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Guncavdi, Oner and Kucukcifci, Suat

Istanbul technical University -Faculty of Management

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Economic Growth under Embargoes in North Cyprus: An Input-Output Analysis§

Öner GÜNÇAVDI* and Suat KÜÇÜKÇİFÇİ

Economic and Social Research Centre (ESRC)
Istanbul Technical University, Faculty of Management

Abstract: *The North Cyprus economy has been under economic embargoes for many years, and has been struggling to eradicate the income difference with the south of the island with extremely limited facilities. Successive governments have accordingly developed distinctive responses to cope with these difficulties. The paper examines these features of the North Cyprus economy with a particular emphasis on its response to economic embargoes. The paper also examines how important economic embargoes would be (or have been) in the North Cypriot economy. For this purpose total economic growth is decomposed with respect to different components of demand. The results show that despite the presence of embargoes, external demand and the availability of import flows are detrimental factors for economic growth. Also domestic final demand is an equally important source of growth in the North Cyprus economy.*

Key Words: Growth decomposition, Economic embargoes, Input-output models, North Cyprus
JEL Classification: C67, F19, F43, F51

I.   INTRODUCTION

The political division in Cyprus has been a long standing political dispute of the world political scene. Despite various attempts by the international community, the division in the island still remains as it is; the Turkish side on the north and the Greek side on the south. The Turkish community on the Northern side has been struggling for political recognition as a sovereign state by the international community, and has been under severe political and economic embargoes since

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1983.[1] So far, Turkey has been the only country that recognises the sovereignty of the Turkish North Cyprus, and has established close political and economic ties with it. In particular, economic isolation from the world economy has eradicated the capability of the Turkish Cypriot economy to generate foreign currency resources, which are inevitably required for a sustainable development of a small island economy, and this leaves the North Cyprus economy extremely dependent on the Turkish economy and foreign currency inflows in the forms of aid and export earnings obtained both from and via Turkey.[2] In addition to political problems, North Cyprus also deals with economic problems of being a small island with limited natural resources and a very small domestic market which constitutes insufficient domestic demand that is required for any sectoral development (*see* Read, 2001). Due to almost full integration into the Turkish economy, the Turkish Cypriot economy is also exposed to all the real and monetary shocks and instabilities prevailing in the Turkish economy.

The economic performance of the Turkish Cypriot economy has been far from impressive in recent years. Whereas the economy grew, on average, only 7 % in the period 1985-1989, the same figure dropped to 2.9 % for the period 1990-1998, and then increased slightly and reached 3.9 % in the period 1999-2003 (*see* Table 1). The Greek side, on the other hand, performed remarkably well in growth in per capita income from 1988 to 2002, averaging 3 % annually (*see* Eichengreen *et al.,* 2004, p. 35). Under favourable conditions (namely the presence of a sound policy stance, a substantial increase in physical capital and full membership of the EU *etc*.) this impressive performance of the economy of the Greek side is expected to continue in the next decade. The present disparity between two sides of the island becomes even more evident when we look at the difference in per capita income. In 2003, Turkish Cypriots achieved only $5,949 per capita income, whereas the Greek side reached to $17,644 per capita in the same year (SPO, 2003). Eichengreen *et al.,* (2004) estimate that per capita income of North Cyprus must grow steadily at around 5% in the next decade in order to catch up to the Greek side. Ayres (2003) is on the other hand presents growth rate estimates which would be sufficient to close the present income gap between two sides of

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[1] The military intervention to resolve the political dispute in 1974 led to the partition of the island into two separate administrations, and from then on both sides started to follow different development paths. However, the international community has continued to recognise the administration on the south as the legitimate government of two societies in the island.

[2] The TNC economy is highly dependent on the Turkish aid. Under the latest protocol between Turkey and TNC signed in January 2001, Turkey undertook the provision of Turkish Cypriots loans and financial assitance totaling $350 million for the purpose of financing projects in public finance, tourism, banking, and privatization. Turkey also agreed to provide a supplementary amount of $140 million to enterpreneurs in the form of low-interest loans to support export-oriented industries and tourism.

the island. Accordingly, he predicts that within an acceptable period of time, say 15-20 years, the per capita income of the Turkish Cypriot economy has to rise to over 7 per cent per annum. He respectively postulates that the resolution of the political dispute would be beneficial mostly for the Turkish side and with an appropriate macroeconomic policy and, most importantly, the removal of all economic and political embargoes, the Turkish Cypriot economy would be able to generate sufficiently high growth rates in order to eradicate the income disparity between the two sides of the island.

This is clearly an unsustainable income disparity that could afflict a possible long-standing federal settlement of the political dispute between two sides of the island. The elimination of these disparities should therefore be considered as the pre-condition for political stability and a possible future federal settlement in the island.[3] After the failure of the Annan Plan in 2004, Turkish Cypriots were accordingly urged to implement appropriate policies in order to eradicate these disparities. However economic isolation offers little scope for closing the present development gap between two sides of the island, and a political settlement of the dispute allowing for the removal of economic embargoes must be considered as a pre-condition for launching appropriate macroeconomic policies which would yield sustainable high growth rates (*see* Ayres, 2003; Eichengreen *et al.,* 2004). Although we would not be, of course, certain about the extent of the income-generating effects of appropriate macroeconomic policies after the settlement, there is at least one thing sure at the moment that economic embargoes and isolation have certainly had a negative impact on the achievement of significantly high growth rates in the North Cypriot economy. Moreover, economic embargoes and isolation over time yield a distinctive economic structure as an income generating mechanism with some distortion which may constitute additional constraints on the nature of economic growth. Therefore the purpose of the paper is first to examine the impacts of economic embargoes on restructuring the North Cyprus economy, and

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[3] The unification under the Annan plan was expected to boost income in North Cyprus by almost 12%; in 2015 for example income in the TRNC would be 100 percent larger than in the absence of unification. However, in comparison with the Greek side of the economy, income per capita in the North Cyprus economy appears to be 40% of its value in the South. Eichengreen *et al.,* 2004 find that the same figure would have risen to 60% of its value in the South in 2020, and income disparity between to sides of the island would prevail even after unification (*see* Eichengreen *et al.,* 2004, p. 42). Mehmet (2002), on the other hand, indicates that this finding of Eichengreen *et al.* (2004) could be the reason for wrong perceptions on the Greek side of the island regarding the UN efforts for unification. In this view Mehmet (2004) indicates three major reasons why the Annan Plan failed. First, both sides lacked information on what federalism is and how it can be made to work. Second, the plan was deficient in terms of power-sharing, providing for the collection and allocation of indirect taxes. The third is the wrong perception, particularly in the south that economic inequalities would require large and persistent subsidies to the Turkish side by the Greek Cypriots.

accordingly to examine the features of the income generation process. The second aim of the paper is then to measure how the North Cyprus economy has dealt with the adverse effects of this isolation. Lastly the paper also seeks some answers as to what extent the removal of this isolation would contribute to the economic growth performance particularly in the eradication of the income divergence between the two sides. In doing so, it is additionally investigated which sector(s) would have high capability of generating high growth rates.

With respect to these aims, the paper is organised as follows. Following this introductory section, Section 2 discusses the present features of the North Cypriot economy and also discusses intuitively the likely effects of economic embargoes on the formation of the economic structure and the income–generation process. Section 3 presents the methodology that we use to examine the nature of the income generation process and to spot the sector(s) of high income generation potential. Section 4 is devoted to a discussion on the data used in this research and the empirical findings. Finally section 5, as usual, sets out our main conclusions and policy discussion.

II. MACROECONOMIC BACKROUND AND ECONOMIC EMBARGOES

A large number of empirical studies in the economic literature postulate that economic growth is the result of a sound macroeconomic policy stance and high investment in physical and human capital (Levine and Renelt, 1992).[4] In this respect TNC exhibits a mixed picture. The country seems to enjoy a high level of education, particularly in recent years, as seen in enrolment rates in Table 1. As a crude indication of the level of physical capital stock, telephones per 1000 person appear to have increased gradually. Despite these encouraging developments in human and physical capital stock, the country seems to have failed to attain a sound macroeconomic policy stance over the period 1985-2007. In particular inflation appears to have been the most crucial weakness of the economy, despite a declining trend in recent years.[5] The economic performance of the North Cyprus economy has been astonishing after the failure of the Annan Plan in 2004. According to Table 1, the economic growth rate reached almost 10% in the period

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[4] Ghafoor and Yorucu (2002) empirically examined the role of physical and human capital investment in explaining the low productivity of the TRNC economy. Their time-series investigation however failed to find any statistically significant relationship between these variables.

[5] In an empirical examination Çiftçioğlu (2000) shows that inflation has a negative effect on economic growth. A 10% increase in inflation seems to lead the economy to a 0.9% decline in economic growth.

2004-2007 after low and sluggish growth periods in the 1990s and in the early 2000s.[6]

Economic growth in any economy shows the need for finance which could be provided by four different ways in practice, namely domestic and foreign savings, aid and inflation. In the case of North Cyprus, inflation is rather imported from Turkey due to the adaptation of the Turkish Lira as a national currency, and cannot be used for generating income in North Cyprus to finance economic growth. Utilising foreign savings through borrowing and capital inflows is also restricted due to economic embargoes, and domestic savings seems to have been insufficient to finance high domestic expenditure and economic growth. In Table 1, the resource (saving) gap, measured by the difference between the ratios of saving and investment in GNP, persistently exhibits deficits in the North Cyprus economy. Current account deficits of the country can also be considered as another indication of resource gaps, and a 6.3% deficit in the current account can account for the external finance requirement in the period of 2004-2007. From Table 1, this requirement is not a novel feature of the North Cyprus economy. In the late 1980s, the economy achieved almost 7% growth rate by generating only a 5.4% current account deficit as a share of GNP. With the slower pace of economic growth in the 1990-1998 and 1999-2003 periods, the current account deficit appears to have declined to 3.5%. However the recent distinguished performance of the North Cyprus economy once again brought about the need of large external financial recourses to finance a 6.3% deficit of GNP in the period of 2004-2007. The sectoral decomposition of these deficits indicates a crucial feature of the North Cyprus economy and puts particular emphasis on the dominant role of the public sector in the use of all available resources in the economy. Accordingly the share of the budget deficit appears to have been around 7% of GNP with the only exception occurring in the period of 1999-2003. Despite a 3.9% low growth rate in this period, the public sector deficit jumped to 15.7% in the period of 199-2003 from 7.6% in the period of 1990-1998. However this deficit seems to have closed in the following period. With the lack of foreign borrowing and insufficient domestic saving, the North

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[6] Of course, this growth performance should not be seen only the outcome of good macroeconomic management. The North Cyprus and the Turkish economies are highly integrated with each other and the use of Turkish currency in the Turkish side of the island has exposed it to the positive and negative shocks in Turkey. Starting from 2002 Turkey adopted an inflation targeting policy to curb and reduce the long standing high and chronic inflation rate. Additionally the international market condition which allows Turkey easily to access international liquidity, the implication of various sound macroeconomic reforms with the guidance of international institutions and beginning of the accession talks to the EU has allowed Turkey to attain high growth rate and achieve its disinflation programme. The North Cyprus economy also benefits from the success of the Turkish economy in the early 2000s, and held it to accomplish high growth rate in the same period.

Cyprus economy remained extremely dependent on aid and credit from Turkey in order to meet the finance requirement, and this appears to have reached 7.1% in the latest period as shown by Table 1.

(*Table 1 about here*)

When compared to other factors others, macroeconomic policies matter even more in the context of open economies. In a small open island economy, the overall economic performance is likely to be affected by openness to trade. This is mainly because the lack of sufficiently high domestic demand can be compensated by external demand. However the presence of economic embargoes in the case of North Cyprus and international restrictions on direct flights to the Turkish side of the island afflicts the North Cyprus economy by stifling external demand. In this regard, the removal of exogenously imposed restriction on the trade of North Cyprus has been the subject of a long political dispute for some time, but there appears to be no positive results in this line so far. As a consequent of these restrictions on external demand, export earnings have remained insufficient to meet import bills. In particular, whereas exports seem to account for only 27% of imports in the period 1985-189, this ratio drastically declined first to 13% in the period 1999-2003, and then to 5.8% in the period 2004-2007.

The sectoral composition of GDP shows another interesting feature of the North Cyprus economy. First of all the share of the agriculture sector seems continuously to decline from 13.9% in the period of 1985-1989, to 9.1%, 8.1% and finally to 7.5% in the 1990-1998, 1999-2003, and 2004-2007 periods respectively. This trend implies that the agricultural feature of the North Cyprus economy gradually disappeared. The manufacturing sector, on the other hand, does not seem to have taken over the declining position of agriculture. Despite a relatively high share in the 1985-1989 and 1990-1998 periods, this sector too has apparently lost its importance in GDP in recent years, and reached almost 10% in the latest period (*see* Table 2). Most interestingly these two sectors in the North Cyprus economy are the only sectors producing tradable goods which could involve foreign trade and generate international liquidity through trade. Unlike them, other sectors like *domestic trade*, *public services* and *transport & communication* sectors available in the North Cyprus economy are mostly inward-oriented sectors, and are only able to generate income in local currency through domestic demand expansion. From Table 2, it appears that the shares of these sectors have increased over time. Despite its 23.5% share, the highest in the

period of 1985-1989, the transport & communication sector becomes the second after public services in the latest period in Table 2.

(*Table 2 about here*)

With respect to the capabilities of each sector to involve into international trade, we become able to group nine sectors available in the North Cyprus economy as tradable and nontradable sectors. This decomposition is especially important for a developing country. This is mainly because the size of the tradable sector can considered as an indication of foreign exchange earning capability of the economy. Accordingly the tradable sectors in Table 2 appear to be the agriculture and manufacturing sectors, and their markets can considered as global in the event of free trade. The nontradable sectors, on the other hand, have a local nature, and meet the local need with domestic supply. This decomposition shows in Table 2 that the nontradable sectors and activities in the North Cyprus economy gradually become overwhelmingly dominant activities. In the latest period in the table the share of tradable sectors in GDP was 17.2% in comparison with the 73% share of the nontradable output. These shares in the period of 1985-1989 were 25.2% and 67.3% respectively. This is clear indication that the North Cyprus economy possesses an economic structure which largely produces nontradable goods with a limited capability of generating foreign earnings. In addition to this feature of the economic structure, embargoes also put the economy under an extra burden by restricting the involvement of the already existing tradable sectors into foreign trade, and reduce the capability of generating foreign currency through foreign trade which is extremely necessary to close up resource gaps.

The Response of the North Cyprus Economy to Economic Embargoes

Developing countries are very often eager to catch up to upper income countries by having high growth rates. In the case of North Cyprus, this is particularly important. Such income gaps will require achieving a sustainable high growth rate. As can be seen from the discussion above, the financing gap resulting from high growth performance of the country, will inevitably constitute the major constraint on having sustainably high economic growth rates. In particular, such high growth also initiates a need of importing intermediate goods, which would not be economically produced otherwise, especially in a small island economy

with very limited economic resources and domestic demand. However this importation necessitates the availability of foreign currency.

Economic embargoes in this regard can be considered as a constraint which is imposed on the external sector of the country, and reduce its capability to access international commodity and capital markets. Any country under such embargoes expectedly has difficulties to finance ambitiously high growth rates, unless special economic ties are developed with a country that ignores economic embargoes. North Cyprus has been coping with these adverse effects of economic embargoes through building up close economic relationships with Turkey. Accordingly, North Cyprus adopted the Turkish Lira (TL) as the national currency, and thus eliminated the difficulties of earning foreign currencies, other than TL, under embargoes.[7] By doing so, the North Cyprus economy would not feel the stringency of the economic embargoes directly, and the easy access to TL through trade with and/or aid from Turkey would allow for it to close up the financing gap easily. However, given the ambition of sustaining high economic growth, the country would not be able to generate sufficient amount of foreign currency and TL from trade with Turkey. This is quite evident from both the extent of current account deficits and the amount of credit and aid received from Turkey in Table 1.

Economic integration with Turkey is not necessary but is not a sufficient condition for earning from trade. The competitive power of the Cypriot exportation is the detrimental factors for generating high and sustainable export market for the Cypriot products. However the absence of sufficiently high external demand would leave no option for North Cyprus other than relying on domestic demand. With respect to this recent unsustainably high domestic growth in North Cyprus, extensively generated by the public sector, seems to have been implemented in order to initiate the high economy growth in the economy.

Despite the importance of the external sector for North Cyprus, there exists a peculiarity in its foreign trade, which shows an important feature of economic embargoes. This peculiarity is the asymmetric implication of embargoes on the external sector. The plots of imports and exports in Figure 1[8]

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[7] Economic embargoes left no option for North Cyprus other than adopting TL as the national currency. With no access to export markets and to international capital market, the country developed foreign trade with Turkey or other countries via Turkey. However this feature of the foreign trade of the country improve the capability of the North Cyprus economy to generate foreign exchange earnings overwhelmingly in TL rather than other currencies, and this therefore constituted the major reason for the adaptation of TL as the national currency.

[8] There is another peculiarity that we observe in the data on export earnings of the country. According to the Statistic Office of North Cyprus foreign exchange earnings through nontradable sectors, namely higher education and tourism are recorded as export earnings. Expenditure on domestic trade by foreigners is also regarded as export earning in the classification of the data.

indicate this peculiarity and imply that economic embargoes have not been as restrictive on imports as on exports in the North Cyprus economy, and moreover the difference between import expenditure and export earnings has been extensively widening in favour of imports after 2001. This indicates that the North Cyprus economy encountered no severe import restrictions, whereas the export ability of the country was strictly constrained as a result of these embargoes. Especially, Figure 2 shows that the origin of this importation has not been only Turkey, although the share of imports from Turkey seems to have increased after 1995. In Figure 3 too, it also becomes clear that other trade partners, other than Turkey, take a significant share of North Cyprus exports.

(*Figures 1, 2 and 3 about here*)

In addition to the adaptation of TL as the national currency, and the asymmetric implication of embargoes on the external sector, North Cyprus has developed two distinctive responses to deal with the negative impacts of economic embargoes. First, domestic demand is intended to be kept as high as possible; mainly through a high income policy and holding the general level of minimum wages distinctively higher than the labour productivity (*see* Figure 4).[9] Second, the inward-oriented, nontradable sector was converted into a particular structure that is able to generate foreign currency income for the economy. Tourism and particularly the higher education sector in this respect have recently become two crucial nontradable production activities generating foreign currency. In Figure 5, the trend of then number of students in the higher education system of North Cyprus by origin country, for example, is given as an indication of this increase in the importance of the higher education sector. Respectively the country appears to have been extremely successful in attracting overseas students, which are overwhelmingly from mainland Turkey.[10]

(*Figure 4 and 5 about here*)

Therefore, despite the presence of an export relationship in a common sense with some trade partners, its quantity is very limited and the trade, most of the time, takes place via Turkish ports with added costs.

[9] Despite the low productivity sector of labour, particularly in the public sector, the general income level has been kept relatively high in the North Cyprus economy, and the deficits that occurred through this unsustainably high income policy have been financed by Turkey, obviously not by income that could have been generated through increasing total factor productivity in the island.

[10] Turkey has a large young population, and is unable to provide sufficient supply capacity in higher education. This presence of the large young population together with the lack of sufficient supply of high education capacity in Turkey has presented an attractive opportunity for the North Cyprus economy, and urged the policy makers, not only in North Cyprus but also in Turkey, to invest in the higher education system and create new supply capacity on the Turkish side of the island. However by allowing the private sector to establish universities in Turkey, the number of students coming to Cyprus from Turkey has begun to decline, and has initiated severe competition with Turkish private universities.

The constraints imposed by being small island economy on the one hand and economic embargoes on the other unfortunately leave no option to North Cyprus other than adopting a particular type of macroeconomic managements and relying on domestic demand expansion. In catching up with the income level on the Greek side, nontradable activities and production has become the engine of the income generation process in North Cyprus. In what follows, given the importance of demand constraints in the income generation process, a methodology that allows us to investigate the roles of each demand components (namely domestic and external components) and industries is to be presented.

III.   MEASURING THE EFFECTS OF ECONOMIC EMBARGOES

In our investigation in this sector, we put a particular emphasis on the demand side factors in the determination of income in the North Cyprus economy, and distinguish the role of different components of final demand in this process. For this purpose we adopted two different methodological approaches which are based upon the input-output models and data available for the North Cyprus economy. The first one introduces the accounting approach to the analysis of patterns of economic growth pioneered by Chenery *et al.* (1962) and examine the relative roles of each domestic and external components of demand (also *see* Günçavdı and Küçükçifçi, 2005 and 2007; Gregory *et al.,* 2001; Albala-Bertrand, 1999; Schumann, 1990; Chenery *et al.*, 1986). The second one is, on the other hand, based on a counterfactual scenario analysis, which allows us to measure the output losses as a result of exogenously imposed demand constraints. With this scenario analysis, the impact of embargoes on the output levels of each industry can be calculated and then it can be decided which sectoral output mostly suffers from these embargoes.

The accounting approach to decompose the sources of economic growth

Input-output models are based on some restrictive assumptions of fixed input-output coefficients with constant returns to scale, fixed factor shares in production and perfectly elastic supplies of factors of production (*see* Bulmer-Thomas, 1982). The Leontief production function is often criticised for its assumption of fixed coefficients in input use. Since we utilise input-output tables observed at two separate dates we obtain direct measures of the change in input

use over time. Therefore, the only necessary assumption on the production function is constant returns to scale across all inputs at each point in time.

In a standard input-output framework the flows of all goods in an economy with n industries can be written as follows:

$$\mathbf{x} = (\mathbf{I} - \mathbf{A})^{-1}(\mathbf{f} + \mathbf{e}) \tag{1}$$

where $\mathbf{I}$ and $\mathbf{A}$ respectively are the unit matrix and the matrix of input-output coefficients, whose element a_{ij} represents the unit-input requirement of the ith industry for the output of the jth industry, all with $(n \times n)$ dimension. $\mathbf{x}$ is the column vector of sectoral production, with $(n \times 1)$ dimension. $\mathbf{f}$ and $\mathbf{e}$, respectively, are the vectors of total final demand and exports, both with $(n \times 1)$ dimension.

The balance equation for the flow of domestic output can be written as follows:

$$\mathbf{x} = \mathbf{w}^{\mathbf{d}} + \mathbf{f}^{d} + \mathbf{e} \tag{2}$$

where $\mathbf{f}^{\text{d}}$: the vector of flows of domestic final use; $\mathbf{w}^{\text{d}}$: the vector of flows to domestic intermediate use, which is given by:

$$\mathbf{w}^{\mathbf{d}} = \mathbf{A}^{\mathbf{d}}\mathbf{x} \tag{3}$$

Upon substituting (3) into (2),

$$\mathbf{x} = \mathbf{A}^{\mathbf{d}}\mathbf{x} + \mathbf{f}^{d} + \mathbf{e} \tag{4}$$

Imports are included in this framework by assuming that imported goods for intermediate and final uses are in fixed proportion of total. In other words,

$$\mathbf{A}^{d} = \mathbf{h}\mathbf{A} \text{ and } \mathbf{f}^{d} = \mathbf{s}\mathbf{f} \tag{5}$$

where $\mathbf{A}^{\text{d}}$: the matrix of domestic input-output coefficients, $\mathbf{h}$: domestic supply ratio in intermediate uses, $\mathbf{s}$: domestic supply ratio in final uses. Substituting (4) into (3) renders the following:

$$\mathbf{x} = \mathbf{h}\mathbf{A}\mathbf{x} + \mathbf{s}\mathbf{f} + \mathbf{e} \tag{6}$$

Section 1.01   Solving (6) with respect to $\mathbf{x}$ gives

$$\mathbf{x} = (\mathbf{I} - \mathbf{h}\mathbf{A})^{-1}(\mathbf{s}\mathbf{f} + \mathbf{e}) \tag{7}$$

This relationship holds for any point in time, and differencing it with respect to time and rearranging the resulting expression give us the change in gross output

between any two periods of time. This final expression allows us explicitly to see the sources of these changes in gross output as follows:

$$\Delta\mathbf{x} = \mathbf{Rs}\Delta\mathbf{f} + \mathbf{R}\Delta\mathbf{e} + \mathbf{R}\Delta\mathbf{sf} + \mathbf{R}\Delta\mathbf{hAx} + \mathbf{Rh}\Delta\mathbf{Ax} \qquad (8)$$

where Δ denotes the change over time; $\mathbf{R} = (\mathbf{I} - \mathbf{hA})^{-1}$ is the Leontief inverse matrix. Equation (8) allocates the change in gross output among changes in the various components of its use as follows:

i.) The changes in domestic final demand ($\Delta\mathbf{f}$): This demand component measures the extent of country's domestic total purchases of final goods.

ii.) The changes in exports ($\Delta\mathbf{e}$): This represents an export component of the external demand and measures the income effect that is generated by foreign demand. With the presence of demand the economy is expected to suffer from losses of income due to lack of sufficient external demand. This component of final demand allows us to measure the importance of economic embargoes in each sectoral income generation process and to understand to what extent the removal of embargoes would influence sectoral as well as total income in the economy.

iii.) The changes in the home shares in final consumption (*import substitution in final demand*) ($\Delta\mathbf{s}$): This contribution shows the output effects that can be ascribed to the change in imported final goods. Naturally the growth contribution is negative if these imports have increased. With the asymmetric implications of economic embargoes, the North Cyprus economy has relatively easy access to imported final goods and is also exposed to import competition which would result in output losses.

iv.) The changes in the home shares in intermediate goods (*import substitution in intermediate goods*) ($\Delta\mathbf{h}$): This component shows the contribution of import penetration in intermediate goods demand. An increase in the import shares has a negative effect on output growth in the domestic economy.

v.) The contribution of technological changes ($\Delta\mathbf{A}$)**:** This contribution to output growth indicates the sectoral output gains due to the ceteris paribus changes in the coefficients of the technological coefficients. This effect is positive if these coefficients (in their majority) have increased.

Of these five components of economic growth, (ii), (iii) and (iv) are all related to external demand and are directly related to the imposition of economic embargoes. If the output contribution of (ii) is particularly high, then economic embargoes can be regarded as to have harmful effects at the sectoral and at the

aggregate levels. The extent of the economic growth provided by an export expansion is however is largely dependent on the ability of the North Cyprus economy to access to international markets. However with the asymmetric imposition of embargoes, indicating that the trade restriction is not imposed on imports as restrictively as on exports, the country would lose output and income due to export restrictions, and at the same time would be exposed to import competition (or penetration), which increases the requirement for foreign exchange resources and makes the country increasingly dependent on external finance from Turkey.

A change in final demand in (i) is a domestic component which can be determined domestically by designing appropriate income and demand management policies. With the small size of domestic demand and economic embargoes this domestic demand component of final demand becomes extremely crucial for the policy makers in the North Cyprus economy to stimulate sectoral development in income with high income and transfer payments.

Counterfactual Scenario Analysis

Having determined the relative importance of each demand component in economic growth, we examine the extent of sectoral contribution to total output in the North Cyprus economy. With the methodology in this section we also intend to distinguish the role of domestic and foreign demand in the income generation process.[11] For these purposes we set up two distinctive hypothetical scenarios, which allow us to measure the amounts of sectoral and total output under two different hypothetical demand conditions described by these scenarios. Respectively these scenarios are as follows:

Scenario I: *It is assumed that the economy demands no (domestic and imported) intermediate goods provided by a given industry for the use of overall domestic production in the economy, and the economy is assumed to be exposed to output losses accordingly. This is also the case in North Cyprus where economic embargoes would exercise trade restrictions on the availability of imported intermediate goods, and would cause output losses in response.*

This scenario allows for measuring the backward linkage effect of a demand for sectoral output generated exogenously in the economic system. Accordingly any demand shock is expected to initiate an income generation process in all industries which are interrelated backwardly with the initial increase in demand.

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[11] See Günçavdı *et al.* (2008) for the detailed technical explanation and mathematical derivations of this scenario analysis.

The absence of a backward linkage of a selected industry with the rest of the economy under this scenario results in losses in output and income at the overall economy.

The output (or income) level produced according to equation (1) in the economy will inevitably differs under this hypothetical scenario, and absolute change in total output level for the absence of the backward linkage for each selected industry can be calculated as follows:

$$\Delta \mathbf{x} = \mathbf{x} - \mathbf{x}^{*} \tag{9}$$

Where Δ is the difference operator, $\mathbf{x}$ is the actual output level produced in the economy without any constraint, and finally $\mathbf{x}^{*}$ is the output level of the economy produced with the absence of the backward linkage of the selected sector.[12] The percentage change of (9) can also be calculated as

$$\varepsilon = \Delta \mathbf{x}^{\mathbf{T}} \hat{\mathbf{x}}^{-1} \tag{10}$$

Where $\mathbf{T}$ represents the transpose of a vector, $\hat{\mathbf{x}}$ implies the orthogonal matrix of actual sectoral production.

Scenario II: *Any selected industry demands no intermediate goods produced by the other industries in the economy in response to an increase in the final demand for the output of the selected industry. With this scenario, it is also examined how dependent the output level of the overall economy is on the use of intermediate goods of this selected industry. In the absence of their demand for imported inputs, we are able to understand how significant a likely restriction would be on the usage of imported inputs by this industry.*

This scenario enables us to determine the importance of each industry as a user (or a demander) of intermediate goods produced by other industries, and in turn to see to what extent the demand of a selected industry for intermediate goods domestically produced contributes to the income generation process in the economy. Accordingly the counterparts of equation (9) and (10) under this scenario respectively can be calculated as follows:

$$\Delta \mathbf{x}' = \mathbf{x} - \mathbf{x}^{**} \tag{11}$$

$$\varepsilon' = \Delta \mathbf{x}'^{\mathbf{T}} \hat{\mathbf{x}}^{-1} \tag{12}$$

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[12] This output level is calculate by the variant of equation (1) which is derived by imposing zero constraints on the first row of the selected industy. This implies that the other industries available in the economy demand no intermediate goods from this selected industry.

Where $\mathbf{x}^{**}$ is the output level under the scenario II.[13]   Equations (9)-(12) are calculated by using the total and domestic flow matrices of commodities produced in the economy. The differences between these two different flow matrices yield the imported commodity flows. Therefore the deviation in the output (or income) gains and/or losses calculated by using total and domestic commodity flows can be considered as the changes in output in a response to the imposition of exogenous demand constraints on imports. In the case of scenario I, these deviations would be regarded appearing when the economy demands no intermediate imported inputs of a selected industry. By this we can understand how much the production process in the overall economy is dependent on the imported inputs provided by the selected industry.

In the case of scenario II, on the other hand, the similar deviations helps us to measure how much the selected industries are dependent on the imported inputs provided by other industries in the economy. Depending on the extent of this import requirement, the sectoral output effects of economic embargoes are expected to vary between industries. In what follows, these two distinctive approaches presented in this sector are applied to the data available for the North Cyprus economy.

III.   EMPIRICAL RESULTS

(a)   *Data*

The aim of this section is to examine the macro-economic sources of changes in the production structure of the North Cyprus economy. Two available input-output tables for 1990 and 1998, which reflect the different structures of the North Cyprus economy, are employed principally. Our focus on these years was primarily dictated by the availability of detailed data on input output tables, and they were obtained from the *State Planning Organisation* of North Cyprus. Our investigation here requires an intertemporal comparison of the sources of output growth, and necessitates handling changes in price levels, particularly in any study involving a highly inflationary country such as North Cyprus. The price adjustment procedure is introduced in Appendix A just to keep the discussion in this section as simple as possible (*see* also Günlük-Şenesen and Küçükçifçi, 1994).

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[13] This output level too can be calculated by the variant of equation (1), which is derived by imposing zero constraints on the first column of the selected industry. This indicates that the selected industry demands no intermeditate inputs from the other industries in the economy.

All nominal values in our analysis are accordingly deflated to 1990 prices. The first table for 1990 contains only 16 sub-sectors, while the second one possesses 63 sectors. However the number of sectors has been reduced to 13 to compare the economic structures in both years. Further details about data and aggregation are available in Appendix B.

(b)   *Results*

Table 3 shows total and sectoral growth rates and the shares of sectoral outputs. Over the 8-year period between 1990 and 1998 the economy seems to have grown almost 48.3 % with, on average, about 5 percent rate per annum. Unlike the manufacturing sector, all sectors have positive annual growth rates. The North Cyprus government gives particular weight to a number of economic activities to generate income in the economy, and the growth performances of these economic activities are worth discussing here. They are namely *tourism & higher education* and *financial activities*. There is no single sector in our aggregated input-output tables generating the similar income level to that of the *tourism and education sector*. However the direct and indirect income generating effects of the first two activities can be captured in the production of trade sector, hotels and restaurants and higher education and other services. Information on the finance sector is already available in the table. The annual growth rates of all these sectors seem to be far above the average growth rate of the economy. Communication and construction & housing are the other sectors that have higher sectoral growth rate than the average. It is also important to note that these sectors possess higher economic growth rates than the average inward-oriented, nontradable industries.

(*Table 3 about here*)

With equation 8 we decompose total and sectoral growth into five different components. Table 4 is a summary table and shows the direction and sizes of the contribution to economic growth of each demand component at the sectoral and macroeconomic level. This table briefly highlights the main results at the aggregate and sectoral levels, and indicates which demand component would have growth-generation potential. Given that fact that economic embargoes impose restrictions on external demand and importation, it is also possible to draw some conclusions regarding how important these demand components as a source of economic growth. By reporting the (+) and (-) signs instead of exact figures in Table 4, we emphasis the qualitative importance of

each demand components. The number of (+) and (-) signs in each cell show the stringency of each demand constraint on sectoral output growth. We assign a single (+) for every 25% contribution of each relevant demand component. If this contribution exceeds 100%, then an extra (+) is added. (+++), for example, indicates that the contribution of the relevant demand component to sectoral output growth is more between 50-75%. (+++++), on the other hand, represents the contribution more than 100%. The same intuition applies to (-) as well.

<center>(*Table 4 about here*)</center>

At the macroeconomic level, final domestic demand and export (external demand) appear to be the most important demand components that generate income in the North Cyprus economy. When we look at the sources of 48.3 percent total economic growth in the period 1990-1998, an expansion in exports appear to be the leading source and account for about 76 percent of this total economic growth. However we must note that the growth capacity of the economy is subject to its ability to access international market due to the presence of economic and political embargoes, and an increased stringency of embargoes would expectedly cause a significant amount of decline in economic growth. Conversely, it is indicated by this finding that the removal of economic embargoes would be expected to improve the economic growth performance of the North Cypriot economy. The result in Table 4 also shows that domestic final demand appears to be the second crucial demand sources of economic growth and almost 53 percent of total economic growth rate is accounted for this demand component. This finding confirms that domestic final demand would be the only demand component that would, to great extent, relieve the negative effect of economic embargoes on growth. This also explains why successive North Cypriot governments have been so keen on expansionary income policies and high domestic transfer payments. Whereas the great extent of economic growth in the North Cyprus economy is, on the one hand, provided by final demand and exports, import competition in final demand, on the other hand, seems to cause a 63 percent reduction in economic growth in the same period. This is mainly because of high dependence of small island economies on imported final goods and the presence of import competition. The Northern Cypriot economy gained almost 4 percent additional growth due to import substitution in intermediate goods. Moreover the use of intermediate goods in domestic production seems to increase in this period and accounts for almost 30 percent of total economic

growth. This is an indication that inter-linkages among sectors in the North Cyprus economy significantly increased in this period.

At the sectoral level inspection, domestic final demand and exports appear to be highly important causes of sectoral output growth in the majority of industries. Domestic final demand contributes to the sectoral output growth by more than 100% in nontradable sectors like *domestic trade* and *transportation* and tradable sectors like *quarrying of stone, sand and clay*. As the latter sector is highly related with another important nontradable sector, namely construction, we can easily conclude that domestic final demand plays a crucial role in nontradables and its related sectors. This conclusion can be enhanced by looking at the contribution of domestic final demand in other nontradable activities in *public services*, *communication*, *housing* and *financial services*.

In fact, exports seem to have contributed to sectoral output growth positively in the majority of industries with the only exception of *manufacturing*, *hotel-restaurants* and *transportation* sectors. Although some of these sectors include inward-oriented, nontradable economic activities, they are capable of generating foreign exchange income for the economy by encouraging foreign residents to come to North Cyprus to utilise from these services. *Tourism-related sectors* (such as trade, hotel-restaurants) and *higher education & other services* are common examples of such inward-oriented, nontradable economic activities.

As expected the contribution of import substitution to economic growth for all sectors, except manufacturing, appeared to be negative, implying that import competition, rather than import substitution prevails in the North Cyprus economy.

Financial activities are considered as another crucial sector along with tourism activities that the present government gives priority to, together with other sectors in generating output expansion in the economy. From the past experience of the Northern Cypriot economy, the production of financial sector is encouraged largely by final demand and then by exportation of financial services (possible to Turkey). Interestingly, in the last column of the table, the use of intermediate goods appears to have increased, and has contributed significantly to the overall growth rate. However, since the sector is completely integrated into the Turkish financial market, import competition created by the Turkish financial sector seem to have been very severe, and it seems that the sector lost a great deals of its productivity due to this competition. This finding implies that the reliance on the financial sector as a source of future economic growth would require differentiating financial products towards those which the Turkish

banking sector could not compete with its Cypriot counterpart. Off-shore banking is one possible option for the Northern Cypriot economy.

Although the results reported in this paper are based on the data which reflects the economic structure of the economy in the past, we can also take them as a reference for designing future macroeconomic policies to stimulate economic growth. In this regard, the overall results in Table 4 strongly indicate that external factors, mainly exports, and final demand can be considered as the two crucial sources of future economic growth in the country. This partly implies that the future growth performance of the North Cyprus economy would be related to political progress towards the solution of the dispute on the island (either recognition of North Cyprus or a federal settlement with the Greek side). This is expected to result in the removal of the economic embargoes, and help the North Cyprus economy improve its access to international markets. With respect to the results in Table 4, any political progress in this direction is likely to provide additional growth to the Northern Cypriot economy in the future.

The second issue regarding the alternative way of stimulating economic growth involves final demand. The domestic market of the economy is very small, and especially the private sector is not big enough to create final demand in the economy. In such circumstances the role of the public sector immediately gains importance to maintain the certain level of domestic final demand. However this role of the public sector would be subject to the fiscal balances of the government in the future. Another important finding of the paper is that the North Cyprus economy is heavily exposed to import competition, particularly in final goods, at both the aggregate and disaggregate levels. This can indeed be seen as an inevitable result for a small island economy. However if the foreign exchange required to finance current account imbalances is not able to be generated through exportation easily, then this results in a high dependency of the economy on the flows of capital; in the North Cyprus' case this is in the form of foreign aid from Turkey. This consequently leaves the economy more prone to international economical and political shocks.

(*Table 5 and 6 about here*)

In Table 5 and Table 6, the results of the counterfactual scenario analysis are reported. Each scenario is conducted separately for total and domestic flow matrices of the economy, and their differences yield the import flows between industries in the North Cypriot economy. The derivation of this later flow matrix enables us to draw some interference regarding the impacts of the imposition of

likely import restrictions, and the empirical results reported in Table 6 are calculated as the proportional difference of output losses for each sector obtained from the matrices of total and domestic input flows in Table 5.

In the first two columns of Table 5, the likely output losses of the economy as a result of scenario I are reported. In scenario I the economy is assumed not to demand any intermediate goods produced by a particular sector, and output losses occurred as a result of this scenario are calculated on the basis of equation (10). With this scenario we are able to examine how important is the production of a particular industry for the overall output production in the economy. Scenario II, on the other hand, shows how important the usage of intermediate goods of a particular sector is for the overall economy. Finally overall output losses in the economy that arise from the lack of these flows of intermediate goods are measured by equation (12).

According to Table 5 the total intermediate goods provided by the manufacturing sector for the use of the economy appears to have produced a substantial amount of output under scenario I in both years. In 1990 for example, the output losses that the economy would be exposed to if the manufacturing intermediate goods were not used in the economy were approximately 13.5% in 1990, but this figure seems to have drastically increased to 32.3% in 1998. This conclusion does not change when the domestic flow relationship between industries are considered. In other words, output losses in the case of not using domestic manufacturing intermediate goods were only 3% in 1990, whereas the same figure was 9.5% in 1998. This is evidently shows that the use of manufacturing intermediate goods produced domestically contributes substantially to overall economic growth particularly in 1998. However the difference in the calculated output losses between the total and domestic flows also reveals the fact of how much the North Cyprus economy depends on importing manufactured intermediate goods. According to results in Table 6, the availability of imported manufacturing intermediate goods contributed the overall output by 77.4% and 70.5% in 1990 and 1998 respectively. This is a clear evidence that the North Cyprus economy crucially depends on the importation of manufactured intermediate goods, and the lack of the import flows of these intermediate goods (for example due to strictly binding economic embargoes) would generate very large output losses.

The agriculture sector appears to be as the second sector that generates second largest output losses at the overall economy level in cases where agricultural intermediate goods are not used in the domestic production.

Respectively output losses in 1990 were approximately 6 % while the same figure was 5 % in 1998. Interestingly, despite the presence of economic embargoes, the North Cyprus economy seems to have become dependent on imported agricultural intermediate goods from 1990 to 1998. The output losses in case of the lack of availability of imported agricultural goods were 17.5% in 1990 and 30.7% in 1998. This seems to imply that the North Cyprus economy increased its dependence on agricultural imported intermediate goods from 1990 to 1998, and became more vulnerable to any restriction on these flows. The same conclusion is also true for the electricity and water industries where the North Cyprus economy imported water great extent from Turkey, and electricity from the south of the island.

In Table 5, the intermediate goods by domestic trade are other inputs that would generate high output losses in the case of their absence in the economy. The presence of this sector and its domestic production of intermediate goods to the economy seem to have contributed to the overall growth only 4.9% and 6.8% in 1990 and 1998 respectively. In regards of the domestic flows, the contribution of the trade sector in 1990 seems to be 4.3% in comparison with 6.2% in 1998.

On the basis of our finding in Table 3, nontradable sectors such as communication, hotel-restaurants, financial services, higher education and other services and housing were the fastest growing sectors between 1990 and 1998. However the empirical findings in Table 5 indicated that the North Cypriot economy does not possesses such a tight backward linkage with these inward-oriented sectors, and their absence appears to have produced relatively small losses in aggregate output. Their lack of production for the domestic flow generates very small output losses in both years. However the historical linkages of the economy on the importation of these economic activities[14], mainly from Turkey, were very high, and the absence of their imports would have generated a substantial amount of output loss in the overall economy. In particular these losses in 1990 were 51.9% for the Hotels-Restaurant sector, 27.3% for the communication sector, 18.4% for transportation, and 4.5% for financial services. However the dependence of the economy on the importation of these sectors appears to have drastically declined in 1998 for the hotel & restaurant sector, but increased for the others. The construction and the quarrying of stone, sand and

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[14] In principle there would be no international trade in nontradable sectors. However with the integration of the North Cypriot economy with Turkey, income generated by these sectors would be taken into Turkey, and would be recorded and considered in the national statistic as if they were expenditure in tradable economic activities. The same is true for export figures. Although tourism is nontradable and generates income in foreign currency within the country, this income is recorded and considered as foreign earnings.

clay sectors shows the same pattern as the finance sector and the North Cyprus economy appears to increase its dependence on the importation of their output. This tendency in these sectors could be interpreted as disproportional expansion if the demand for the output of these sectors was met by domestic production and the domestic demand was directed towards the importation from a foreign market, namely Turkey.

The last two columns of Table 5 show the results derived under the assumption of scenario II. In other words, each number in these columns shows the output losses in case where a particular industry demands no intermediate goods from the rest of the economy. This is an illuminating empirical exercise that shows to what extent the use of (imported and domestically produced) intermediate goods of a particular sector generates income in the North Cyprus economy. From Table 6, it is also possible to draw some conclusions on the effects on the overall output of the restrictions imposed on the use of imported inputs. According to Table 5, intermediate goods demand of the *construction*, *agriculture*, *manufacturing*, *hotels-restaurant*, *transportation*, *finance* and *higher education & other services* industries appears to have become the important sources of economic growth in the economy. When we examine the results of Table 6, demand for imports of these sectors seems to be very important and each of these sectors was extremely dependent on imported intermediate goods. In particular the lack of importation for the *construction* sector in 1998 would result in a 62.3% decline in output in the economy, whereas the same decline were 82.3% in c*ommunication*, 55.6% in *electricity & water*, 51,3 % in *hotel & restaurants*, 59.7% in *higher education & other services* industries. For all these findings, we can conclude that the high sectoral growth would most likely generate higher importation, and the absence of importation, for example due to strictly imposition of economic embargoes, would be a candidate of generating substantial amount of output loss in the North Cypriot economy.

V. CONCLUSION

North Cyprus is a small island economy with a limited domestic market and natural resources. There has also been a political dispute with the Greek side of the island in existence since 1974. Since then, North Cyprus has been under several economic and political embargoes. A search for a peaceful settlement of this dispute is subject to the existing income differences between the two sides of

the island. The most recent attempt of finding a resolution of the dispute, namely the Annan Plan, was accepted by a great majority on the Turkish side whereas it was rejected by the South. This income difference constitutes one of the major obstacles and it urges the need of appropriate macroeconomic policies to eradicate this inequality. However with the presence of economic embargoes, the North Cyprus economy has had a very limited choice of action in this direction.

In this paper we examine the responses of the North Cyprus economy to the embargoes, and indicate that the income divergence between the two sides requires attaining high economic growth rates and expenditure accordingly. As one way of achieving this, the North Cyprus government has adopted the TL as a national currency. This has then enabled the economy to reduce the stringency of liquidity constraints on domestic expenditure and most importantly on imports directly from Turkey. Direct and easy access to the Turkish capital market hence allows the availability of liquidity to surge without ever increasing production towards Turkey and other foreign markets. Building a close economic, other than political, relationship has helped North Cyprus to by-pass the restrictions of the economic embargoes. Higher expenditure capacity of the economy to sustain the high domestic demand is provided by easy access to the Turkish capital market, high income policies and transfer payments. But these policies have also accounted for high saving gaps and current account deficits of the economy.

Another important feature of the North Cyprus economy is the dominant feature of nontradable economic activities, and the novelty with this feature is that the economy has eventually become able to generate foreign exchange income, namely in TL, from nontradable economic activities such *as tourism related economic activities* and *higher education & other services.*

The paper reveals that exports and final demand were two crucial components of economic growth. Due to insufficient private sector and domestic markets the public sector becomes more important in generating final demand. But the fiscal stance of the economy in generating public-sector-driven economic growth would be the main concern in this regard. Exports, on the other hand, are another contributor to growth. However, the economic and political embargoes seem to be the main disadvantage of the economy, restricting its ability to access the international markets, particularly to the European Union market. The removal of the embargoes in this respect would generate substantial economic growth for the North Cyprus economy, and this should be considered as a pre-condition for eradicating the income gap between two sides of the island before reaching a peaceful settlement of the political dispute.

Another important issue is that the economic embargoes appeared to have been implemented asymmetrically on the external economic relationship of the economy, and despite various practical difficulties and high dependence on imports from Turkey the North Cyprus economy has access to international markets. The flow of imports from Turkey constitutes a crucial source of economic growth. However, a strict imposition of embargoes on imports would create drastically high output losses. The paper therefore implies that the economic embargoes have not been strictly imposed on the North Cyprus economy, but possess a significant impact on output growth. As a final point, the removal of the community's isolation would generate not only economic growth for North Cyprus, but also generate hope for a peaceful settlement in the island.

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Appendix A: *Price Adjustment Procedure*

The examination of the effects of structural changes in the economy requires an interpemporal comparison by handling changes in price levels. Using two input-output matrices for different years in current prices, we attempt to adjust coefficient matrices for s based matrices to the base year t ($s>t$) (e.g. see Günlük-Şenesen and Küçükçifçi, 1994). The deflating procedure involves expressing $\mathbf{A}_s$, the matrix of technical coefficients, in the price of the year t. We define $\mathbf{A}_s^t$ as $\mathbf{A}_s$ deflated with year s prices, so that

$$\mathbf{A}_s^t = \mathbf{P}_s^{-1}\mathbf{A}_s\mathbf{P}_s \tag{A-1}$$

where $\mathbf{P}_s$ is the diagonal matrix of industrial price indices capturing changes in price levels from year t to s. From B-1, the typical element of $\mathbf{A}_s^t$ is

$$a_{s,ij}^t = \frac{x_{s,ij}}{x_{s,j}}\frac{P_{s,j}}{P_{s,i}} \tag{A-2}$$

where $P_{s,i}$ and $P_{s,j}$ are changes in industrial price indices of sector i and sector j from year t to year s respectively, and the ($P_{s,j}/P_{s,i}$) term on the right-hand side captures the relative prices from year t to year s.

Appendix B: *Sectoral Aggregation*

The TRNC input-output table for 1998 comprised thirteen sectors. The available latest table, on the other hand, possesses 63 sectors. Due to this mismatch of the number of sectors at a disaggregation level of the data in 1998, we aggregated all sectors in the 1998 table to the 13 sectors.

The sectoral aggregation table in the 13 ×13 sectors

	SECTORS	*Sector numbers in the 63×63 input-output table*
1	Agriculture	1-6
2	Quarrying of stone, sand and clay	7
3	Manufacturing	8-39
4	Electricity-Water	40-41
5	Construction	42
6	Trade	43
7	Hotels-Restaurants	44-45
8	Transportation	46-49
9	Communication	50
10	Financial services	51-52
11	Higher education and other services	53-61
12	Public services	62
13	Housing	63

Table 1 – Selected macroeconomic indicators

	1985-1989	1990-1998	1999-2003	2004-2007[a]
(%)				
Real growth rate	6,9	2,9	3,9	9,9
Inflation rate	49,7	84,8	44,5	10,7
Exports/imports	27,2	16,9	12,5	5,8
Enrolment ratio				
Pre-school	46,8	97,1	100	100
Primary school	99,8	100	100	100
Junior high school	82,4	98,2	100	100
General & technical high school	56,4	82,0	84,2	91[b]
Higher education	25,8	50,0	61,8	77,7[b]
Telephone per 100 person	124	315	413	433[b]
(% of GNP)				
Savings	13,4	13,2	14,6	16,5
Investment	18,8	16,7	16,9	22,7
Current account deficit	5,4	3,5	3,5	6,3
Budget deficit	7,1	7,6	15,7	7,8
Aid and credit from Turkey	3,9	1,9	12,1	7,1

Sources: SPO (2008), *Economic and Social Indicators*, Nicosia: North Cyprus.
a) Figures for 2007 are provisional.
b) Figures for 2007 are not available.

Table 2 – Sectoral composition of GDP (%)

	1985-1989	1990-1998	1999-2003	2004-2007[a]
Agriculture	13,9	9,1	8,1	7,5
Manufacturing	11,3	12,4	10,8	9,8
Construction	6,8	5,3	4,3	7,7
Trade	23,5	19,1	16,0	16,6
Transport & communication	8,0	9,4	12,3	10,6
Financial services	5,0	8,0	6,8	5,9
Housing	2,7	2,1	2,7	3,1
Other services	5,2	6,8	9,6	10,1
Public services	16,0	19,6	21,3	18,5
Import taxes	7,5	8,2	8,1	10,3
Tradable sectors[b]	**25,2**	**21,5**	**18,9**	**17,2**
Nontradable sectors[c]	**67,3**	**70,3**	**73,0**	**72,5**
Import taxes	7,5	8,2	8,1	10,3

Sources: SPO (2008), *Economic and Social Indicators*, Nicosia: North Cyprus.
a) Figures for 2007 are provisional.
b) The share of the tradable sectors is the sum of agriculture and manufacturing sectors.
c) The share of the nontradable sectors are taken as the sum of the sectors other than manufacturing and agriculture.
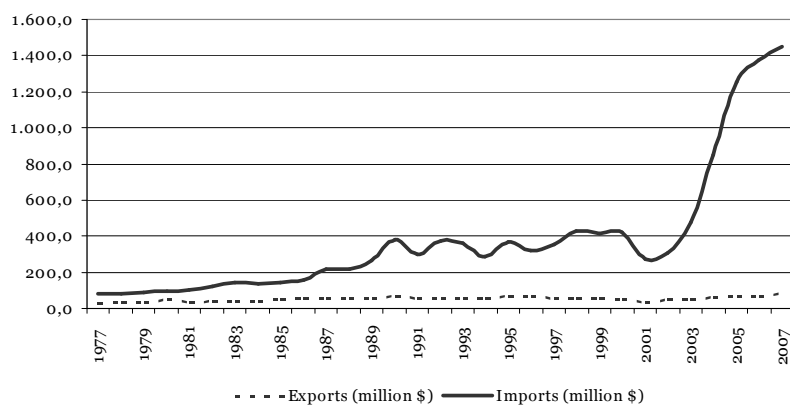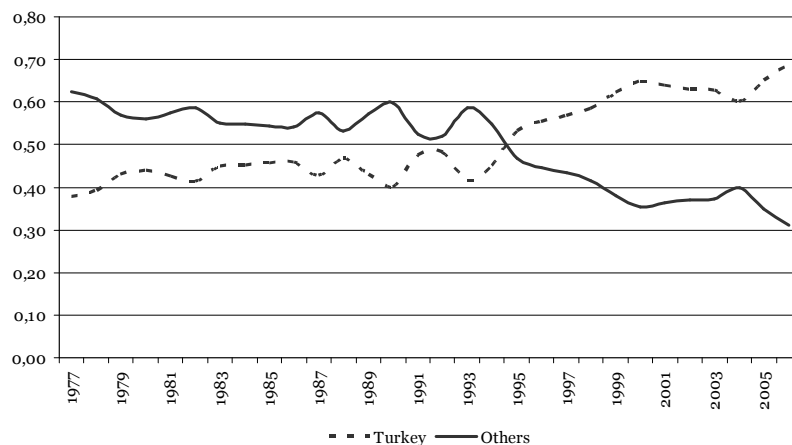

Figure 1 – Exports and imports
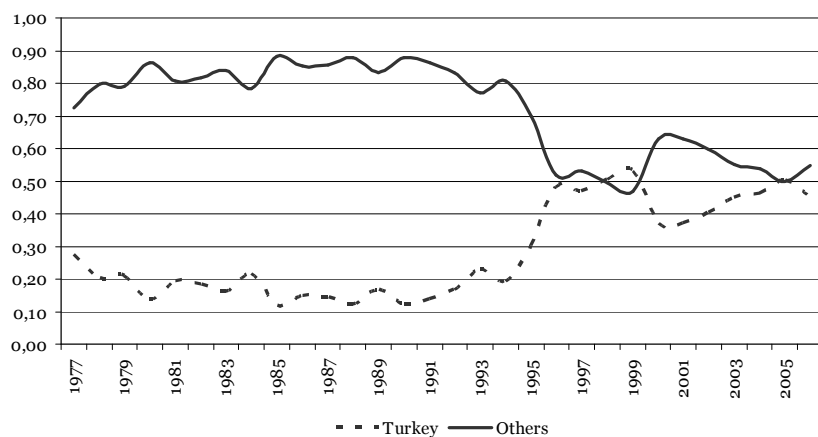

Figure 2 – Imports by origin
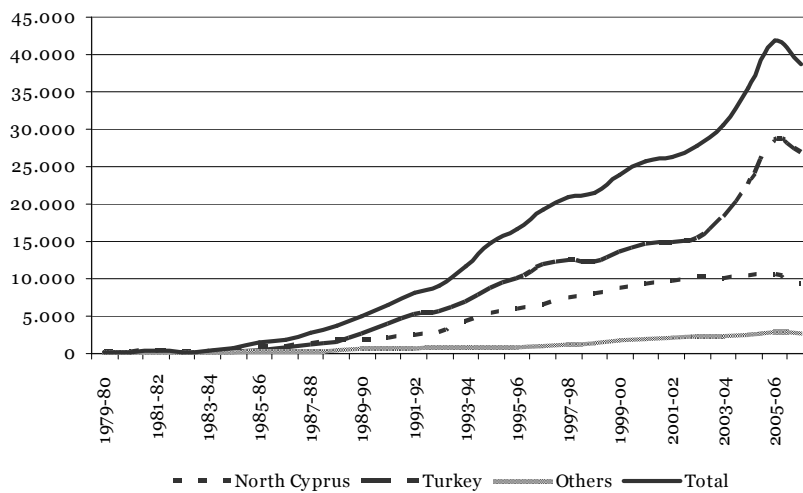
Figure 3- Exports by destination

Figure 4 – The number of students in the higher education system in North Cyprus by their origins

Table 3 – The Shares and Growth of Sectoral Output (%)

		Output Growth (1990-1998)		Shares of Sectoral Output	
		Overall Period	Annual*	Initial Year	Terminal Year
1	Agriculture	10.4	1.2	12.1	9.0
2	Quarrying of stone, sand and clay	3.2	0.4	0.8	0.6
3	Manufacturing	-27.1	-3.9	27.2	13.4
4	Electricity-Water	1.4	0.2	1.2	0.8
5	Construction	108.3	9.6	8.1	11.3
6	Trade	59.7	6.0	14.6	15.7
7	Hotels-Restaurants	213.0	15.3	5.7	11.9
8	Transportation	55.9	5.7	8.7	9.1
9	Communication	320.7	19.7	0.7	2.1
10	Financial services	176.0	13.5	3.8	7.1
11	Higher education and other services	193.4	14.4	4.2	8.3
12	Public services	13.4	1.6	11.7	9.0
13	Housing	105.9	9.4	1.2	1.7
	Total	**48.3**	**5.0**	**100**	**100**

*Annual growth rates are calculated as the geometric average of each period.

Table 4 – The Contribution of Each Growth Component

	SECTORS	Final demand	Exports	Import substitution in final demand	Import substitution in intermediate goods	Changes in technology
1	*Agriculture*	--	+++++	-----	-	+++++
2	*Quarrying of stone, sand and clay*	+++++	+++++	-----	-----	+++++
3	*Manufacturing*	+++	-----	+++++	-	---
4	*Electricity-Water*	-----	+++++	-----	---	+++++
5	*Construction*	++++	+	-	+	+
6	*Trade*	+++++	-	-	+	+
7	*Hotels-Restaurants*	-	+++++	-	+	+
8	*Transportation*	+++++	-	-	+	+
9	*Communication*	+++	+	-	+	+
10	*Financial services*	++	+	-	+	++
11	*Higher education and other services*	-	+++++	-	+	+
12	*Public services*	++++	0	0	0	0
13	*Housing*	+++	+	0	0	0
	Total [100]	**+++ [53,2]**	**+++ [75,9]**	**--- [-63,4]**	**+ [3,9]**	**++ [30,4]**

Notes: Bold sector names in the table above show the contracted sectors from 1990 to 1998. The number of (+) or (-) signs in each cell show the direction of the influence of each demand components on total economic growth. A single (+) or (-) represents the contribution of the relevant demand component by 25%. The contribution of corresponding growth components with 25-50 % is donated by (++). (+++) shows the contribution by the amount between 51% and 75%. (++++) indicates the share of the relevant demand component between 76% and 100%. (+++++) are used to show the share of contribution of a demand component exceeding 100%. The sign minus, on the other hand, shows the negative contribution of the relevant components. For the import substitution in final and intermediate goods components of growth in third and fourth column, positive signs is taken as an indication of import substitution, while the negative sign as an indication of import competition.

Table 5 - Overall output effects of imposing a binding constraint on the use of intermediate inputs (%)

		Scenario I		Scenario II	
		1990	1998	1990	1998
	Total				
1	Agriculture	5.96	5.18	4.73	7.57
2	Quarrying of stone. sand and clay	0.61	1.12	0.03	0.56
3	Manufacturing	13.53	32.29	9.36	7.27
4	Electricity-Water	0.80	1.98	0.92	3.67
5	Construction	0	0.81	7.15	11.72
6	Trade	4.89	6.84	2.90	7.19
7	Hotels-Restaurants	0.27	2.97	2.13	9.95
8	Transportation	1.85	2.67	2.86	8.57
9	Communication	0.22	1.22	0.28	1.92
10	Financial services	1.33	6.54	0.44	3.42
11	Higher education and other services	1.99	3.01	0.66	4.17
12	Public sector	0	0	0	0
13	Housing	0	0	0.24	1.73
	Domestic				
1	Agriculture	4.92	3.59	2.42	3.74
2	Quarrying of stone. sand and clay	0.54	0.62	0.02	0.25
3	Manufacturing	3.06	9.54	8.05	5.85
4	Electricity-Water	0.48	1.07	0.11	1.63
5	Construction	0	0.56	2.52	4.42
6	Trade	4.34	6.22	1.71	5.00
7	Hotels-Restaurants	0.13	2.29	1.51	4.85
8	Transportation	1.51	2.06	0.91	4.53
9	Communication	0.16	0.74	0.16	0.34
10	Financial services	1.27	5.62	0.33	1.91
11	Higher education and other services	1.84	2.41	0.33	1.68
12	Public sector	0	0	0	0
13	Housing	0	0	0.17	0.70

Source: Authors' calculations.

Table 6 – Overall output effects of imposing a binding constraint on the use of imported inputs

		Scenario I		Scenario II	
	(%)	1990	1998	1990	1998
1	Agriculture	17,5	30,7	48,8	50,6
2	Quarrying of stone, sand and clay	11,5	44,6	33,3	55,4
3	Manufacturing	77,4	70,5	14,0	19,5
4	Electricity-Water	40,0	46,0	88,0	55,6
5	Construction	-	30,9	64,8	62,3
6	Trade	11,3	9,1	41,0	30,5
7	Hotels-Restaurants	51,9	22,9	29,1	51,3
8	Transportation	18,4	22,9	68,2	47,1
9	Communication	27,3	39,3	42,9	82,3
10	Financial services	4,5	14,1	25,0	44,2
11	Higher education and other services	7,5	19,9	50,0	59,7
12	Public sector	-	-	-	-
13	Housing	-	-	29,2	29,5

Source: Authors' calculations.