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Economic Policy Papers

THE ECONOMIC EFFECTS OF THE TURKISH INVASION ON THE GREEK CYPRIOTS

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1. Introduction

The primary objective of this paper is to estimate the economic impact of the Turkish invasion of Cyprus in 1974 on the Greek Cypriots. We first examine this impact by analysing the effect of the Turkish invasion on macroeconomic indicators such as the Gross Domestic Product (GDP) and its components. Subsequently, we look at microeconomic issues with a view to assessing the effects on households and, in particular, the Greek Cypriot refugees.

The macroeconomic analysis starts with a brief historical review of the evolution of the Cypriot economy from the establishment of the Cyprus Republic in 1960 until 1997. This allows the reader to acquire a broad view of the economic progress on the island before and after 1974 so as to have a better understanding of the economic impact of the Turkish invasion of the island that took place in that year. We then use econometric forecasting methods to predict the values of the various economic indicators that would have prevailed in the absence of the Turkish invasion and calculate the difference between the forecasted and actual values. We interpret this difference as the economic impact of the Turkish invasion. The economic indicators investigated include: (a) the per capita and total Gross Domestic Product (GDP) and its components (consumption, investments, government spending, and imports and exports); and (b) individual sectors of particular interest to the Cyprus economy, such as agriculture, manufacturing, construction and tourism.

The methodology described above is a standard way of measuring the effects of 'structural breaks'. To our knowledge there are no studies in the economic literature dealing with the economic effects of events comparable to those caused by the Turkish invasion of Cyprus in 1974. The closest possible literature can be found on natural disasters, e.g. famines (Ravallion, 1997; and O'Rourke 1994). Even then, however, the methodology used and the whole perspective is very different than in this paper.

A serious drawback of the econometric approach used in this paper to measuring the economic effects of the Turkish invasion is its inability to

capture losses not reflected in the national accounts, such as those recovered through increased unpaid effort by workers and volunteers. To correct for this drawback, we complement the macro-econometric approach to estimating the economic impact of the Turkish invasion on the Greek Cypriots with a stock-taking or accounting approach. More specifically, we calculate: (a) the value of materials (buildings, machinery, equipment, raw materials, furniture, furnishings etc) owned by Greek Cypriots and destroyed as a result of the Turkish invasion; and (b) the foregone income from denied access to Greek Cypriot property in the Turkish-occupied part of the island. Both the Planning Bureau (1975) and the Department of Statistics and Research (1976) have such information available, in studies conducted soon after the Turkish invasion. In this paper we use mostly the information from the survey conducted by the Department of Statistics and Research (1976).

After the invasion, the government took several measures towards alleviating the economic burden of the affected individuals. The fourth section of the paper reviews these measures and calculates the total economic help of all types received by individuals, and contrasts this with the amount of the private losses incurred, as calculated in the third section. We will see that the economic help given to the dispossessed and other affected individuals was far lower than the losses incurred and that is because the foregone income from the loss of access to private property became so much greater year by year that was impossible to cover with any form of economic help.

2. Macroeconomic impact

2.1 The Cyprus economy: 1960-97

The performance of the economy of the government controlled part of Cyprus has been impressive during the last two decades of the 20th century (Temple, 1997) and has rapidly approached the average level of GDP per capita in EU countries (IMF Country Report, 2003). The World Bank in its July 2002 list of economies classifies Cyprus as a high income country.

This section briefly reviews the evolution of the economy of Cyprus from the time of the establishment of the Republic of Cyprus in 1960 until 1997. Table 2.1 presents the average annual growth in GDP and its components for the period 1960-97. This time period is divided in four sub-periods: the pre-invasion period 1960-73, the turbulent period during and just after the invasion 1974-75, the reconstruction period 1976-80, and post-reconstruction period 1981-97.

Table 2.1: Average annual growth of GDP and components (1960-97)

Time period	GDP	Investment	Consumption	Imports	Exports	Public spending
Before 1974: 1960-73	7.4	11.0	7.3	10.4	10.2	1.5
Invasion period: 1974-75	-17.9	-29.9	-15.2	-21.3	-25.2	11.0
Post invasion period : 1976-97	6.7	8.2	6.9	9.3	10.3	6.5
5-year periods :						
1960-95	7.8	15.5	6.1	7.8	10.4	0.2
1966-70	7.3	7.3	9.3	12.3	10.8	-0.8
1971-75	-3.1	-6.1	-2.6	-1.4	-4.7	8.8
1976-80	11.5	22.3	11.5	20.3	21.2	6.1
1981-85	5.7	2.1	6.2	6.5	8.8	5.0
1986-90	6.9	5.3	6.7	8.4	10.0	11.8
1991-97	3.8	4.6	4.2	4.1	3.8	4.0
Whole period: 1960-97	5.6	7.2	5.8	8.0	8.4	5.0

Source: (i) Department of Statistics and Research: Historical Data on the Economy of Cyprus 1960-91 and Economic Report, 1995-97.

(ii) Authors' calculations.

During the pre-invasion period 1960-73, the average annual GDP growth rate was 7.4%. This was mainly an export-led growth, with foreign demand increasing at an average annual growth rate of 10.2% in real terms. At that time Cyprus was exporting mostly agricultural and manufacturing goods. Also, from the mid 1960s, Cyprus started exploiting its comparative advantage as a summer holiday destination.

During and immediately after the invasion, in 1974-75, GDP dropped by 17.9%. Uncertainty due to instability had a negative effect on private investment demand. The government controlled part of the island was reduced in terms of production capacity in the exporting sectors, especially agricultural land, resulting in a 25.2% decrease in exports. Furthermore, the same part of the island faced an influx of refugees from the Turkish controlled part. Unemployment increased to 15.2% (from around 3%)

whereas public spending increased by 11%, reflecting the expansionary policy followed by the government as part of a general reconstruction policy.

During the years 1976-80, the average growth rate increased to 11.5% and production reached its pre-invasion levels soon after the invasion. Furthermore, during the period 1981-97, the average growth rate of the economy was about 5.4%, which compares very favourably with growth rates in other developed and developing countries during the same period (Temple 1997).

2.2 The effect on GDP

In this section, we use estimates obtained from econometric analysis to compute the economic effects of the Turkish invasion on the GDP and its components. The econometric model used in this analysis is explained in the Appendix. Unless otherwise stated, the results reported in tables and diagrams below are expressed in 1980 prices.

Total and per capita GDP

Table 2.2 presents the estimated effects on the per capita and total GDP. The second column shows the actual per capita GDP and the third column the forecasted per capita GDP, i.e. the per capita GDP Cyprus would have had without the Turkish invasion. The difference between the two columns represents the economic effect of the Turkish invasion, and is presented in column four in CYP; column five of the table represents the same difference in percentage terms. We consider the effect of the Turkish invasion on the per capita values as a more accurate measure of the welfare loss of the Greek Cypriot side, since it takes into account the reduction in the government controlled part of Cyprus after 1974.

The results reported in Table 2.2 show that the total loss of per capita GDP was CYP4200 in 1995 prices (CYP1343 in 1980 prices). It is worth noting that in addition to this pecuniary loss a significant proportion of the Greek Cypriot population lived in temporary lodgings (tents or sheds) until

September 1976 and faced other non-pecuniary losses in its standard of living¹.

Table 2.2: Total and per capita GDP (1980 prices)

Time period	Per Capita GDP				Total GDP		Per capita loss in 95 prices
	Actual	Pre-dicted	Loss (CYP)	% Loss	Loss (CYP millions)	% Loss	
Before 1974: 1961-65	570	-	-	-	-	-	-
1966-70	798	-	-	-	-	-	-
1971	987	-	-	-	-	-	-
1972	1042	-	-	-	-	-	-
1973	1039	-	-	-	-	-	-
Invasion period: 1974	927	1123	-196	-21.2	-66	-6.4	-804
1975	883	1194	-311	-35.2	-218	-19.4	-1219
After the invasion: 1976	1052	1261	-209	-19.8	-229	-19.2	-746
1977	1220	1328	-108	-8.9	-235	-18.6	-354
1978	1308	1376	-68	-5.2	-243	-18.3	-199
1979	1427	1487	-60	-4.2	-265	-19.3	-156
1980	1495	1556	-61	-4.1	-280	-18.8	-138
After 1980: 1981-85	1683	1746	-64	-3.8	-317	-18.8	-113
1986-90	2151	2153	-2	-0.1	-386	-18.9	-4
1991-97	2592	2561	0	0.0	-405	-16.1	0
Whole period: 1960-97			-1343			-17.4	-4200

Source: (i) Department of Statistics and Research: Historical Data on the Economy of Cyprus 1960-91, Economic Report, 1995-97, Demographic Report, 1997, Statistical Abstract, 1995-97.

(ii) Authors' calculations.

Diagram 2.1 below, presents the growth rate of the actual and predicted per capita GDP for the period 1974-82 and shows the impressive revival of the economy. In 1974 and 1975 the growth rate of the actual per capita GDP was negative, -10.8% and -4.7% respectively. The predicted values show that per capita GDP would grow at the positive rate of 8.1% and 6.3% for the respective years. However, the actual growth rate in 1976 (19.1%) and 1977 (16%) was 3-4 times higher than the predicted one. This pattern is repeated for 1978 and 1979.

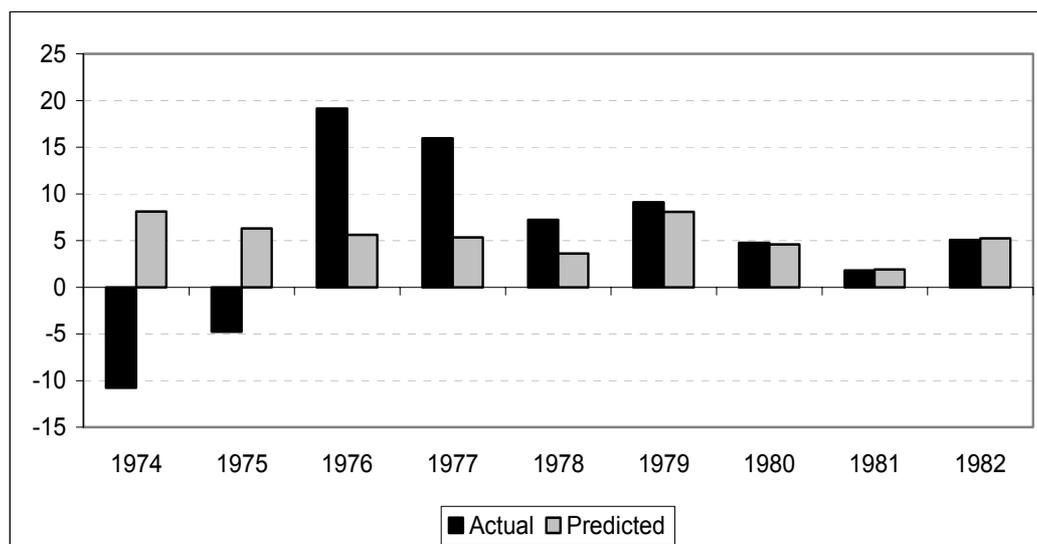
GDP components

Diagrams 2.2a-d show the effects of the Turkish invasion on the components of GDP: consumption, investments, public spending and the balance of payments. As expected, these effects are all negative, except for

¹ Department of Statistics and Research for Housing, Household Survey, 1979.

public spending. Diagram 2.2a shows that the positive trend of per capita private consumption was disrupted in 1974, but the high growth rates in 1976-77 brought per capita consumption back to its pre-74 levels by 1978. This illustrates the rapid increase in the standard of living of Greek Cypriots following the Turkish invasion.

Diagram 2.1: Growth rate of actual and predicted per capita GDP: 1974-82



Source: Department of Statistics and Research and authors' estimations.

From Diagram 2.2b, we see that per capita investments dropped by 32.8% in 1974. Although investment would fall despite the Turkish invasion, due to the first oil shock, the drop would have been much smaller, at 4.7%. After 1975, per capita investment started growing at a very high rate (22.9% in 1976 and 54.6% in 1977), because of the reconstruction measures undertaken by the government at that time. By 1977 per capita investment surpassed its predicted level.

As shown in Diagram 2.2c the Turkish invasion had a positive impact on the per capita public spending in subsequent years. The massive increase in unemployment, the dispossession of a large proportion of the Greek-Cypriot population and the loss of infrastructure necessitated a large scale state intervention for reconstruction. The fiscal and balance of payment deficits increased substantially in the years following the Turkish invasion. In particular, balance of payment deficits, as shown in Diagram 2.2d, appears to have stabilised at a permanently higher level after 1974.

This could be attributed to the fact that the efforts for the reconstruction of the economy increased demand for consumption and capital goods to levels that could no longer be satisfied by indigenous economic resources.

Diagram 2.2a: Per capita consumption*

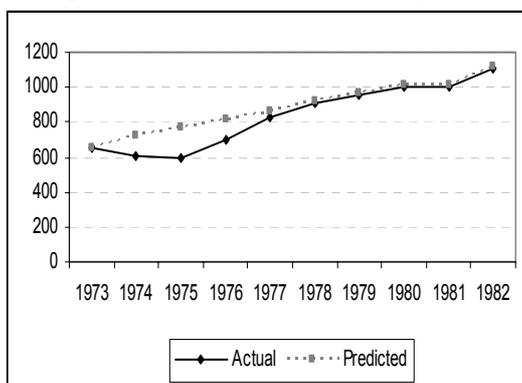


Diagram 2.2b: Per capita investment

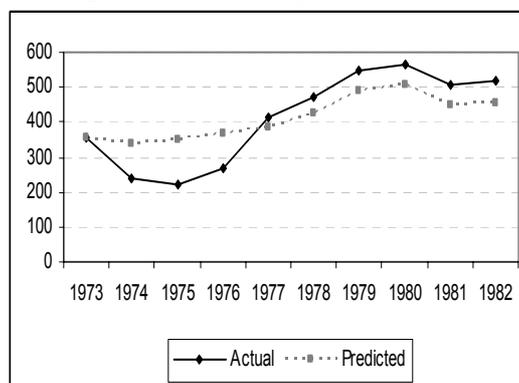


Diagram 2.2c: Per capita public spending

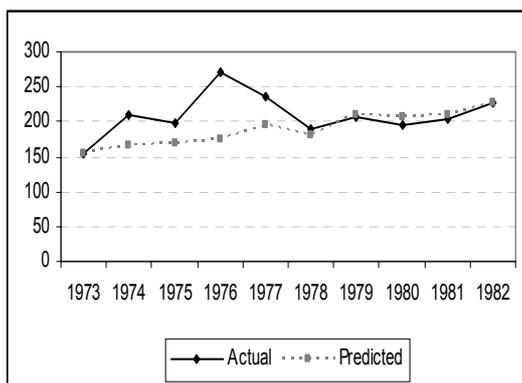
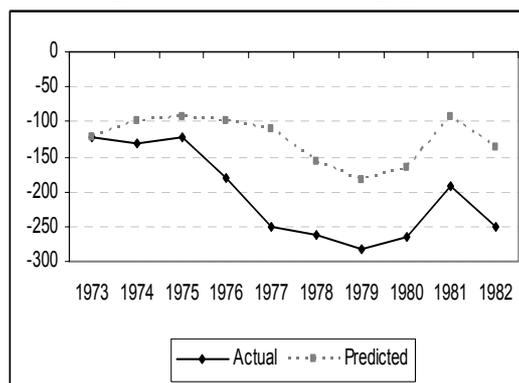


Diagram 2.2d: Balance of payments



Source: Department of Statistics and Research and authors' estimations.

* The vertical axis of Diagrams 2.2a-d are millions of CYP (in 1980 prices)

2.3 Sectoral effects

The Turkish invasion had a negative impact on the agricultural sector, leading to a drop in its value added by 20%, from the already low levels of 1973 (Diagram 2.3a). As far as the Greek Cypriots are concerned, the sector was unable to recover because the area lost to the Turkish occupation included some of the most fertile land on the island.

The manufacturing sector (Diagram 2.3b), was also affected negatively by the Turkish invasion in 1974, although not to the same degree as the agricultural sector. The manufacturing sector received priority in the

government efforts for the reconstruction of the economy because, unlike land, lost capital was replaceable.

Diagram 2.3a: Agriculture*

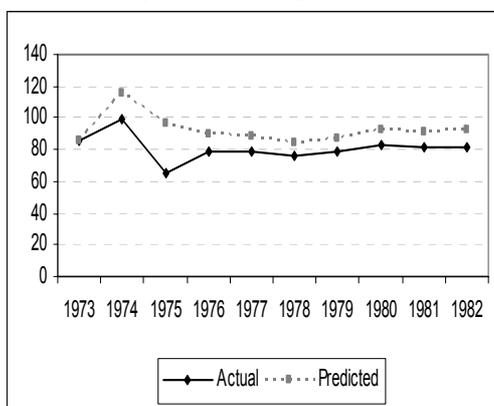


Diagram 2.3b: Manufacturing

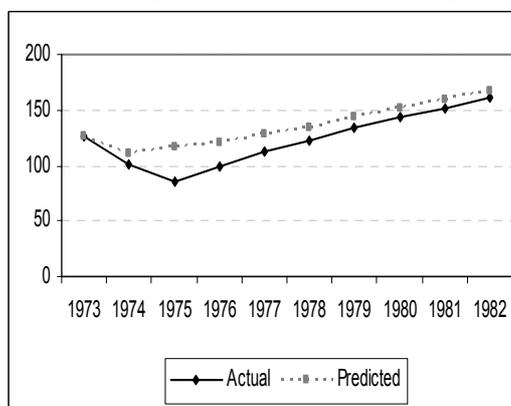


Diagram 2.3c: Construction

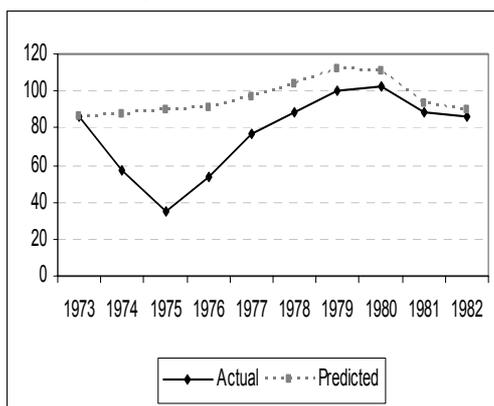
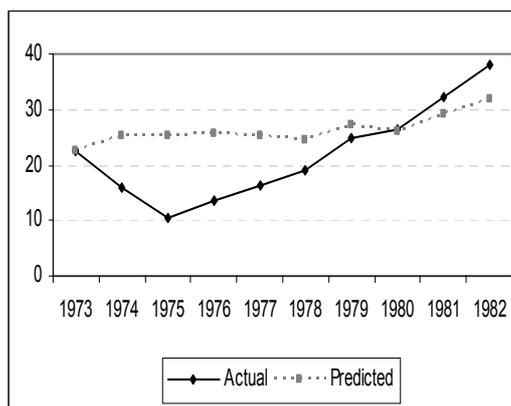


Diagram 2.3d: Tourism



Source: Department of Statistics and Research and authors' estimations.

* The vertical axis of Diagrams 2.3a-d are millions of CYP (in 1980 prices)

The effect of the Turkish invasion on the construction sector was profound during the period 1974-75. As shown by Diagram 2.3c, the value added of the sector fell from CYP86 millions (1980 prices) in 1973 to CYP35 millions in 1975. According to the predictions of our econometric analysis, the value added of the sector in 1975 would have been CYP90 millions if the Turkish invasion had not taken place. The sector returned to its predicted levels by the beginning of the 1980s, growing faster after the Turkish invasion than would have done otherwise (Mamuneas and Pashardes, 2000).

Just before the Turkish invasion 67% of the total capacity in tourist lodgings and 87% of the tourist beds under construction on the island were located in the areas now occupied by the Turkish army. At that time the tourist sector represented only 2.2% of the Cyprus GDP, but fifteen years after this share increased to 20%. As shown by Diagram 2.3d, the sector grew very fast, and by 1979 was above the level predicted under the assumption that the Turkish invasion did not take place. The sector continued growing at an even faster rate throughout the 1980s. These developments in the tourist sector can be largely attributed to the government policy aiding the growth of this sector as a way out of the economic crises caused by the Turkish invasion. This policy was implemented through measures like low-cost loans, tax exemptions for investments in the sector etc. The rising demand for tourism in Eastern Mediterranean countries during the period under consideration was also a factor helping Cyprus to exploit its comparative advantage as a popular summer holiday destination.

3. An accounting measure of economic losses

Following an accounting approach to measuring the economic losses incurred by Greek Cypriots as a consequence of the Turkish invasion in 1974, one can distinguish these losses into two categories:

- the private property and goods permanently destroyed during or after the 1974 hostilities, and
- the economic cost corresponding to the denied access to property in the Turkish controlled part of the island since 1974.

Below we discuss these two components of economic loss incurred by Greek Cypriots in turn.

3.1 Impact cost

There are two available sources of data for calculating the value of the Greek Cypriot private property and goods permanently destroyed during or after the 1974 hostilities: (a) an ad hoc study conducted by the Planning Bureau in April 1975; and (b) a survey conducted by the Department of Statistics and Research in 1976 documenting the value of property and

goods left behind by Greek Cypriot refugees. The numbers we present here come from the latter source.²

**Table 3.1: Private impact cost to Greek Cypriots
(CYP, millions in 1995 prices)**

Description	Value
Buildings	449.3
Transport vehicles	77.9
Merchandise and raw materials	539.4
Equipment and Tools	466.2
Other private capital losses	62.0
Private homes	936.0
Domestic equipment	604.5
Private transportation vehicles	31.3
Total	3166.6

Source: Department of Statistics and Research and authors' estimations.

Table 3.1 presents the private impact cost to Greek Cypriot refugees in eight categories of goods, expressed in 1995 prices³. These losses in private homes and other building establishments comprised together the biggest impact cost, amounting CYP1385 million. In total, the impact cost of the Turkish invasion for the Greek Cypriot side was CYP3.2 billion. This means that the average Greek-Cypriot family dispossessed in 1974 incurred an impact cost (in terms of abandoned buildings and movable property) of nearly CYP63 thousand.

3.2 Loss from denied access to property

According to figures supplied to us by the Planning Bureau, 58.2% of the private land currently controlled by Turkish Cypriots belongs to Greek Cypriots. This section estimates the value of this land for each year over the period 1974-97, with a view to calculating the economic loss from being denied access to it. Our estimations refer only to the value of land,

² The difference in the calculations obtained from the two sources was found to be mostly below 5%. When this difference was above this level, the calculations for each category of losses we specify below were repeated using additional information from the National Accounts.

³ Here we assume that buildings, vehicles and other capital goods are destroyed or otherwise fully depreciated. This assumption may not be valid for some of these goods, in particular, buildings. Yet it should not have a significant impact on our calculations because the residual value of buildings abandoned more than 25 years ago is negligible compared, for instance, to the value of the abandoned land.

excluding homes or other buildings as these are regarded as part of the impact cost discussed in the previous section.

The value of the occupied land

Estimating the value of land requires knowledge of the price of land and, of course, the area it covers. In this section we describe the methods we used in this paper to estimate these two parameters. For the purposes of our analysis we divided the privately owned occupied land in four categories: housing estate, tourist zones, semi-agricultural and agricultural. The reason for the above categorization is that the increase in the price of land was not uniform across these types of land, therefore the cost of denied access to land varies accordingly.

The price of land

We collected a sample of 6000 land transactions that took place during 1974-1994 in the government controlled areas of the five districts: Nicosia, Limassol, Larnaca, Paphos and Famagusta. The figures were taken from the records of the District Land Registries considering all the relevant parameters (price, location, area in square meters, etc). From these figures we constructed a price index, using weighted averages, for each one of the five categories of land from 1973-1997 (1973=100). We then used these price indices to estimate the value of the Greek Cypriot land in the Turkish controlled areas, assuming that if the Turkish invasion had not taken place the price of this land would have had the same increase.⁴

Diagrams 3.1a-3.1d present the *real* price of each category of land (CYP per square meter) as a three period moving average to smooth outliers. Agricultural and semi-agricultural land experienced an increase in price throughout the period 1974-97. Land used for agriculture and tourism also increased sharply in price from 1974 to the early 1980s. In the case of agricultural land this can be attributed to speculative purchases to take advantage of the expected change of use to other more lucrative types of land (housing and tourist zones). In the case of land in tourist zones the

⁴ Semi-agricultural land in the district of Nicosia is excluded from this calculation because the increase in the prices was partly caused by the Turkish invasion itself, i.e. due to the housing needs of refugees.

price increase can be attributed to expectations associated with the rapidly expanding tourism sector.

Diagram 3.1a: Housing estate*

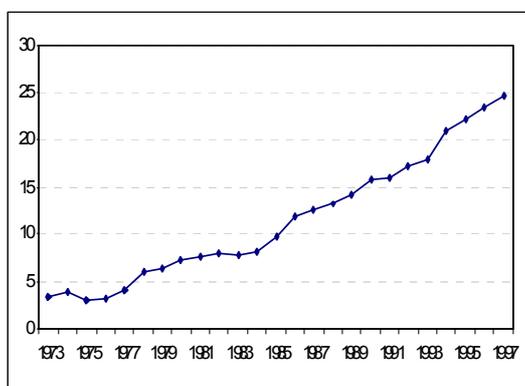


Diagram 3.1b: Semi-agricultural

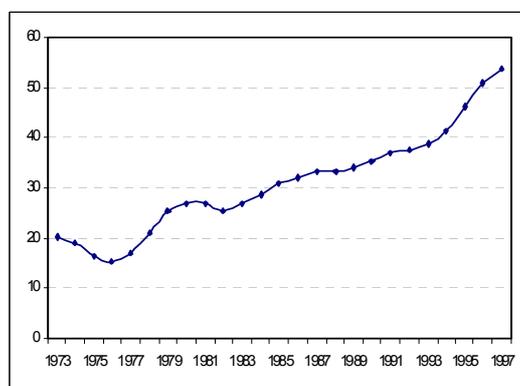


Diagram 3.1c: Agricultural

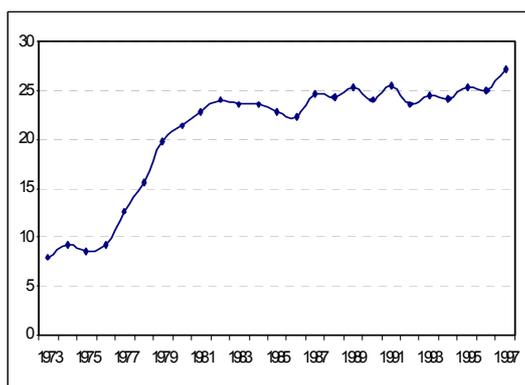
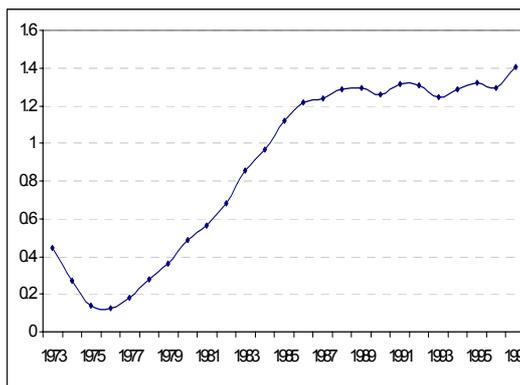


Diagram 3.1d: Tourist zones



Source: District Land Registries and authors' estimations.

* The vertical axis of Diagrams 3.1a-d is CYP per square meter (1980 prices).

The area of privately owned occupied land

The estimation of the area that each category of land would have been in Turkish controlled areas if the Turkish invasion had not taken place, is based on the following four assumptions:

1. Tourist zones would have been 1% of total land.⁵

⁵ This is based on (a) most of the areas with a potential to be used for the tourist industry were in the Turkish controlled part of Cyprus, and (b) the percentage of tourist zones in government controlled areas is approximately 0.6%. Over time tourist zones are assumed to have been increasing according in proportion to the number of tourists visiting Cyprus.

2. The Greek Cypriot owned housing estate and semi-agricultural land would have increased in proportion to the population.⁶
3. Agricultural land is total land minus the tourist zones, housing estate and semi-agricultural land.
4. 90% of the Turkish controlled housing and tourist land is privately owned.

The areas of each category of Greek Cypriot private land in the Turkish controlled areas estimated in the way described above are shown in Table 3.2 below. As one would expect, our estimation suggests that if the Turkish invasion had not happened, the land for housing and tourist development would have increased at the expense of agricultural land.

**Table 3.2: Area of Turkish controlled Greek Cypriot land by category
(million square meters)**

Year	Housing	Agricultural	Semi-agricultural	Tourist
1975	98.4	1721.3	185.7	4.1
1976	99.1	1721.2	185.9	3.3
1977	99.8	1721.0	186.1	2.6
1978	101.2	1719.5	186.5	2.3
1979	102.7	1717.3	186.8	2.8
1980	104.3	1714.2	187.2	3.9
1981	106.1	1711.1	187.7	4.7
1982	108.1	1707.6	188.4	5.5
1983	110.4	1703.7	189.1	6.4
1984	119.3	1692.9	189.9	7.4
1985	128.3	1681.8	190.9	8.7
1986	137.2	1670.6	191.8	10.0
1987	139.7	1666.1	192.4	11.4
1988	142.1	1662.0	192.9	12.6
1989	144.4	1657.9	193.2	14.0
1990	146.7	1653.6	193.5	15.8
1991	149.5	1648.0	193.9	18.2
1992	153.2	1641.0	194.8	20.5
1993	158.0	1633.8	196.4	21.3
1994	163.5	1623.8	198.3	23.9
1995	168.6	1615.5	200.1	25.5
1996	172.7	1606.6	201.5	28.8
1997	175.9	1601.6	202.4	29.7

Source: District Land Registries and authors' estimations.

⁶ The proportion of the population was calculated using statistics for the middle of 1974 from the Demographic Report 1997 of the Department of Statistics and Research.

The value of land

After estimating the price and area of private land we calculated the value of each category of land under the ‘without Turkish invasion’ assumption for the period 1975-97. Assuming that the cost of denied access to property is around 1.3% of the land value, we computed the Greek-Cypriot losses from denied access to private property to be as shown in Table 3.3.⁷ These losses over for the period 1975-97 were almost CYP3 billion (1995 prices) and increase over time due to the increase in property prices.

Table 3.3: Cost from denied access to private property (CYP million, 1995 prices)

Year	Housing	Agricultural	Semi-agricultural	Tourist	Total
1975	20.0	4.0	8.2	0.2	32.4
1976	19.9	3.7	9.4	0.3	33.3
1977	20.6	4.1	11.0	0.4	36.1
1978	23.3	5.4	14.8	0.6	44.2
1979	28.5	7.6	18.4	0.9	55.4
1980	34.0	10.4	21.8	1.3	67.5
1981	37.9	13.0	24.1	1.8	76.9
1982	41.6	15.9	26.8	2.2	86.5
1983	45.0	19.1	28.7	2.7	95.6
1984	49.3	22.6	30.7	3.2	105.9
1985	53.2	26.5	34.6	3.6	117.8
1986	56.7	29.7	41.5	3.9	131.8
1987	60.2	32.1	48.9	4.5	145.7
1988	62.7	33.6	53.6	5.2	155.0
1989	65.5	34.1	55.4	6.3	161.3
1990	68.5	34.1	57.1	7.0	166.8
1991	73.2	34.2	59.0	7.5	173.9
1992	78.6	34.1	62.5	8.2	183.3
1993	83.8	33.8	64.3	8.9	190.7
1994	89.1	33.4	66.6	9.8	199.0
1995	97.1	33.4	66.9	10.4	207.8
1996	108.2	33.8	68.2	10.7	220.9
1997	119.8	34.7	70.0	11.3	235.8
Total	1336.9	533.5	942.3	110.7	2923.4

Source: District Land Registries and authors’ estimations.

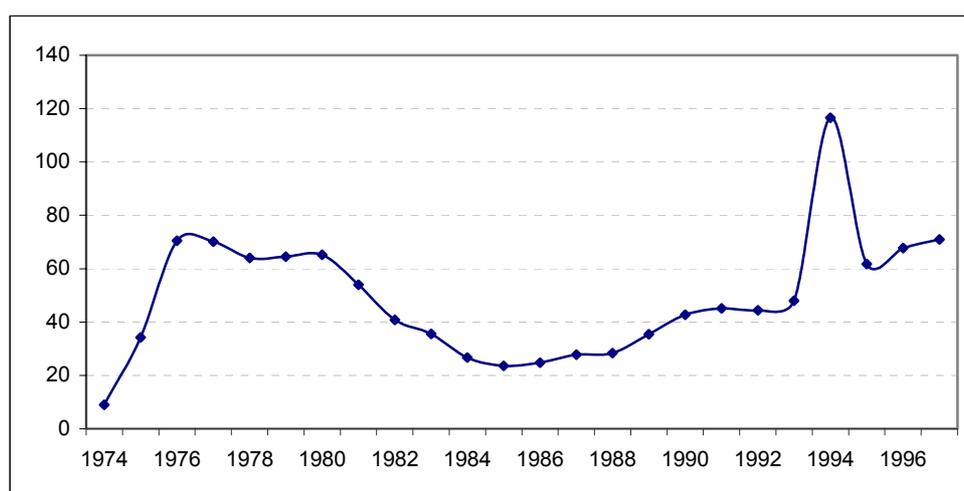
⁷ The figure 1.3% is roughly the difference between the interest rate of borrowing and lending. The logic here is that land returns equal the lending rate: if it were lower then the owners of land could sell it and deposit their money in the bank; if it were higher then people could use their deposits to buy land. The increase in supply in the first case and the increase of demand in the second would drive the return of land to the same level as the lending rate. Of course, this logic is based on the assumption of zero transaction costs.

4. Measures to equalise the economic burden

4.1 Refugee fund

The government, in an attempt to alleviate the financial hardship caused by the Turkish invasion, set up a special fund to help the refugees. Diagram 4.1 shows the amount transferred to the Greek Cypriot refugees through in each year over the period 1974-97. As seen from this diagram, in the years immediately after 1974, payments to refugees through this fund increased considerably and reached CYP70.1 millions. Notably, payments to the refugees decrease over the period 1981-1985, reaching their lowest point, CYP24 millions, in the last year of this period. Thereafter, they follow an upward trend until 1997. The big increase reported in 1994 was the result of a one-off payment to repair refugee settlements.

Diagram 4.1: Payments to the refugees, 1974-1997 (CYP million, 1995 prices)



Source: District Land Registries and authors' estimations.

4.2 Other forms of economic help

Apart from the economic benefits described in the previous sub-section, there were four other forms of economic help to Greek Cypriot refugees: Firstly, in the form of low interest loans, guarantees and grants. In total, the difference between the interest payments that were actually paid and the payable interest payments for the years 1976-97 is calculated to be CYP5 million (figures in this section are in 1995 prices). Secondly, the government gave tax exemptions to refugees during the period 1991-95 that

sum up to CYP46.4 million. Thirdly, in 1993-94 the government wrote off all the refugee debts, a benefit totalling to around CYP60 millions.

Finally, Greek-Cypriot refugees benefited from access to abandoned Turkish-Cypriot properties in the government controlled areas. The value from access to these properties has been estimated in the same way as the loss from denied access to Greek-Cypriot properties in the Turkish occupied areas, described in the previous section. As shown in Table 4.1 the benefit from access to Turkish Cypriot properties amounts to more than CYP1 billion during the period 1995-97. This means that access to Turkish Cypriot properties gave to Greek-Cypriot refugees the opportunity to recover almost one third of the cost from denied access to their own properties in the occupied part of the island.

**Table 4.1: Value of access to Turkish-Cypriot properties
(CYP millions, 1995 prices)**

Year	Turkish Cypriot land in government controlled areas (million m ²)	Market value	Access value
1975	537.13	638.28	9.57
1976	537.13	929.22	13.94
1977	537.13	1199.94	18.00
1978	537.13	1523.68	22.86
1979	537.13	1725.18	25.88
1980	537.13	2001.23	30.02
1981	537.13	2443.95	36.66
1982	537.13	2729.37	40.94
1983	537.13	3117.17	46.76
1984	537.13	3372.26	50.58
1985	537.13	3438.56	51.58
1986	537.13	3560.98	53.41
1987	537.13	3576.52	53.65
1988	537.13	3516.00	52.74
1989	537.13	3664.87	54.97
1990	537.13	3658.38	54.88
1991	537.13	3532.36	52.99
1992	537.13	3665.25	54.98
1993	537.13	3813.77	57.21
1994	537.13	3828.98	57.43
1995	537.13	4148.07	62.22
1996	537.13	3991.10	59.87
1997	537.13	4287.03	64.31
Total			1025.43

Source: Planning Bureau, Department of Statistics and Research, Land Registry and authors' calculations.

Finally, Table 4.2 compares the cost of the Turkish invasion and the economic help to the Greek Cypriot refugees over the period 1974-97. At the end of this period the cost accumulated to CYP6.1 billions and the economic help to CYP2.4 billions. Despite the fact that during the first few years after 1974 the economic help was higher than the cost corresponding to denied access to property, the impact losses of 1974 were far too high to be covered from that difference. In addition, the rising cost from denied access to property after 1980 becomes higher than the economic help, making the distribution of the economic burden of the Turkish invasion among Greek Cypriots increasingly biased against the refugees.

Table 4.2: Comparison of cost-benefit with and without Turkish-Cypriot properties (CYP millions, 1995 prices)

Year	Cost	Benefit		Cost-Benefit Difference	
		Including access to T/C properties	Excluding access to T/C properties	Including access to T/C properties	Excluding access to T/C properties
1974	3166.6	9.0	9.0	3157.6	3157.6
1975	32.4	43.8	34.2	-11.4	-1.8
1976	33.3	85.8	71.9	-52.5	-38.6
1977	36.1	91.4	73.4	-55.3	-37.3
1978	44.2	91.3	68.5	-47.1	-24.3
1979	55.4	93.1	67.2	-37.7	-11.8
1980	67.5	98.4	68.3	-30.9	-0.8
1981	76.9	94.0	57.3	-17.1	19.6
1982	86.5	85.8	44.8	0.7	41.7
1983	95.6	86.4	39.6	9.2	56.0
1984	105.9	81.0	30.4	24.9	75.5
1985	117.8	79.7	28.1	38.1	89.7
1986	131.8	83.4	30.0	48.4	101.8
1987	145.7	87.6	33.9	58.1	111.8
1988	155.0	87.0	34.2	68.0	120.8
1989	161.3	96.5	41.5	64.8	119.8
1990	166.8	104.5	49.7	62.3	117.1
1991	173.9	114.2	61.2	59.7	112.7
1992	183.3	115.4	60.4	67.9	122.9
1993	190.7	124.9	67.7	65.8	123.0
1994	199.0	241.4	184.0	-42.4	15.0
1995	207.8	133.6	71.3	74.2	136.5
1996	220.9	127.6	67.7	93.3	153.2
1997	235.8	135.2	70.9	100.6	164.9
Total	6090.2	2391.0	1365.2	3699.2	4725.0

Source: Planning Bureau, Department of Statistics and Research, Land Registry and authors' calculations.

5. Conclusion

The economic cost to Greek Cypriots due to the Turkish invasion is estimated in this paper using an econometric and an accounting approach.

The econometric approach, based on predictions of macroeconomic indicators with and without the Turkish invasion, estimates this cost to CYP4200 per capita (1995 prices). By construction, this figure does not include the cost replaced by non-market efforts and a big part of it was absorbed by the government, with a more than 80% increase in public spending in the period 1974-76. This expansionary fiscal policy had a positive impact on private consumption and investment and contributed to the revival of the government controlled economy. However, it led to an increase of public debt and had a long lasting effect on the balance of payments deficit.

The Turkish invasion affected all sectors of the economy, especially agriculture. The manufacturing sector was negatively affected to a lesser degree and revived quickly because part of the economy reconstruction efforts concentrated on this sector. The impact on the construction sector was especially profound during 1974-75 but soon after 1975 this sector grew rapidly and returned to the pre-74 levels. The tourist sector presents particular interest: while it was reduced to the 2/5 of the level it would have been without the invasion effect, it started growing dramatically after 1975 and continued to do so until the 1990s. It is estimated that the tourist sector in the government controlled areas grew faster and bigger than it would have had without the effects of the Turkish invasion.

The accounting approach to estimating the cost of the Turkish invasion to the Greek Cypriots was based on simply adding: (a) the impact cost in 1974 due to buildings and movable property abandoned by the Greek Cypriot refugees; and (b) the accumulated cost in subsequent years due to denied access to Greek Cypriot private property in the areas occupied by Turkey. Following this approach the cost of the Turkish invasion to the Greek Cypriots is substantially higher than that estimated through the econometric approach, arguably because it also includes non-market activities. More precisely, the impact cost is CYP3166.6 millions and the

cost in subsequent years due to denied access to Greek Cypriot private property in the Turkish controlled areas CYP2923.4 millions.

Regarding the distribution of this cost we have found that the measures taken by the government to alleviate economic hardship were substantially short of spreading the economic burden of the Turkish invasion equally between Greek Cypriot refugee and non refugee people.

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Appendix: Macroeconomic forecasts and calculations

For the calculation of the effect of the Turkish invasion on macroeconomic series, we used dynamic and static methods for forecasting GDP and its components. The dynamic method was based on a Vector Autoregressive (VAR) model and the static on a Seemingly Unrelated Regressors (SUR) model. Both methods gave similar results. For the discussion in the paper we have chosen to use the results obtained from the SUR model because the forecasts from the VAR model exhibited large standard errors.

A.1 Dynamic forecasts

The dynamic forecasting method used is based on repeated estimation of an AR model. Specifically, we estimated an AR(1) with trend (t).

$$y_t = \alpha + \beta y_{t-1} + \gamma t + u_t, \quad t=1, \dots, T \quad (1)$$

where y is a macroeconomic series. Initially, we estimated equation (1) using the values of our series for the pre-74 period, i.e. 1960-73. Then using the estimated parameters α, β, γ we forecast the 1974 value of the series:

$$y_{74} = \alpha^* + \beta^* y_{73} + \gamma^* t \quad (2)$$

where α^*, β^* and γ^* are the estimated parameters α, β, γ , respectively. Equation (1) is then estimated for the period 1960-74 and the value of the series for 1975 is forecasted. The same procedure is repeated until we have the forecasts for all the years up to 1997.

As we have already mentioned, the forecasts exhibited large standard deviations, as one should expect given the very small sample of available observations (annual values for the years 1960-73).

A.2 Static forecasts

GDP and its components

We estimated a SUR system of equations for the macroeconomic series of GDP components (consumption, investment, imports, exports, services and public expenditure) imposing the identity

$$Y = C + I + G + (X - M) \quad (3)$$

where Y: GDP, I: investment, C: consumption, G: public expenditure, X: exports and M: imports.

After experimenting with numerous alternative formulations the following SUR system of equations was estimated:

$$\begin{aligned} y_t = & \alpha + \beta t + \gamma^2 + \beta_1 y_{t-1} \\ & + \delta_1 D_{73} + \delta_2 D_{74} + \delta_3 D_{75} + \delta_4 D_{76} + \delta_5 D_{77} + \delta_6 D_{91} \\ & + \zeta_1 DT_{74_85} t + u_t. \end{aligned} \quad (4)$$

where D are time dummies for the year or period in the subscript. The time dummies for 1973 and 1991 account for the oil shock and the Gulf war, respectively. The effect of the Turkish invasion on the trend of the series was

found to have lasted until 1985. For the asymptotic covariance matrix of the prediction error ($y_{T+\tau} - \hat{y}_{T+\tau}$), see Schmidt (1974).

The SUR system above was estimated by Full Information Maximum Likelihood (FIML) and the parameter estimates are reported in Table A.1 below (the public expenditure is the omitted equation).

**Table A.1: Parameter estimates of GDP and components equations
(standard errors in brackets)**

Parameter	GDP	Consumption	Investment	Imports	Exports
Constant	-0.5595 (0.0892)	-1.0689 (0.1261)	-1.6860 (0.2195)	-1.1825 (0.1697)	-1.2445 (0.1979)
Lag t-1	0.3098 (0.0941)	0.2124 (0.0861)	0.1238 (0.0990)	0.4189 (0.0743)	0.4508 (0.0811)
Trend	0.0512 (0.0078)	0.0633 (0.0078)	0.0543 (0.0129)	0.0631 (0.0117)	0.0654 (0.0113)
Trend squared	-0.0005 (0.0001)	-0.0006 (0.0001)	-0.0004 (0.0003)	-0.0006 (0.0002)	-0.0006 (0.0002)
Dummy 1973	-0.0421 (0.0429)	-0.0453 (0.0438)	0.1209 (0.1154)	0.0805 (0.0983)	-0.0522 (0.0794)
Dummy 1974	-0.1730 (0.0414)	-0.1574 (0.0424)	-0.4186 (0.1118)	-0.2192 (0.0952)	-0.3180 (0.0769)
Dummy 1975	-0.2219 (0.04419)	-0.2203 (0.445)	-0.5084 (0.1196)	-0.3326 (0.0970)	-0.4125 (0.0812)
Dummy 1976	-0.0665 (0.0484)	-0.0964 (0.0475)	-0.3376 (0.1258)	0.0523 (0.1011)	-0.0068 (0.0887)
Dummy 1977	-0.0065 (0.0436)	-0.0049 (0.0443)	0.0263 (0.1125)	0.0895 (0.0964)	-0.0200 (0.0797)
Dummy 1991	-0.0231 (0.0419)	0.0808 (0.0428)	-0.0673 (0.1125)	0.1197 (0.0962)	-0.1024 (0.0781)
Trend x dummy 1974-85	-0.0014 (0.0010)	-0.0001 (0.0010)	0.0050 (0.0027)	0.0036 (0.0023)	-0.0005 (0.0018)

The value added of sectors

For the four sectors of the economy, agriculture, manufacturing, construction and tourism, we estimated four separate AR models to account for the fact that each of these sectors was affected differently by the Turkish invasion. The final models estimated for each sector are as follows.

Agriculture⁸: AR(2)

$$y_t = \alpha + \beta t + \beta_1 y_{t-1} + \beta_2 y_{t-2} + \delta_1 D_{73} + \delta_2 D_{74} + \delta_3 D_{75} + \zeta_1 DT_{7687} t + u_t \quad (5)$$

Manufacturing: AR(1)

$$y_t = \alpha + \beta t + \gamma^2 + \beta_1 y_{t-1} + \delta_1 D_{74} + \delta_2 D_{75} + \delta_3 D_{76} + \zeta_1 DT_{7477} t + \mu_1 DG_{7496} y_{t-1} + u_t \quad (6)$$

Construction: AR(1)

$$y_t = \alpha + \beta t + \gamma^2 + \beta_1 y_{t-1}$$

⁸ The dummy for 1973 accounts for severe drought experienced by Cyprus in this year.

$$+ \delta_1 D_{74} + \delta_2 D_{75} + \delta_3 D_{76} + \zeta_1 DT_{8090} t + u_t \quad (7)$$

Tourism (Hotels and Restaurants): AR(1)

$$y_t = \alpha + \beta t + \gamma^2 + \beta_1 y_{t-1} + \delta_1 D_{74} + \delta_2 D_{75} + \zeta_1 DT_{7579} t + \zeta_1 DT_{8090} t + u_t \quad (8)$$

All the equations are estimated by OLS and the parameters obtained are reported in Table A.2.

Table A.2: Parameter estimates of sectoral equations (standard errors in brackets)

Parameter	Agriculture	Manufacturing	Construction	Tourism
Constant	1.0623 (0.9150)	0.7030 (0.3852)	1.0135 (0.4450)	0.3153 (0.1327)
Lag t-1	0.1031 (0.1607)	0.7959 (0.1176)	0.6878 (0.1407)	0.8517 (0.0661)
Lag t-2	0.6728 (0.2048)			
Change in lag t-1 effect		-0.0245 (0.0086)		
Trend	0.0024 (0.0034)	0.0327 (0.0136)	0.3510 (0.0147)	0.0088 (0.0104)
Trend squared		-0.0005 (0.0001)	-0.0006 (0.0016)	0.0001 (0.0002)
Dummy 1973	-0.3709 (0.1729)			
Dummy 1974	-0.1486 (0.1692)	-0.2395 (0.0736)	-0.5259 (0.1469)	-0.4542 (0.0795)
Dummy 1975	-0.3851 (0.1539)	-0.2636 (0.0501)	-0.7739 (0.1157)	-0.5894 (0.0795)
Trend dummy 1974-77		0.0024 (0.0020)	0.0077 (0.0059)	
Trend dummy 1975-79				0.0067 (0.0043)
Trend dummy 1976-87	-0.0051 (0.0027)			
Trend dummy 1980-90			-0.0031 (0.0016)	0.0042 (0.0021)