is an independent state situated in the north of Cyprus Island, which in turn is located in the east of the Mediterranean Sea. Northern Cyprus declared its independence in 1983; nine years after a Greek Cypriot attempt to annex the island to Greece triggered an invasion by Turkey. It has received political recognition only from Turkey. The rest of the international community recognises the sovereignty of the Republic of Cyprus over the entire island, including the portion currently under the control of the Northern Cyprus state. The economy of Northern Cyprus is dominated by the service sector, including the public sector, trade, tourism and education, with smaller agriculture and light manufacturing sectors. The economy currently operates on a free-market basis, with a great portion of its administration costs funded by Turkey. Because of its status and the embargo, Northern Cyprus is dependent on Turkish military and economic support (Wikipedia, the free encyclopedia**)**.

The international isolation of the country since its inception has aggravated its economic problems and jeopardizes its long-term growth process. In this context, the economy of Northern Cyprus can be taken as a special case study for the literature on small island economies. Furthermore, the relevance of export-orientation for Northern Cyprus' long-term output performance should be highlighted. In light of the abovementioned considerations, the main aim of this paper is to assess Northern Cyprus' output performance in the last three decades. A supplementary aim is to investigate the impact of export-orientation on Northern Cyprus' output level.

The organization of the paper is as follows: The following section surveys the literature on the major characteristics of small island economies. The third section analyses the structure of the economy of North Cyprus as a special case study of a small island economy. This analysis uses a comparative method. The fourth section is devoted to a review of the quantitative studies attempting to examine special factors determining the output level of small island economies. Consequently, the output performance of the Northern Cyprus economy is empirically investigated by using a panel data model for the period 1977-2005. The last section recapitulates the central discussion.

2. Major Characteristics and Problems of Small Island Economies: A Literature Survey

"The Economic Consequences of Size of Nations" was a conference organized by the International Economic Organization in 1957 and provided the first substantial work investigating the economic consequences of the size of nations. At the same time, the conference, by initiating the distinction between small and large countries, contributed to country typologies in the literature on development. Furthermore, the conference analyzed the impacts of the size of nations on the economic, social and political structure of developed and underdeveloped countries (Robinson 1960).

Later on, the literature started to concentrate on island states, rather than on small economies as such. The fact that island states constitute the greater portion of small economies led the literature to focus on the problems of island economies. In a recent joint study by the World Bank and Commonwealth Secretariat (2000:4), among 45 states defined as small, 31 are island states. Nevertheless, in the literature, there is a growing consensus on the similarity between the major structural characteristics of small continental countries and island states (Armstrong and Read 1995; Dolman 1985; Dommen 1980).

Between these two categories, the most apparent difference can be explained by the concept of isolation. With regard to countries, the concept of isolation refers to the restrictions of a country's economic, political and cultural relations with others. By definition, islands are geographically isolated. They are disconnected from

the mainland, and their degree of isolation directly depends on that distance.

In general, isolation of small island economies jeopardizes foreign trade and restricts their development. Trade, however, is crucial for island states, since small domestic markets preclude scale economies. In the presence of scale economies, however, output could be increased, giving an impetus for the production costs in both private and public sectors to decline, and hence, productivity to rise (Briguglio, 1995).

Furthermore, the lack of scale economies creates obstacles in the production of public services. Due to the indivisibility principle of public services, the access to these services can be unexpectedly costly in small island economies. For instance, Alesina and Spolaore (1997) indicate that education, health and social services are produced with relatively high prices in the case of small island economies.

Additionally, scale economies also affect research and development activities; and small island economies face severe problems in the improvement of local technologies. For this reason, small island states heavily depend on the import of foreign technology (Milner and Westeway, 1993; Selwyn, 1980).

Moreover, the isolation of island economies makes transportation costs relatively high. The lack of alternative modes of transportation and the necessity of scale economies for transportation by sea and air adversely affect transportation costs for these economies (Briguglio, 1995). Distance and high transportation costs directly determine the structure of production in small island economies. Agricultural commodities cannot be diversified, and the production of the manufacturing industry that heavily depends on the imported inputs cannot compete on international markets (Encontre 1999).

The formation of a competitive market structure seems to be extremely difficult for small island economies. The small domestic market creates a natural barrier for the firms willing to enter into the market, and thus monopoly and oligipolistic market structures dominate the economy. Imperfect market structures, on the other hand, lead to welfare losses for the economy in general and for consumers in particular.

Meanwhile, the smallness of the domestic market also prevents the pursuit of an import substituting industrialization strategy in the process of economic development. Island countries that have followed an import substituting industrialization strategy have been observed to suffer from a rise in commodity prices, the spread of low quality goods in the market and the formation of black markets (Briguglio, 1995).

On the other hand, outward orientation as an alternative way to overcome the problems of a small domestic market and to use the advantages of scale economies makes small island states dependent on the rest of the world, as are all other open economies (Streeten, 1993). Nevertheless, small island economies are more vulnerable to external shocks and their growth rates are more open to fluctuations. Meanwhile, some researchers insist that export-oriented growth policies are more advantageous for small economies (Salmon 1999).

Also, smallness causes scarce natural resource endowment and weak linkages between industries (Briguglio 1995; Faruggia 1993). The insufficiency in the domestic provision of raw materials and intermediate goods for the use of industries makes these economies too heavily dependent on imports. The finance of imports, in turn, necessitates foreign currency inflow. But the fact that the range of their exported goods is narrow, coupled with the fact that it is impossible for them to affect the world price of exported and imported goods, leads to economic instability in these countries originating from external shocks (Briguglio, 1995).

Small domestic markets and international specialization in the production of a few commodities create an asymmetry in local production and consumption patterns. While goods produced domestically are intensively exported, consumer goods are generally imported in small island economies. Furthermore, both consumer and producer goods are often demanded by areas within the service sector such as trade, banking and tourism (Khatkhate and Brock, 1980). Therefore, the service sector in general, and the trade and tourism sectors in particular, play a crucial role in the development process of small island economies.

As is pointed out above, one of the most significant structural characteristics of small island economies is their vulnerability to external shocks. According to the World Bank and Commonwealth Secretariat (2000:8), the standard deviation of increases in per capita income levels of small countries is 25 per cent higher than that of large countries. These relatively high fluctuations have their roots in the natural and economic characteristics of small economies. Moreover, the consequences of natural disasters affect a high proportion of the population and damage the stable functioning of the whole economy.

Not only natural shocks, but also economic shocks adversely affect small island economies. The structure of small island economies is influenced by their foreign trade, making them heavily dependent on the conditions of international markets. Such dependence

constitutes the background of the small island economies' vulnerability. A relatively high foreign trade ratio, a narrow range of exported goods and services, and trade relations with a limited number of countries all tend to aggravate economic instability in small island countries.

Country	Population	Geographic Area (km^2)	Per capita Income ($)	Share of Imports in GDP (%)	Distance to the Nearest Continent (km)	Share of the First Two Commodities in Total Exports (%)*
Africa Averages	538,181	1,825	3,301	63	950	
Cape Verde	483,675	4,033	1,765	61	600	95
Comoros	757,174	2,235	369	38	500	95
Mauritius	1,221,474	2,040	4,594	55	1650	87
Sao Tome and Princ.	149,430	364	964	81	500	-
Seychelles Islands	79,154	455	8,814	78	1500	73
Asia Averages	222,658	2,697	3,367	61	2564	
Bahrain	705,862	694	12,542	62	500	84
Cook Islands	18,216	236	7,332	48		-
Fiji	833,683	18,274	2,761	62	1500	75
Kiribati	95,459	726	781	32	1500	100
Maldives	313,352	298	2,260	66	600	90
Marshall Islands	57,437	181	2,108	111		-
Micronesia	108,826	702	2,281	32		-
Nauru	13,107	21	3,465	32	300	-
Palau	19,764	459	6,174	32	300	-
Samoa Islands	182,361	2,831	1,807	76	2900	-
Solomon Islands	453,886	479	568	59	700	-
Tonga	101,607	650	1,626	66	3000	96
Tuvalu	10,349	26	2,285	114	4000	-
Vanuatu	203,299	12,189	1,141	68	12900	74
Caribbean Averages	273,046	2,405	7,243	63	464	
Antigua and Barba.	79,587	442	9,036	71	500	69
Bahamas	314,451	13,873	14,462	58	900	66
Barbados	268,204	430	9,867	56	435	64
Dominica	78,316	751	3,279	59	500	88
Grenada	101,924	344	4,262	77	160	83
St. Kitts and Nevis	41,674	269	8,927	71	500	92
St. Lucia	158,183	622	4,611	69	500	71
St. Vincent and Gre.	117,800	388	3,137	63	500	76
Trinidad and Tob.	1,297,275	4,529	7,607	41	180	69
Europe Averages	454,650	3,116	11,259	56	179	
Northern Cyprus	**215,970**	**3,555**	**5,949**	**37**	**94**	**68**
Southern Cyprus	750,000	5,476	16,038	48	94	60
Malta	397,980	316	11,790	82	350	79
Overall Averages	308,075	2,513	5,245	61	1345	

Table 1: Basic Economic and Demographic Indicators for Selected Small Island Economies (2003)
Source: United Nations Statistics Division, www. unstats.org;
World Statistics Pocketbook, www.sids.net;
* 2001 for all the countries except the Northern Cyprus.

On the other hand, tourism is one of the more important sources of export revenues for most island economies. Towards the end of the twentieth century, the share of tourism in total export revenues was 76 per cent in St. Lucia, 61 per cent in Antigua and Barbuda, 55 per cent in Barbados, 51 per cent in Samoa, and 42 per cent in Vanuatu (World Bank and Commonwealth Secretariat, 2000:10-11). Therefore, stability in tourism revenue seems to be vital for the short- and long-term economic performance of small island countries.

Natural and economic shocks in small island economies also have some negative impacts on the flow of foreign financial resources. Foreign investors are relatively more risk-averse in the case of small island countries (Briguglio 1995). Foreign aid and loans have the potential to stimulate investment expenditure of the private sector in small island economies (Collier and Dollar 1999), but the amount of per capita foreign aid and loans recently declined for most small island economies (World Bank and Commonwealth Secretariat 2000).

3. The Structure of the Economy of Northern Cyprus as a Small Island State: A Comparative Analysis

Having a geographical area of 3,555 km^2, a population of 215,970 and a national income of $1,283.7 million USD in 2003, Northern Cyprus can be categorized as a small economy according to all criteria used to define smallness [1]. Consistent with this definition, the country shows all the major characteristics of a small island economy indicated in the literature, namely smallness, isolation and vulnerability, and faces important structural problems originating from these specificities.

As in the case of other small island economies, the absence of scale economies also creates problems for the economy of Northern Cyprus. This phenomenon, in turn, affects the degree of its external dependency. Among others, this dependency reveals itself in the import ratio. The ratio of imports to GDP reached 37 percent in Northern Cyprus in 2003. However, this ratio remained well below the average (61%) for the small island economies included in Table 1. This ratio was 48 percent for Southern Cyprus and 82 percent for Malta.

Furthermore, the absence of scale economies associated with poor resource endowment has adverse consequences on the structure of production, reducing the variety of commodities in the case of small island economies. Consequently, the range of export commodities narrows and the risks from foreign trade augment. This pattern seems to be totally valid for the Northern Cyprus economy. The range of commodity production is quite restricted in Northern Cyprus. The economic activities mainly concentrate on the production of a few agricultural commodities (like potatoes, cereals and citrus fruits), a small-scale manufacturing industry (food) and tourism. These commodities and services constitute a significant portion of the total exports of the country. In 2003, the share of processed agricultural and food products rose to 68 per cent of total exports. The limited number of exported commodities makes the country extremely vulnerable to external shocks. In the meantime, the share of the first two commodities in total exports was 79 per cent in Malta, and 60 per cent in Southern Cyprus. This share is considerably higher for almost all the small island economies mentioned in Table 1.

Additionally, the export ratio in Northern Cyprus is low compared to other small island economies (See Table 3). Low export ratios do not only originate from the country's geographic isolation [2] but also from its high degree of economic and political isolation. Consequently, transportation and communication costs rapidly increase, restricting export opportunities. Since the country suffers from a lack of international recognition, it faces relatively more difficulties in establishing multilateral trade relations with other countries. As can be see from Table 2, almost 70

Northern Cyprus		Southern Cyprus		Malta	
Exports	**Imports**	**Exports**	**Imports**	**Exports**	**Imports**
Turkey (45)	Turkey (61)	U.K. (19)	U.S. (9)	U.S. (20)	Italy (20)
U.K. (23)	U.K. (10)	Russia (9)	Greece (9)	Germany (13)	France (15)
Total: 68	**Total**: 71	**Total**: 28	**Total**: 18	**Total**: 33	**Total**: 35

Table 2: Country Destination and Origin of Merchandise Exports and Imports of Northern Cyprus, Southern Cyprus and Malta (% of Total)

Source: DPÖ (2007) and World Statistics Pocketbook, www.sids.net

percent of the Northern Cyprus trade volume is restricted to only two countries, indicating obstacles to expanding trade relations compared to Southern Cyprus and Malta.

Furthermore, Northern Cyprus trade flows have to take place via Turkey, unless they are produced locally. In short, in the case of Northern Cyprus, one may argue that export orientation could not be used as a substitution mechanism to bypass the problems associated with the existence of the small domestic market, poor resource endowment and absence of scale economies.

Due to its high political isolation and its special economic ties with Turkey, Northern Cyprus is heavily affected by the economic crises experienced in that country. This fact aggravates the economic vulnerability of Northern Cyprus, and produces further instabilities in its long-term economic performance, in

Income Category	Geographic Region	Share of Exports in GDP	Share of Trade and Tourism in GDP	Share of Agriculture in GDP	Share of Manufac. Industry in GDP	Per capita Foreign Aid ($) in 2000-2003	Secondary School Enrolment Ratio (%)
High							
Bahamas	Caribbean	49	23	3	3	18.50	76
Bahrain	Asia	80	10	1	11	63.25	87
Barbados	Caribbean	50	23	3	5	21.00	90
Southern Cyprus	Europe	47	19	4	9	51.50	93
Malta	Europe	77	16	2	19	27.75	87
High-Middle							
Antigua and Barba.	Caribbean	62	17	3	2	123.75	-
Cook Islands	Asia	4	39	13	3	-	-
Northern Cyprus	**Europe**	**17**	**16**	**10**	**9**	**728.45**	**100**
Dominica	Caribbean	46	13	15	7	267.00	92
Grenada	Caribbean	42	18	9	4	120.25	96
Mauritius	Africa	56	15	5	19	10.75	74
Nauru	Asia	57	15	17	1	-	-
Palau	Asia	57	31	4	1	1672.75	-
Seychelles Islands	Africa	79	23	3	15	149.00	100
St. Kitts and Nevis	Caribbean	46	16	2	8	232.00	95
St. Lucia	Caribbean	55	18	5	4	119.00	76
St. Vincent and Gre.	Caribbean	46	17	7	6	59.00	58
Trinidad and Tob.	Caribbean	56	19	1	15	-2.50	72
Lower-Middle							
Cape Verde	Africa	26	22	6	5	224.00	58
Fiji	Africa	58	14	15	12	42.50	76
Maldives	Asia	88	33	8	8	79.00	51
Marshall Islands	Asia	12	16	10	6	1173.50	65
Micronesia	Asia	57	15	17	1	960.25	-
Samoa Islands	Asia	27	22	13	17	201.25	62
Sao Tome and Princ.	Africa	38	9	17	4	224.25	-
Tonga	Asia	21	14	24	3	219.75	72
Tuvalu	Asia	13	14	19	4	-	-
Vanuatu	Asia	65	33	21	5	169.25	28
Low							
Comoros	Africa	21	22	41	5	44.50	29
Kiribati	Asia	47	15	17	1	185.50	-
Solomon Islands	Asia	35	9	45	5	122.75	-

Table 3: Selected Small Island Economies According to Income Categories (2003)
Source: United Nations Statistics Division, www. unstats.org;
World Development Indicators Database, www.worldbank.org; DPÖ (2007).

addition to the structural problems inherent for a typical small island state.

According to the level of development measured by per capita income, the variations between small island economies may be mainly attributed to their geographic region, structure of production and export performance (See Table 3).

With respect to geographic region, small island economies situated in the European and Caribbean regions generally attain high income levels, while those in Africa and Asia manifest poor performance in this context. But Northern Cyprus can only achieve moderate per capita income level compared with other small island economies in the European region such as Southern Cyprus and Malta. As mentioned before, the main reason of this relatively poor performance can be associated with the high degree of economic and political isolation of the country.

Furthermore, whereas the export ratio of small island economies in the high-income category averages 61 percent, the average of this ratio is 48 percent for higher middle-income, 40 percent for lower middle-income and only 34 per cent for the low-income country categories (See Table 3). Depending on this statistical fact, it can be argued that the development level of the countries can be raised with an increase in the ratio of the total exports of the goods and the services to GDP in the case of small island economies. However, the export performance of Northern Cyprus does not seem to support this argument. With a 17 per cent export ratio in 2003, Northern Cyprus achieved an export performance far lower than the average of low-income small island economies.

When the production structure of small island economies is observed using the data in Table 3, the countries having relatively large shares of agriculture in GDP attained relatively low income levels. Conversely, counties succeeding in developing their manufacturing industry together with their internal trade and tourism sectors generally possessed high income levels. For instance, whereas the share of the agricultural sector in GDP for high-income countries averaged 3 per cent in 2003, the same share attained 7 per cent for higher middle-income, 15 per cent for lower middle income, and 34 per cent for low-income small island countries. On the other hand, the average of the share of the trade and tourism sectors in GDP for high and middle-income countries ranged from 19-20 per cent. The same share averaged around 15 per cent for low-income small island economies. Northern Cyprus did not exhibit a striking contrast with the averages of its income category (high-middle). Nevertheless, one should notice that while the contribution of the agricultural sector to national output was slightly higher than the average level, that of trade and tourism remained relatively small compared to other island economies of the higher middle-income category.

Exporting a great portion of domestically produced commodities is one of the main characteristics of small island economies. Therefore, the production structure of these economies at the same time reflects the structure of their exported products. Table 4 shows the structure of exported products for selected island states. Besides states located in the European Continent, namely Northern Cyprus, Southern Cyprus and Malta, islands from different geographic regions (Africa, Asia and Caribbean) and extreme income categories are selected in constructing Table 4.

In comparison with the structure of production, the structure of exported products indicates a stronger relation with the development level measured by per capita income (Parilla *et al.* 2007; Velde *et al.* 2007). Agricultural products constitute the greatest portion of exported commodities in Northern Cyprus, Comoros and Kiribati, where per capita income levels are

Northern Cyprus	Southern Cyprus	Malta	Barbados	Comoros	Kiribati
Agricultural Products (41.0%)	Food Products (33.0%)	Metal Products (68.0%)	Chemical Products (35.0%)	Agricultural Products (89.0%)	Agricultural Products (93.0%)
Food Products (32.7%)	Metal Products (27.0%)	Chemical Products (11.0%)	Food Products (29.0%)	Chemical Products (6.0%)	Other Manu. Ind. (7%)
Textile (20.1%)	Chemical Products (18.0%)	Textile (10.0%)	Metal Products (21.0%)	Other Manu. Ind. (3%)	-

Table 4: Structure of Exported Products for Selected Island States (% of Total Exports)
Source: World Statistics Pocketbook, www.sids.net

relatively low. On the opposite side, industrial products take the leading portion of total exports in Malta, Barbados and Southern Cyprus, where per capita incomes are relatively high (See Table 1 and 4).

Furthermore, the impact of human capital on economic development in general and the export of industrial products in particular should be mentioned in the case of small island economies (Layne *et al.* 2008; Bunwaree 2001). High technology products constitute 62 per cent of the total exports of Malta, and 21 per cent in Barbados. These constitute only 1 per cent in Comoros, however, where per capita income level is the lowest among the 31 small island economies presented in Table 1. The secondary school enrolment ratio is also very low (29 %) in Comoros. School enrolment ratios attained the very high levels of 87 per cent in Malta and 90 per cent in Barbados. Yet Northern Cyprus, which has a secondary school enrolment ratio of 100 per cent, could not manage to export high technology products owing to its peculiar structural characteristics and, especially, to brain drain.

Moreover, peculiar structural characteristics of the economy of Northern Cyprus can also be detected in the average per capita foreign aid received during the period of 2000-2003. With approximately $730 USD per capita in foreign aid, mostly originating from Turkey, Northern Cyprus obtained an amount of aid significantly higher than the small island states average (See Table 3). Relatively high amounts of foreign aid not only assist in compensating for the poor economic performance of the country, but also contribute to increasing income levels.

From the above analysis, the special features of the economy of Northern Cyprus become more apparent in the context of the experience of small island economies. But the factors determining long-run output performance of the country should be closely investigated. Before attempting to do so, empirical studies focusing on the factors determining output performance of small island economies will be reviewed in the next section.

4. Special Factors Determining Output Levels in Island Economies: A Review of Empirical Studies

Depending on the theoretical background of the neo-classical growth model, one may infer that small island nations are not optimal economic units and that their per capita income levels are expected to be low (Downes 2004; Hammond and Rodriguez-Clare 1993; Looney 1989; Bhaduri *et al.* 1982). Contrary to theoretical expectations, however, the historical economic performance of small island economies seems to be promising. According to the World Bank's classification, most of the small island economies are ranked under the upper-middle and high income economy categories. Therefore, the need emerges for a survey of the literature to investigate empirically the determinants of output level in small island economies.

Some of the empirical studies concentrate on testing the negative relation between country scale and growth performance. Milner and Westaway (1993) could not find a statistically significant relation between country scale and economic growth. Using factor analysis, Armstrong and Read (1998) do not find a negative correlation between country scale measured by population and GNP. Similarly, Easterly and Kraay (2000) do not find significant variation between the growth performance of small and large countries. Furthermore, they find that small countries, although affected by output fluctuations mostly originating from their outward oriented industrialization experience, achieve relatively high per capita income levels. Therefore, the factors that lead to the high output level performance of the small island economies should be closely examined.

By enlarging the small domestic market, and raising productivity and international competitiveness, foreign trade is one of the most decisive factors affecting the output performance of small island economies (Streeten 1993; Ashoff 1989). Due to their structural characteristics, the openness to international trade of small economies is relatively high. For most small economies, the ratio of foreign trade to GDP exceeds 100 per cent. Thus, the multiplier effect of foreign trade on economic growth is expected to be high in the case of small island economies (Ashoff, 1989). Additionally, small island states focusing on the export of goods and services in which they have comparative advantages have realized high output performances, as in the cases of Southern Cyprus and Malta (Read, 2004; Demetriades *et al.* 1993).

The geographic position of the economies also has direct impacts on economic performance. According to the empirical works of Armstrong and Read (2000) and Armstrong *et al.* (1998), one of the most important determinants of the per capita income level for small economies is associated with their geographical position. Small countries situated in rich and dynamic regions like Western Europe have attained higher per capita income levels and average growth rates compared to small countries in other regions [3].

Taking distance as an indicator for easy access to foreign markets, Redding and Venables (2002) demonstrated that 70 per cent of the variations in the per capita income levels could be attributed to the distance factor alone. Meanwhile, owing to their similar geographical positions, convergence of the income

levels of the Pacific island states is tested. The existence of such a convergence could not be found in the quantitative work of Cashin and Loayza (1995).

The effect of human capital in general, and education in particular, on economic growth has also been empirically analyzed in the case of small economies. In his econometric work, Benerjee (1982) found a positive relation between the school enrolment ratio and growth. Similarly, Manning (1982) found a statistically significant association between education and economic growth in the case of small economies. Downes (2004) also showed that education was one of the crucial components of high economic performance in the case of Barbados.

Political sovereignty of small nations should also be investigated in the context of the determinants of their income level. Theoretical expectations indicate that political sovereignty will eventually lead to higher output performance for small island economies (Armstrong and Read 2003). But the findings of current empirical studies surprisingly contradict these expectations. Both the works of Armstrong and Read (2000) and that of Bertram and Karagedikli (2002) demonstrate that small dependent states achieve relatively high growth rates and income levels in comparison to independent small states. The results do not differ even when the income transfers from the centre states are excluded from the analysis. Furthermore, in the work of Bertram (2004), where the conditional convergence hypothesis is tested in the case of small economies, it is found that the economic growth rates of small island economies converge with those of their "metropolitan patrons".

Having reviewed the empirical literature, the paper now concentrates on the output performance of Northern Cyprus, and a quantitative analysis will be performed to this end.

5. Panel Data Analysis of the Output Performance of Northern Cyprus

In this section, the effect of investment, employment and export variables on the output performance of the Northern Cyprus economy are tested by using panel data analysis.

5.1. The Model and Data

The literature survey on the characteristics of small island economies as well as structural analysis of the Northern Cyprus economy underlined insufficient domestic demand as the main economic problem of those nations. Therefore, the main factor stimulating the output level seems to be foreign demand, and thus exports in small island economies. Under these circumstances, in analyzing empirically the output performance of an island economy like Northern Cyprus, exports can be used in the estimated production function alongside other variables. In this framework, an export-augmented Cobb-Douglas production function can be used. This specification permits the inclusion of exports as a third input of production, providing a procedure to capture total factor productivity growth (Medina-Smith 2001; Feder 1983). To explain the rational of the model, it is worth quoting Thirwall (2000:17-18) directly:

> *"The neoclassical supply-side model of the relation between exports and growth assumes that the export sector, because of its exposure to foreign competition, confers externalities on the non-export sector, and secondly that the export sector has a higher level of productivity than the non-export sector. (…) The export sector is likely to be more 'modern' and capital intensive than the non-export sector which to a large extent consists of low productivity agriculture and petty service activities. The externalities conferred are part of the dynamic gains from trade discussed at the beginning, associated with the transmission and diffusion of new ideas from abroad relating to both from production techniques and efficient management practices."*

Therefore, the export-augmented Cobb-Douglas production function is specified as follows:

Y = F (K, L, EXP) where,
Y= aggregate output (real GDP),
K =capital,
L =labor force,
EXP= total real exports of goods and services.

In this study, the main sectors (agriculture, industry and services) of the Northern Cyprus economy are determined as the cross section units, and a panel is constructed. Compared with cross section and time series models, panel data models have some advantages. The rise in the number of observations, and thus the increase in the degree of freedom leading to more confident parameter estimations, can be considered as the most important of these advantages. Additionally, the difference among the cross section units can also be investigated depending on this method (Hsiao, 1996:3). Because of these advantages, the present study employs a panel data model. Due to the lack of sufficient time series and cross section data in the case of the economy of Northern Cyprus, using panel data analysis in the empirical research leads to

more statistically reliable results. Moreover, by defining the main economic sectors as the cross section units, the heterogeneity among these sectors can be examined.

At the initial level, the estimated model can be specified in the following way:

$$(LNGDP)_{it} = \beta_{1it} + \beta_{2it}(LNI_{it}) + \beta_{3it}(LNE_{it}) + \beta_{4it}(LNX_{it}) + u_{it} \quad (1)$$

In this model,

i = cross section units of agricultural, industrial and services sectors

t = years from 1977 to 2005

$LNGDP_{it}$ = natural logarithm of agricultural, industrial and services sectors' output in every year of the study period

LNI_{it} = natural logarithm of the total fixed investments in the agricultural, industrial and services sectors from 1977 to 2005

LNE_{it} = natural logarithm of the number of employed people in the agricultural, industrial and services sectors from 1977 to 2005

LNX_{it} = natural logarithm of the exports of the agricultural, industrial and service sectors from 1977 to 2005

In Northern Cyprus, the single centre which collects the data related to economic and social indicators is the State Planning Organization. The present study uses the data of this organization (DPÖ 2007). Investments are used to proxy capital stocks and include both public and private investments directed toward all sectors of the economy. They are then aggregated into three main sectors. Employment figures are obtained from the aggregation of the number of employed people in all sectors into the three main sectors of the economy. Similarly, exports from all sectors are summed in three main sectors, namely agriculture, industry and service. For the service sector, only tourism revenues are used to represent service exports, since there is no other economic activity within the country which could be included in the exports of this sector.

To measure and estimate the effect of foreign markets, i.e. export growth, on the output performance of the country, elasticities are estimated. For this aim, the model is constructed in a double logarithmic form. Sector output, investment, employment and export variables are first indexed by taking the value of the initial year (1977) of the study period as 100, and then converting indexed values into natural logarithms.

Finally, due to their significance in the production process, both capital and labor have positive effects on overall output level. As mentioned before, depending on the positive externalities in small island economies, exports are also expected to have a positive effect on Northern Cyprus output level.

5.2. Estimation Results

First of all, the stationarity of the variables used in the model should be tested. According to the test results, all of the series are not stationary. Therefore, first order differences of the series are used in the analysis [4]. The estimated model turns out to be a simple growth model:

$$D(LNGDP)it = \beta 1it + \beta 2it\ D(LNIit) + \beta 3it\ D(LNEit) + \beta 4it\ D(LNX\ it) + uit \quad (2)$$

The panel data methods of pooled regression and fixed effect models are performed for the regression. This study preferred to provide the results of both models to get thick modeling with more robust results. Put differently, various possible model results are considered to see whether the significance, size and sign of the coefficients change or not under different modeling approaches. According to the pooled regression results, all explanatory variables are statistically significant variables for the estimated equation. Furthermore, the sign of coefficients are found to have turned out as expected [5].

The estimation results of the fixed effect model indicated that the effect of cross section units, namely the agricultural, industrial and services sectors, on the sector output did not vary considerably. In other words, the results of an F-test do not statistically support sector differences in terms of fixed effects. [6]

Besides the fixed effects, a time effect model is also estimated. In doing so, time effects on the dependent variable could be empirically examined depending on the F-test [7]. Since the F value is greater than the appropriate F-Statistic, the null hypothesis is rejected, and it is concluded that time effects are significant for output growth. Therefore, the time effect regression model is statistically the best model in explaining the variations in output level. Furthermore, the Durbin-Watson test result of the regression indicates that there is no autocorrelation problem in the estimation process.

Pooled, fixed effect and time effect regressions are performed using the EViews program. Fixed effect specification is mainly used to account for time invariant unobservable heterogeneity that is potentially correlated with the dependent variable. Thus, it is also expected to capture the idiosyncratic factors that might have affected sector output growth.

Sample:	*1977 2005*			
Included Observation:	*27*			
Number of cross-section used:	*3*			
Total observations:	*84*			
Variable	***Coefficient***	***Std. Error***	***t-Statistic***	***Probability***
C	*0.012712*	*0.005001*	*2.541618*	*0.0140*
DLNI	*0.112936*	*0.007990*	*14.13432*	*0.0000*
DLNE	*0.652533*	*0.123055*	*5.302774*	*0.0000*
DLNX	*0.165319*	*0.043885*	*3.767078*	*0.0004*
R^2	*0.827496*	*Mean Dependent Var.*	*0.079459*	
Adjusted R^2	*0.729853*	*S.D. Dependent Var.*	*0.217736*	
Sum Squared Resid	*0.678796*			
S.E. of Regression	*0.113170*	*F-Statistics*	*8.474653*	
Durbin-Watson Stat.	*2.032020*	*Prob(F-Statistics)*	*0.000000*	

Table 5: Time Effect Model Regression, dependent variable: DLNGDP

Nevertheless, the estimation results showed that the effect of the cross section units on sector output growth did not vary considerably. Conversely, time effects are significantly important in determining output growth in the case of Northern Cyprus.

Regression results suggest that investment, employment and export variables are statistically significant variables since all of them have high t-ratios. The signs of the coefficients are positive as expected, meaning that there is a direct relation between the explanatory variables and sector output. Furthermore, explanatory variables with time effect seem able to explain almost 83 per cent of the changes in sector output.

5.3. Evaluation of the Main Findings

Empirical analysis indicated that there is no considerable variation among the cross section units defined as the agricultural, industrial and services sectors. In other words, particular characteristics of the different economic sectors do not statistically contribute in explaining production increases within the country. Therefore, the existence of homogeneous structure among the sectors can be suggested from the empirical results on the experience of the economy of Northern Cyprus.

On the other hand, empirical analysis reveals that time effects significantly determine the output level of the economy of Northern Cyprus. When time effects are closely examined, interesting results emerge. For example, the Gulf crisis of 1990-91 and severe economic crises in Turkey in 1994 and 2000 adversely affected Northern Cyprus' output level [8]. Such associations may also indicate dependency of the economy of Northern Cyprus on the Turkish economy.

Furthermore, the regression results also proposed that investment, employment and export variables significantly affect sector production increases in Northern Cyprus. Fixed investments play a crucial role in augmenting output increases. The main findings of our empirical analysis confirm this relation. A one percent increase in investment leads to a 0.11 percent increase in production. In fact, the effect of investments on production seems to be relatively low compared to export and employment variables. This can be explained by the low investment efficiency in the country. Furthermore, the amounts of fixed investments in the economy of Northern Cyprus are not high for a typical developing country [9]. Moreover, investors are adversely affected by the economic and political uncertainties of the country, and are unwilling to raise existing levels of investment.

Moreover, the number of employed people had a considerable impact on the total output growth. As to the findings of the current study document, a one percent increase in the number of employed people causes a 0.65 percent increase in sector output. Therefore, the rising quantity and quality of the labor force seems to be vital for raising the output level of the country. As mentioned before, school enrolment ratios are relatively high in Northern Cyprus. Therefore, there is potential for a highly educated labor to be employed in technologically advanced production units. Yet the economy suffers from the existence of such production units, and therefore, highly skilled labor could not be productively employed. Consequently, brain drain is observed, or qualified

labor is heavily employed in an inefficient public sector.

Meanwhile, as indicated above, the production and export structures of the country focus on agriculture, an agricultural-based manufacturing industry, and tourism. These sectors, in turn, necessitate a relatively low-qualified labor force. By gradually shifting low-skilled Turkish labor to the island from the beginning of the 1990s, the employment problem of these sectors was solved. Therefore, the labor force leading to an increased production level in the Northern Cyprus probably originated from a low-skilled labor force shifted from Turkey to the island.

Finally, export exerts considerable effects on sector production in the case of Northern Cyprus. This finding is totally consistent with the literature on small island economies. According to the estimation results, a one percent increase in the export of goods and services has the potential to raise sector output level by 0.16 percent. In this context, the impact of the tourism sector should be underlined alongside the export of commodities in the economy of Northern Cyprus. With the existence of a limited domestic market in the country, foreign market and tourism can play a substitution role to stimulate output levels. Moreover, exports indirectly influence the output level through provoking the growth of total factor productivity (Günçavdı and Küçükçiftçi 2008; SPO 2001; SPO 1994).

6. Concluding Remarks

Different from other island economies, the economy of Northern Cyprus suffers from a lack of international recognition, which in turn raises the degree of its economic isolation. Additionally, due to its special ties with Turkey, the unstable economic structure of that country directly affects Northern Cyprus, making this island economy more vulnerable to external shocks compared to others.

In fact, small island economies function in unfavorable conditions with respect to traditional industrialization strategies. Due to the lack of sufficient domestic markets, these economies cannot follow import substituting industrialization policies. Furthermore, the success of export-led growth strategies suffers from factors such as high transportation costs and the instability of foreign markets in the case of small island economies.

Revealing the major characteristics of a small island state, the Northern Cyprus economy depends on the expansion of goods and services exports to attain high output levels. In fact, Northern Cyprus pursued import substituting industrialization policies until the second half of the 1980s. After that period, however, industrialization policies shifted towards export promotion and emphasis was given to the service sector. Within these, tourism started to play a paramount role.

As far as the production processes of the economy are concerned, one should primarily deal with investment. In this context, the current empirical analysis confirms that fixed capital investments positively affect output growth in the case of the economy of Northern Cyprus. Furthermore, the most important obstacle to the rise of investment levels in the country is its prevailing economic and political uncertainty. Skeptical views concerning the future of the island make investors reluctant to invest more. Additionally, interest rates are relatively high due to the country's heavy dependence on Turkish financial markets. Consequently, high interest rates prevent an increase in investment.

As one of the main factors of production, labor is also very important for output growth. Consistent with the theoretical expectations, the findings of the empirical analysis indicated a positive association with employment and sector production increases in the economy of Northern Cyprus. But the present output structure of the economy requires a low-skilled rather than a highly-educated and qualified labor force. This situation forces young and educated labor to migrate abroad, and pulling instead unskilled labor into the country. The structure of this abnormal labor market leads to a waste of human resources. Therefore, it will be more beneficial to specialize in the production sectors, which would necessitate the use of qualified labor.

Another finding of the empirical analysis indicated a significant contribution of international demand defined as exports of goods and services. Therefore, exports could be considered one of the main motives of the sector output expansion in the economy of Northern Cyprus. A production structure mostly dependent on foreign demand makes it easier to overcome the restrictions originating from the insufficiency of the domestic market through the creation of new employment opportunities for a highly qualified labor force and additional production capacity with productive investments. Moreover, the export of goods and services has the potential to raise total factor productivities, and hence, to further improve the country's output expansion. In short, one may argue that outward orientation seems to be relevant in achieving higher levels of output in the case of the economy of Northern Cyprus.

In this framework, sectors having great potential to contribute to the country's long-run output performance, depending on foreign demand,

should be carefully determined, and both physical and human resources should be devoted to the improvement of these sectors. The higher education sector of the country emerges as the single successful example in this respect. With the support policies of the government and the impact of growing foreign demand, higher education has the potential to create new employment opportunities and significantly contribute to production expansion in the country. Other sectors of the economy should be carefully scrutinized in this context. With its output-enhancing characteristics and foreign demand orientation, the tourism sector merits particular interest.

Notes

1. About the measures of smallness, see Read (2001).

2. According to the demographic and economic indicators mentioned in Table 1, a strong correlation cannot be observed between the geographic isolation measured by the "distance to the nearest continent" and per capita income levels in the case of small island economies (See Table 1).

3. The economic integration of small Western nations into the European Union should also be mentioned in this context.

4. According to ADF-Fisher test statistics, for almost all the variables Chi-Square values are insufficient to reject the null hypothesis of a unit root. When the ADF-Fisher test is used for testing the stationarity of the first differences of all variables, however, as to the Chi-Square values, the null hypothesis of a unit root is rejected for all variables.

5. The estimation result of the pooled regression model is as follows:

$$D(LNGDP)it = 0.01 + 0.10\ D(LNI) + 0.62\ D(LNE) + 0.16\ D(LNX) + u\ it$$

(1.83) (8.60) (6.33) (7.66)

R2=0.60 SSR=1,045893 F-statistic=40.055895

With t-statistics in parentheses.

6. The estimation result of the fixed effects regression model is as follows:

$$D(LNGDP)it = 0.08\ D(LNI) + 0.92\ D(LNE) + 0.17\ D(LNX) + u\ it$$

(7.41) (7.78) (8.18)

Constant terms in the fixed model are:

β1 Agriculture=0.024 β2 Industry=-0.004 β3 Services=-0.016

R2=0.70 SSR=1.045641 F-statistic=37.47570

With t-statistics in parentheses.

According to the results of this estimation and pooled estimation, F-test [F =((SSRPooled-SSRFixed)/(N-1))/(SSRFixed/(NT-N-K))] is performed with null hypothesis Ho: β1 Agriculture= β2 Industry= β3 Services. As to the test result, the calculated F ratio (0,009) is smaller than the critical value (3,15) for α= 0.05. Therefore, the null hypothesis that the constant term for all the sectors is identical could not be rejected.

7. Time effects are presented in Table A.

To analyse whether the time effects are statistically significant, an F-test is performed for the null hypothesis Ho: λ1978=λ1979…=λ2005. According to the estimation results, the calculated F ratio is equal to 3,1425. It is smaller than the critical value of 1,70 for α= 0.05. Therefore, the null hypothesis of homogeneity of time effects is rejected.

1978—C	0.024245
1979—C	0.062399
1980—C	0.053297
1981—C	0.179056
1982—C	0.018856
1983—C	-0.171583
1984—C	0.067036
1985—C	0.055320
1986—C	-0.054068
1987—C	0.002669
1988—C	0.082102
1989—C	0.019639
1990—C	-0.066512
1991—C	-0.025898
1992—C	0.103553
1993—C	-0.000569
1994—C	-0.013616
1995—C	-0.002618
1996—C	-0.009392
1997—C	-0.057384
1998—C	0.004313
1999—C	0.079452
2000—C	-0.043708
2001—C	0.095499
2002—C	0.010196
2003—C	0.002433
2004—C	0.017737
2005—C	0.055322

Table A: Time Effects

8. For details, see endnote 7.

9. The rate of fixed investments on the GDP never exceeded 20 per cent during the period of 1977-2005, except for the year 1986 (DPÖ, 2007:10-11).

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