Reducing the Relative Size of Government
in Israel after 1985

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Abstract

This chapter analyzes the significant decline in the relative size of the Israeli public sector after 1985. We present evidence that fiscal discipline increased significantly after 1985, which contributed to this decline. We show that the reduction of public expenditure can be attributed to three main factors: the decline of defense expenditure, the reduction of subsidies to the business sector, and reduction of interest payments, due to debt decline. Of these the main contributor is defense. We find that reduction of relative defense costs is related mostly to the decline in the Israeli-Arab Conflict, and also to a change in economic behavior of the defense sector, toward greater cost awareness. Finally, contrary to other costs, transfer payments increased after 1985. We examine this rise and show that it is mostly due to demographic changes and to economic changes in unemployment and inequality.

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1. Introduction

This chapter analyzes the dynamics of fiscal policy in Israel. It identifies and tries to explain the two major changes in fiscal policy following the stabilization program of 1985: a sharp decline in the public sector deficit and a gradual decline in the relative size of the public sector in Israel. These changes have followed a long period in which both the share of government and the public deficit have been very high, following the wars of 1967 and 1973. Our analysis comes out with four main conclusions. The first is that fiscal discipline increased substantially after 1985. The second result is that reduction of the relative size of government has been achieved mostly by defense expenditure reduction. The third result is that defense reduction can be attributed to two main causes, the decline in the level of the Israeli-Arab Conflict, and a sharp change in economic behavior of the defense sector after 1985, which has become more frugal. The fourth conclusion is that the increase in welfare transfers after 1985 can be viewed as a result of demographic changes and of the rise in unemployment and inequality in Israel.

We begin with a broad survey of the public sector since 1960. We show that the size of government increased dramatically in the years 1967-1973, from less than 35% of GNP to more than 75% of GNP, and remained at this high level until 1985. This rise has been triggered by the intensification of the Israeli-Arab conflict during those years. The deficit was also high at an average level of 15% of GNP. After 1985 we observe a clear change in direction. Since then expenditure has decreased to a current size of 55% of GNP. During the same period public income has declined as

well, but with a lag, so that the deficit has been sharply reduced immediately after 1985. The decline in the public sector and in the deficit can also be appreciated in an international perspective. While before 1985 the relative size of the Israeli public sector has been the highest in the world, it is currently close to European countries like Italy, France, the Netherlands and Germany.

We next turn to examine statistically the relationship between public expenditure, income, and the deficit. We show that cointegration between expenditure and income becomes stronger after 1985, when the lags of adjustment to one another become shorter. This result is interpreted as an indication for stronger fiscal discipline after 1985, which also operates more quickly in bringing the deficit down. We also conduct a specific test for a change in cointegration after 1985 and show that such a change is indeed significant. We briefly discuss the reasons for greater fiscal discipline after 1985, among them the Law of "No-Printing" of 1985 and the "Budget Deficit Reduction Law" of 1991.

We then turn to analyze the reduction of government, namely the reduction of expenditure after 1985. We first examine the main components of expenditure and observe that the decline has been mostly in three areas: defense, subsidies to the business sector, and interest payments. Subsidies to the business sector were reduced immediately in 1985, as good subsidies were slashed as part of the stabilization program. The following liberalization process further reduced transfers to the business sector. Interest payments have been gradually reduced since 1985 as an endogenous result of the reduction of debt, which has been achieved by the low deficits following 1985. Hence, the key reductions have been in subsidies and in defense, of which the reduction in defense is much larger, as it accounts for more than 10% of GNP.

In the next stage we examine reduction of defense expenditure in more detail.

It is tempting to view the decline of the relative size of defense as a result of rapid economic growth. From 1985 to 1998 real output doubled in Israel. At the same time defense costs went down from 20.1% to 9.2% of GNP. Hence, the absolute decline in defense has been moderate. But this view is misleading. Economic growth came with increase in population, with higher wages, with technical progress and thus in more advanced weapon systems. All these should have raised defense costs substantially. Our empirical analysis tries to explore why this rise did not occur.

We find that throughout the period defense costs are strongly correlated with three main factors: defense expenditure of the neighboring Arab countries, defense expenditure of the US, and the relative price of defense in Israel. Arab defense expenditure increases Israel's defense expenditure, while for the whole period we found that American expenditure had a negative effect and can be viewed as complementary. The effect of price on costs changes sharply in 1985. While before 1985 price rises led to a small reduction in expenditure, after 1985 price rises reduce expenditure by much more, namely the elasticity of defense with respect to price has become much higher. We therefore observe a sharp change in economic behavior of the defense sector in 1985, toward greater cost awareness and greater tendency to reduce expenditure.

Finally, we discuss an additional component of expenditure, transfer payments to households. This is the main component that has increased relative to GNP since 1985. We examine what are the main variables that affect the dynamics of transfer payments, both aggregate transfers and their various components, i.e. unemployment benefits, child allowances, old age payments, etc. We find three main variables that explain most of the changes in transfer payments and their share in GNP: the size of population older than 65, the rate of unemployment and income inequality between

the lower and middle income classes.

These results shed some light on the nature of the changes in fiscal policy in the recent two decades. We observe three clear trends. The first is a significant increase in fiscal discipline, which has been caused by the trauma of the period (1973-1985) of loss of fiscal control and of high inflation. The second trend is a serious trimming down of the defense sector. This has been enabled by the worldwide trend of defense expenditure reduction, coupled with a decrease of the level of the Israeli-Arab conflict, but also by imposing greater economic discipline on the defense sector. The third trend is a reduction in the intervention of the government in the economy. This liberalization led to reduction of transfers to the business sector. But it also increased inequality in Israel and that raised transfers to households. Hence, the liberalization process had a mixed effect on fiscal policy.

The chapter is constructed in the following way. Section 2 presents a general survey of government reduction in Israel with international comparison. Section 3 analyzes the dynamic interrelationship between public expenditure and income. Section 4 examines which components of expenditure have contributed to the aggregate reduction. Section 5 analyzes the changes in defense costs and section 6 analyzes changes in transfer payments. Section 7 summarizes the results and the appendix contains some further tests of the data.

2. General Trends in Fiscal Policy in Israel

The aggregate trends in fiscal policy in the years 1960-1998 are presented in Table 1 and Figure 1. Table 1 describes averages within sub-periods of public expenditure, public income, taxes, public deficit and public debt as shares of GNP. The reason we
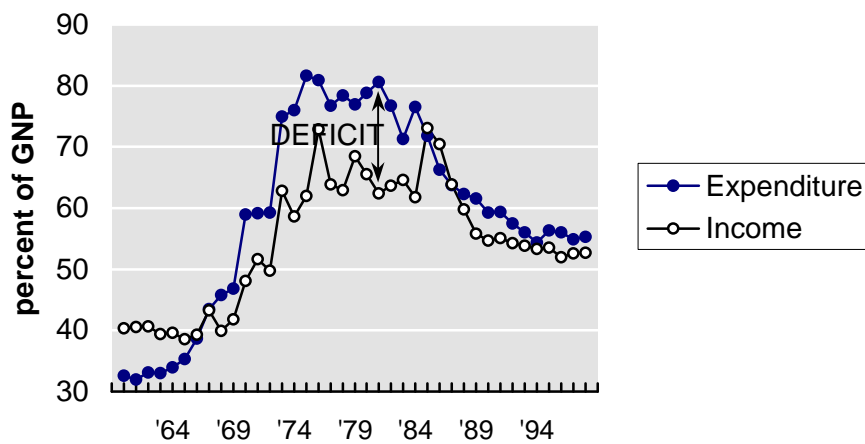
distinguish between public income and taxes is that a large part of public income in Israel comes from overseas donations and intergovernmental transfers, mostly from the US[1]. Another relevant issue for Table 1 is the new Health Tax, which is in action since 1995. Table 1(a) describes the fiscal variables including the Health Tax, while Table 1(b) deducts the Health Tax from both income and expenditure, for the sake of comparison with previous periods.

The sub-periods chosen in Table 1 follow the main events of the time. The years 1960-1966, prior to the Six Day War, are characterized by a rather low profile of the Israeli-Arab conflict and by high rates of growth, which began to slow down during the 1965-1966 recession. The years 1967-1972 are years of increasing conflict with the Arab world, beginning with the Six Day War, and followed by occupation of land from Egypt, Jordan and Syria, and by a War of Attrition against Egypt, Syria and the Palestinians throughout most of the period. These are also years of high growth rates, spurred by increased military demand and increased labor supply from the occupied territories. The years 1973-1984 follow the peak of the Arab-Israeli conflict and are also the high inflation years. The Yom-Kippur war against Egypt and Syria has been very costly both in human life and economically, and it led to a costly arms race throughout the 70s. This is also a period of loss of fiscal control, of high inflation and of low economic growth. The stabilization program of July 1985 reduced the annual rate of inflation more than 400% to an average of 20%. The years 1985-1989 are therefore years of stabilization, which end in a recession in 1988-1989. In 1990 a large wave of immigration from the former Soviet Bloc began, which started a period of high economic growth. The years 1990-1992 mark the immediate absorption of the

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[1] The transfers from the US began in the early 70s, and increased to a high level after 1973. In 1985 and 1986 Israel received an additional transfer of $1.5 billion to support the stabilization program. Since then aid has been rather stable at an annual level of $3 billion. In the early 60s Israel received

immigration wave. In 1993-1996 economic growth was enhanced by the Peace Process, which was revitalized by the Oslo Accords in September 1993. In the years 1997-1998 the economy entered a recession, led by the reduction in investment due to various reasons.

Expenditure, Income and Deficit of the Public Sector, 1960-1998

[Insert Table 1 here]

Table 1 reveals the main developments mentioned in the introduction. The public sector increased significantly after 1967, peaked between the years 1973 and 1985, and has been gradually reduced since then. Note that public expenditure has been reduced since 1985 by more than 23% of GNP. This large reduction enabled the public sector to reduce its deficit from 15% to 3% of GNP, namely by 12% of GNP. It also made possible a reduction in income by more than 11% of GNP, including a reduction of the tax burden by 4% of GNP and also a reduction of the share of aid

substantive aid from Germany, as part of the reparation agreement signed in 1953.

from the US.[2]

It is important to note that though expenditure reduction was gradual, the reduction of deficit was immediate[3], and deficits stayed relatively low in historical terms, even though large exogenous shocks occurred, such as mass immigration and peace agreements. The immediate reduction of deficit was achieved in 1985 and 1986 both by reducing expenditure by 10% of GNP and by increasing income by a similar amount, due to the special one-time US aid of $1.5 billion and due to recovery of tax collection after the stabilization.[4] The reduction of expenditure did not lead to immediate reduction of taxation, which remained high at a level of 45% of GNP in 1985-1988. Only in 1989, when expenditure reduction was secured, taxes were reduced to 39% of GNP.

These observations lead us to the hypothesis that in addition to reduction of its relative size, the public sector also adopted after 1985 much higher fiscal discipline. In Section 3 we test this hypothesis more systematically. A possible explanation to the increased fiscal control can be the effect of the trauma of the inflationary period 1973-1985. Fiscal discipline was helped by two important acts of legislation: the Law of No-Printing of 1985 and the Budget Deficit Reduction Law of 1991. The first law passed in September 1985 as part of the stabilization program, and it prohibits the Bank of Israel to lend money to the government to finance its deficit. The law puts various restrictions on the overdraft in the government's accounts in the Bank. As a result of this law deficits after 1985 have been financed by borrowing from the public and abroad and not by monetary injections. This in itself contributed significantly to

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[2] Since US aid is $3 billion since 1985, its real value has declined over the years, and more importantly its size relative to GNP has declined dramatically from 8.6% of GNP in 1987 to 3.5% in 1998.

[3] The impacts of fiscal consolidations have been studied extensively in recent years. A recent contribution is Alesina and Ardagna (1998).

[4] This is a clear demonstration of the Tanzi-Oliviera effect in reverse.

fiscal discipline.[5] The second law further restricted the central government by setting a future path of diminishing deficits. The initial law in 1991 set a target of zero domestic budget deficits within a number of years. Later in 1993 the law was softened and set a condition that domestic deficits must annually decrease relative to GDP. From 1997 the law is in terms of the overall deficit instead of domestic deficit, and it sets a path of declining deficits until 2001, when the deficit should reach a level of 1.5% of GDP.[6]

The decline in public sector can be further appreciated when presented in an international perspective. Prior to 1985 the relative size of the public sector was the highest in the world.[7] Currently it is within the range of most European countries. Table 2 presents an international comparison of the relative size of public sector in GDP in a number of countries in the years 1993-1996, which is derived from IMF (1998).[8] This set of data includes separate accounts for central and local governments, which we added, deducting transfers between branches of government. We also adjusted for differences between indexed and non-indexed debts to allow comparison with Israel, where almost all debt is indexed, unlike most European countries. The countries are ordered by size of expenditure. As is clear from Table 2, the size of government in Israel is smaller than Sweden, close to that of Italy, Germany, France and the Netherlands, and is larger than that of the US, UK, and Spain. A few words of caution apply. First, the actual public sector of Israel is somewhat larger as Table 2 does not include some public non-profit enterprises.[9] Second, in some countries, like Italy and France, government includes a pension system, unlike in Israel, where long-

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[5] Some claim that the government can still circumvent the No Printing Law by borrowing from abroad and exchanging the foreign currency by the Bank of Israel. Such loopholes must of course be closed.
[6] A detailed description of the development of this law can be found in Dahan and Strawczynski (1997).
[7] See The World Bank (1984), p. 268-269.
[8] We have chosen a representative set of OECD countries.

term saving is stimulated mainly through tax exemptions. A comparison of tax rates yields similar results. In 1994 the tax burden (percent of taxes in GDP) in Israel was 40.0, while the average in EU countries was 42.5 and the average in OECD countries was 38.5.[10] This brief international comparison indicates that the public sector in Israel is close to major European countries.

[Insert Table 2 here]

Concerning taxation, direct taxation declined and indirect taxation increased after 1985. This has been influenced by two increases in the rate of VAT, in 1985 and in 1991. Income Tax and National Insurance (Social Security) Payments, declined after the stabilization, except in the period 1993-95, as a result of the rapid growth of the economy[11]. In an international comparison of the structure of taxes with OECD countries Israel comes up with lowest share in GDP of direct taxes, while having the highest share of indirect taxes.[12]

The decline of the public sector is reflected not only in size reduction, but also in the mode of operation in the economy. One of the most dramatic processes since 1985 has been a gradual process of privatization, both of public companies, but not less important of many public services and activities. While the privatization of public companies received much public attention, the process of privatization of public activities, also known as "outsourcing", has received less attention but is of even larger magnitude. Privatization of services means that more public services are purchased from private suppliers rather than produced by public employees. Two prominent examples are infrastructure construction, and nursing services to old and

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[9] Compare with Table 1.
[10] See State Revenue Administration (1998).
[11] For further discussion of the fiscal consequences of rapid growth in these years see Ben-Bassat and

disabled. In the past infrastructure construction was carried out by "MAATZ" (government department of public works). In recent years construction has been transferred to private contractors, while "MAATZ" only plans and supervises. The Nursing Law shifted nursing from public nursing homes to private provision of nursing services financed by transfer payments.

It is hard to get an exact quantitative estimate of the process of privatization of public services, but we can present an indirect estimate. We employ a break up of public civilian consumption into labor inputs and purchases as a crude measure to the scope of the process.[13] In the following calculations we consider public civilian consumption net of depreciation costs. In 1980 the share of labor costs was 83%, while the share of purchases in civilian public consumption was 17%. Since then the share of labor costs decreased to 72% in 1998, and the share of purchases increased to 28% in 1998. This is clearly a large increase, which indicates the scale of privatization of services. To demonstrate the size of the process note that civilian public purchases increased by 2.5% of GNP since 1980.

3. Fiscal Discipline

In Section 2 we raise the hypotheses that fiscal discipline increased substantially after 1985. This is hinted both by the low deficits after 1985 and by the observation that taxes were reduced only in 1989 after several years of expenditure reduction. In this section we test the hypotheses of greater fiscal discipline after 1985, by performing a cointegration analysis of the variables expenditure and income. Such an analysis examines how close the two variables follow one another and at what speed one

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Melnick (1997) and Hercowitz and Strawczynski (1998).
[12] See State Revenue Administration (1996).
[13] We use civilian consumption and exclude military consumption for two reasons. First, defense can

adjusts to changes in the other.

The analysis uses two data sets. The main one includes annual data of total (domestic + foreign) expenditure and income of the public sector, in the period 1960-1998 (source: Central Bureau of Statistics). The second set is used mostly to corroborate our main results, and it consists of quarterly cash data of total domestic expenditure and income of the central government, from the second quarter of 1987 to the first quarter of 1999 (source: Accountant General in the Ministry of Finance).[14] The analysis is performed in real terms, using the Consumer Price Index as a deflator. The list of variables we use is therefore:

- E - Total Annual Public Sector Expenditure, in real terms.

- I - Total Annual Public Sector Income, in real terms.

- T - Total Annual Public Sector Income excluding Unilateral Transfers, in real terms.

- EQ - Quarterly Domestic Expenditure of the Central Government, in real terms.

- IQ - Quarterly Domestic Income of the Central Government, in real terms.

As a first step we perform a Johansen Cointegration test, which serves two important goals in our analysis. First, it examines existence of cointegration, namely of a long-run relationship between income and expenditure. Second, it reveals the structure of lags in this relationship, which is crucial for understanding how expenditure adjusts to income and vice versa. The results are shown in Table 3.

[Insert Table 3 here]

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be much less privatized than the rest of the government. Second, defense purchases are highly influenced by defense prices, which increase significantly over time.

[14] In order to remove credit movements from cash data during the period 1987-1991 we used seasonality coefficients on credit operations. We thank Avisar Cohen for providing us the data on credit operations.

The most striking result in Table 3 is that the lag structure between expenditure and income becomes shorter with time[15]. In the whole period (1960-1998) cointegration between expenditure and income is obtained only after 5 years, both for total income and for income excluding unilateral transfers (mostly taxes). Such a long lag means that there is practically no cointegration between expenditure and income during the whole period. In the sub-period 1980-1997 cointegration improves and the lag shortens to 4 years. Finally, in the more recent period (1986-1998) the lags shorten to 1 and 2 years for total income and income excluding unilateral transfers, respectively. This pattern of lags can be interpreted as follows: the closer we get to the present, the shorter is the period of adjustment of income to changes in expenditure. This trend is observed also for taxes, which react within shorter lags than total income in all sub-periods. The economic meaning of these statistical findings is that fiscal discipline increased significantly after 1985.

The cointegration test for quarterly data for the recent sub-period supports the annual results, as it shows that cointegration is obtained after 10 periods, i.e., 2 years and a half, which is roughly consistent with the result obtained for annual income excluding unilateral transfers.

[Insert Table 3 here]

The weak cointegration for the whole period together with the result of shorter lags in more recent periods lead us to the hypothesis that fiscal discipline changed significantly after 1985. Consequently, the second step in the analysis is to test cointegration allowing for a regime shift after 1985. For this purpose we use the

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[15] The procedure for computing the number of lags is based on computing Likelihood Ratios (LR) for successive increases in the number of lags. We report the minimal number of lags that passes consecutively two LR-Tests.

methodology developed by Gregory and Hansen (1996).[16] Results are presented in Table 4. Note, that we test both for causality from expenditure (E) to taxes (T) and vice versa. Since unilateral transfers are considered to be more exogenous than taxes, we examine only causality from total income (I) to expenditure. Furthermore, in the test for total income in Table 4 cointegration is obtained only when accounting for a regime change in 1984 instead of 1985, since unilateral transfers increased sharply in that year.

[Insert Table 4 here]

The results of Table 4 support our hypothesis of a regime shift from low to high fiscal discipline.[17] In all three tests the ADF is higher than the critical value at 1% significance, and coefficients have the expected signs. Moreover, while in the first period (1960-1984) the coefficient of expenditure was unsustainable in the long run (1.52), the regime shift (-0.61) allows for a sustainable behavior of the public sector expenditure, since the sum of coefficients turns to be 0.91. A similar picture is obtained in the other tests, of tax adjustment to expenditure, and of expenditure adjustment to total income (i.e., including unilateral transfers). In the former test the sum of coefficients is 1.06, while in the latter it is 1.

4. Which Expenses Were Reduced?

Section 3 shows that fiscal discipline increased dramatically after 1985. Greater fiscal discipline obviously played an important role in reducing the relative size of the public sector in Israel. When deficit must be low and taxes are limited, expenditures

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[16] We are grateful to Michael Beenstock for referring us to this methodology.

[17] In non-reported regressions we dealt with the possibility of additional regime shifts, mainly during the sixties. However, the single period in which the slope coefficient of the regime shift was significant

must be reduced. The question still remains how the public sector has been reduced and what enabled reduction of expenditures. We turn to this question in the following sections and begin with a survey of the changes of the various components of public expenditure, to see which one declined by more relative to GNP in order to gain a better understanding of the process of expenditure reduction.

Table 5 presents a breakup of public expenditure to various components and examines how these have changed during the eighties and the nineties. In this table we break up public expenditure to public consumption, public investment and to transfers. We further split public consumption to security, public administration, education, health, and welfare services.[18] We also break up transfers to transfers to households, transfers to the business sector and finance costs, namely interest payments. Note that transfers to the business sector include three main elements: price subsidies to a large group of consumption goods, which increased significantly during the inflationary period, subsidies to credit and to investment projects, according to the Law of Encouragement of Capital Investments, and export subsidies.

[Insert Table 5 here]

A close examination of Table 5 reveals that the decline in public expenditure can be attributed to three main processes:

1. The share of defense expenditure in output declined significantly after stabilization from a level of 21% to less than 10% of GNP in recent years. This decline has a number of reasons. First, the high level of defense expenses after 1973, of more than 32% of output, has been temporary and began to decline after a period of military reconstruction and upgrading. Second, the Peace with Egypt, and the speeding up of the peace process in the early nineties contributed as well. Third,

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is after 1985.

there has been a serious attempt to reduce costs and to operate in a more economic fashion after 1985, and one clear example is the cancellation of the "Lavi" project in 1987. This change is discussed in length in the next section.

2. In 1985, as part of the stabilization program, the government slashed subsidies to consumption goods and further reduced them later on. Export subsidies were reduced after inflation came under control and credit subsidies were reduced as well. As a result, transfers to the business sector declined significantly throughout the period. These transfers increased slightly only once, in 1991 and 1992, when the government subsidized housing in a large scale for the immigration wave. But even that episode did not change the overall decline in transfers to the business sector as shown in Table 4.

3. Interest payments have been reduced significantly since 1985. This has been a direct result of the immediate reduction of deficit in the mid-eighties and of the fiscal restraint since then. The public net debt, which increased to a dangerous level of 157.6% of GNP in 1985, began to decline and in 1998 it reached a level of 89.6% of GNP. As a result, interest payments declined as well.

Not all components of public expenditure have declined in the eighties and the nineties, as is clear from Table 5:

1. The largest increase has been in transfers to households. These transfers increased due to various reasons. One reason has been demographic changes in Israel, both due to aging and partly due to immigration. Another reason is the rise of the unemployment rate since the late 80s, which increased unemployment benefits and income subsidies. Third, there has been an increase in inequality in Israel during the eighties and the nineties, which increased transfers, due to their

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[18] In this table we deduct the Health Tax from expenditures for the sake of comparison.

progressiveness, as well. We systematically explore this issue in Section 6.

2. Other two areas where expenses were reduced in 1985, but have later increased during the early nineties are education and health. This increase has been a policy change of the Rabin Government of 1992-1996.

3. Expenditures on public investment increased as well after 1985. This increase followed a long period of neglect of Israel's infrastructure and the need to improve it and to adjust it to the large increase in population, seemed to be rather acute in the early nineties. Indeed this has been another policy change implemented during the Rabin Government.

1.   Table 6 breaks it up according to the spending units. Table 6 shows that the central government reduced its relative expenditure significantly, while the other branches of the public sector increased their expenditure relative to output

Note that tables 5 and 6 complement one another. According to table 6 the central government has been leading in reducing expenditure in the economy, while the other sub-sectors increased expenditure. Indeed, from table 5 we see that the types of costs that led the reduction, defense, interest payments and subsidies to the business sector, are all under the responsibility of the central government. Does it mean that the central government led the cost reduction while the more independent units increased spending? That is true in general, but not everywhere. We also have to keep in mind that some of the sub-sectors, like the National Insurance Institute, are not independent but rather controlled by central government.

5. Explaining the Reduction in Defense Costs

In this section we examine more carefully the reduction in the relative size of defense expenditure, which is described in Section 4, and which has been a key factor in public expenditure reduction. In order to understand the dynamics of defense expenditure we perform a cointegration analysis, which tests the existence of a long-run relationship between this variable and other explanatory variables.[19]

Following is a description of the data and the variables we examine. The source of data on military expenditure is the US Arms Control and Disarmament Agency (ACDA).[20] The sample period is 1966-1997.[21] The source of data on military prices is the Israeli Central Bureau of Statistics. The variables we examine are:

- ISRAEL - defense expenditure of Israel is the dependent variable and is measured in constant US dollars.[22]

- RIVALS - defense expenditure of neighboring Arab countries is the sum of defense expenditures of Egypt, Syria and Jordan, which are the main military adversaries of Israel.[23] Our a-priori hypothesis is that there is a positive relationship between defense expenditure of Israel and that of its rivals.

- PD_PFF - the relative price of defense expenditure is a composite price index of government defense consumption in dollar terms (defense prices divided by the exchange rate and the U.S. GDP deflator). The coefficient of this variable provides an indication for the elasticity of defense demand in Israel. Caution in this

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[19] There are many combinations of explanatory variables, which can be candidates for a cointegration vector. Beenstock (1998) performs a cointegration analysis with additional combinations of variables.

[20] ACDA data is expressed in constant US dollars (using implicit GNP price deflators and the official exchange rate in the base year). The data is not adjusted for differences in purchasing power parity due to the difficulty of calculating specific military price indices.

[21] Data for 1998 was not available at the time of writing. As for historical data, since data on defense expenditure in the fifties is not available, we begin our sample when defense expenditure begins to rise in Israel, just before the Six Days War in 1967.

[22] The US dollars data on Israel was taken from ACDA, in order to assure consistency with the data of Arab countries. By using the share of defense consumption in GNP we corroborated that Central Bureau of Statistics data corresponds almost completely to the data of ACDA..

[23] We have tried to include Iraq in this variable, but have realized that Iraqi defense expenditures are to a large extent affected by events independent of the Israeli-Arab conflict, like the Iran-Iraq war.

interpretation is required, since price changes may reflect changes in quality as well. It is also important to note that this price index is composed of both wages in the defense sector and prices of military equipment.

- USA - defense expenditure of the US is a variable that measures the defense expenditure of an important ally and arms supplier. On one hand, the existence of a significant annual US military aid to Israel implies that an increase in arms production by the US maybe translated into an increase in arms supply to Israel, leading to a positive relationship between USA and ISRAEL. On the other hand, an increase in arms production in the U.S. implies an increase of defense capabilities of the ally, and thus it allows for a reduction in defense expenditure. We conclude that ex-ante it is not clear what the sign of this coefficient should be.

- TREND is a time trend, which may act as a substitute for the quality of military equipment, mostly due to technical progress.

- Periodical and Political Variables, which are represented by dummies for different periods, include periods of various Defense Ministers. The main periodical variable we examine is the period following the stabilization in 1985, in order to examine whether there has been a structural change in the behavior of the defense sector after 1985.

[Insert Table 7 here]

Table 7 presents the results of the cointegration analysis. The basic equation includes the defense expenditure of the neighboring Arab countries and of the US, the price index (PD_PFF) and a time trend. The coefficients are significant and with the expected signs, but cointegration is rejected at the 5% level. This lack of cointegration leads us to the next step in the analysis, which is to test for a regime shift after 1985,

Controlling for that would have complicated the analysis too much.

since a similar shift is found is Section 3 with respect to total public expenditure. Another finding that leads us to test for a regime shift is the relatively high price elasticity found in the basic regression. Following the methodology of Gregory and Hansen (1996), the second regression in Table 7 presents the test of the hypothesis of a change in <u>all</u> coefficients after 1985 through an interaction variable (d85), which takes the value 0 before the stabilization plan and 1 afterwards. The result indicates that after allowing for the regime shift, cointegration cannot be rejected at the 5% significance level.

The regression with regime shift also shows that the coefficients have changed significantly after 1985. No special economic meaning can be associated to the change in the coefficients of RIVALS and USA in 1985, as these are related to geopolitical issues, such as the peace with Egypt and the Gulf War. We therefore concentrate on the change in the price coefficient, i.e., the price elasticity, which is the single relevant variable for testing fiscal discipline.[24] While previous to 1985 demand for defense was not so elastic according to regression (2) in Table 7, after 1985 elasticity increased dramatically. One interpretation can be that this is a result of greater fiscal discipline, and the defense sector became much more cost and price aware. Another possible (and complementary) interpretation is that given the general trend of reduction in defense expenditure a decision was made to substitute size by quality, both in equipment and in personnel. Such a substitution contributes to the negative correlation between prices and wages and quantity. Regression (3) repeats the same exercise for domestic defense expenditure (ISRAEL_D) and presents similar results.

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[24] The methodology used by Gregory and Hansen (1996) allows for the use of a dummy variable for the <u>whole cointegration vector</u>. Thus, the single relevant alternative would be to test a regime shift in a year of a geopolitical change such as the Peace Agreement with Egypt. We do not present such a test

In regression (4) in Table 7 we replace the absolute defense variables by defense expenditure as percent of GNP. Clearly this regression does not include the trend variable, since in the long run the share of defense expenditure in GNP has no trend. In this regression as well cointegration is not rejected. Finally, we present the error correction equation, which strengthens the case for cointegration, since the lagged value of the residuals is significant, and its coefficient is negative between zero and minus one, as expected.

Regression (4) in Table 7 enables us to answer our initial question, namely what enabled the large reduction in the relative size of defense costs since 1985. We use the coefficients of this regression and find that 32.1% of the decline can be attributed to reduction in defense costs of neighboring Arab countries. The reduction of American military costs accounts for 30.6% of the decline in Israeli defense costs, and 37.3% are due to higher prices of defense, namely due to higher price elasticity. The large impact of USA is of great interest here, both due to its large effect and also because in the 90s it has a positive effect on Israeli defense costs opposite to earlier periods. A possible interpretation is that in the 90s we observe a global trend of defense reduction, which is captured by our USA variable. This trend reduced defense exports from Israel and thus contributed to the decline of defense industries, which are part of defense costs.

Finally, we examined whether political variables have affected defense expenditure as well, in addition to the variables we have explored. This is done, in non-reported regressions, by adding dummy variables for periods of different defense ministers. Note that these variables reflect not only the defense minister, but also specific events that have occurred in that period. Examples are Weitzman and the

since this possible regime shift is not relevant for the economic variable under research, i.e., for price

large costs of implementing Peace with Egypt, and the first period of Rabin as defense minister, which coincides with the Intifada. Overall, the political variables seem to contribute to the analysis much less than the pre-post stabilization variable (d85).

6. The Rise of Welfare Transfer Payments

As shown in Section 4, transfer payments experienced an opposite trend to the decline in public expenditure, and their share in GNP has risen since 1985. In this section we try to gain some understanding of this increase. We mainly examine whether it can be viewed as an endogenous response to exogenous demographic and economic changes, like aging, unemployment, or income distribution. The source of the data is the Central Bureau of Statistics and the National Insurance Institute.

The set of variables is the following:

- The dependent variable TR is total real current transfers to households, and is used both in per-capita terms (TR_P) and as a share of GNP (TR_Y).

- POP65 is the main demographic variable, which is the share of people over 65 years old in the population. It is included due to importance of old-age transfers. Other demographic variable is the percent of families with four children or more (FAM4). Clearly we expect a positive coefficient on all these variables.

- BOT_TOP measures the income ratio of the bottom to top quintile and it represents income inequality. An additional index is MEAN_MEDIAN, calculated as the ratio between the mean and median income. Two opposite forces are expected to play a role. The persistent increase in inequality is one of the well-known explanations for the relative increase of transfers and government

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elasticity.

involvement in OECD countries.[25] But at the same time, we expect an increase in the opposition of wealthy agents toward increasing taxes in order to finance transfers. We expect the variable BOT_TOP to represent the first force, and MEAN_MEDIAN to represent the second force.

- LOG(Y_P) is log of real GDP per capita and is the main economic variable we use. At any given degree of inequality a rise in income raises transfers, which can be viewed as a normal good. Hence, the coefficient should be positive.

- U is the rate of unemployment and the second macroeconomic variable we use. Although one may think that this variable is stationary, and as such should not be included in cointegration analysis, we find that similarly to OECD countries, the rise in unemployment in Israel has been quite persistent.[26] Hence we add U as a potential candidate for explaining the persistent increase in transfers.

[Insert Table 8 here]

Results are shown in Table 8. The first regression is performed for the longest period for which data is available: 1960-1997 and it uses only demographic variables, due to missing data on economic variables in the years 1960-1970.[27] Interestingly, this is the only equation where we cannot reject cointegration, a result that is strengthened by the error-correction equation. We find that both old age population and 4-children families have significant effects. Concerning 4-children families it seems that the choice of the period is crucial: while in the whole period this variable is significant, it is not any more after the seventies. One possible reason for this result is related to statutory changes in children allowances made following the Ben-Shachar

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[25] Alesina and Perotti (1997).

[26] In fact, testing for the degree of integration shows that this is a unit-root variable.

[27] The reason is twofold: first, the data on income inequality is not available in the sixties, second,

Committee in 1975.

The next regressions are restricted to the period 1970-1997. The second and third regressions include both economic and demographic variables. Regression (2) shows that the coefficient of BOT_TOP is not significant at the 5 percent level, probably because of the correlation between this variable and both the share of 65+ in the population and the unemployment rate. The coefficient of the index MEAN_MEDIAN is negative as expected, reflecting the increasing opposition of the tax-payers to the increase in transfers.

In regression (4) the dependent variable becomes transfers as a percent of GNP. This regression is also used as the basic specification for a non-reported analysis that introduces political variables, by adding different periods of the Knesset as fixed effects. The only significant effect is found for the first National Unity government (7.84-11.88). This period has been characterized by some erosion of transfers, during the implementation of the stabilization program. One possible interpretation is that such a unity government allows for a reduction of transfers to minor parties or to some pressure groups, as predicted by the literature on political spending bias.[28]

Note, that the result that additional political variables have a weak effect on transfers does not mean that changes in transfers have not been a result of political processes. It just raises the possibility that these processes themselves reacted to the demographic and economic changes and were endogenous to a large extent.

7. Concluding Comments

This paper examines the long-run dynamics of fiscal policy in Israel. We reach two

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unemployment benefits constitute a relevant variable only after the seventies.

types of results, one on the overall behavior of the public sector, and one on specific components of expenditure. In general we find that since 1985 there is a continuous reduction of the size of the public sector together with much tighter fiscal discipline. These two results are of course strongly related. On the one hand, expenditure reduction helps to balance the budget, and on the other hand, reduction of public deficit after 1985, reduces the public debt and interest payments and thus accounts for part of expenditure reduction.

When we examine the components of public expenditure we realize that most of the changes have been in four areas: defense, interest payments and subsidies to the business sector that declined, and welfare transfers to households that increased. We identify three main processes that motivate these changes. The first is the decline in the level of the Israeli-Arab conflict, the second is the greater fiscal discipline after the trauma of the inflation years, and the third is the process of liberalization of the Israeli economy after 1985. We next relate each of these processes to the fiscal changes we have described.

The reduction of the level of hostility of the Israeli-Arab conflict during these years has been very significant despite various fluctuations. The peace agreement with Egypt, the Madrid process, the Oslo Accord and peace with Jordan mark a significant process of reducing the level of hostility. This enabled, as we have shown in our cointegration analysis to reduce the defense expenditure significantly.

The second process is tightening of fiscal discipline after 1985. This led to low deficits since 1985, and as a result to reduction of debt to output ratios since then. This reduced the relative size of interest payments, which is one of the three costs that decreased since 1985. The tighter fiscal discipline had a strong effect on defense

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[28] Roubini and Sachs (1989).

expenditure as well. As we have shown, there was a significant increase in the cost-awareness of the defense sector after 1985, and that helped in expenditure reduction. Another effect of tighter fiscal discipline has been on reduction of subsidies to the business sector, such as price subsidies, and credit and export subsidies.

Note, that the reduction of subsidies to the business sector was not motivated by fiscal prudence only, but can also be viewed as part of an ongoing process of liberalization, in which the government reduces its active role in production and allocation. This is the third process that has affected fiscal policy since 1985. While this process has contributed to cost reduction, mostly of subsidies to goods, exports, credit and investment, it has had an opposite effect on other costs. The process of liberalization has had social ramifications such as higher inequality and unemployment, although these changes are a result of additional factors such as immigration. These social ramifications also affect fiscal policy, since they tend to increase welfare payments. Indeed, we show in the paper that these social developments contributed, with the aging of the population, to the increase in transfers to households since 1985.

We would like to end by trying to draw some general conclusions on possible future trends in fiscal policy in Israel. We should focus first on the three locomotives of cost reduction: defense, interest payments and subsidies to the business sector. The ability to reduce the relative size of defense seems limited as it is already below 10% of GNP and the peace process is still far from full completion. Subsidies to the business sector are already very small, 2.6% of GNP in 1998. Interest payments can still be further reduced, if the deficit is kept small and if the relative size of debt keeps shrinking. However, we are afraid that transfer payments will continue to rise, due to the current trends in inequality and the increased persistence of unemployment. This

overall picture together with a higher fiscal discipline, make it difficult to implement further desirable reductions of the tax burden. In fact, tax revenues as a percent of GNP are higher today than they were in 1989 or before the implementation of the Budget Deficit Reduction Law. [29] It seems that the feasibility of tax reductions today, as opposed to the past, depends much more on the possibility of reducing public expenditure in areas like education, health and welfare. Large changes in these areas involve major debates on Israel as a welfare state, on which we can all disagree.

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[29] Statutory tax rates were reduced between 1993 and 1996, but increased in 1997-98.

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Tables

<u>Table 1</u>
<u>Public Expenditure, Income, Deficit and Debt (% of GNP): 1960-1997</u>

(a) Including Health Tax after 1995

Years	-1960 1966	-1967 1972	-1973 1984	-1985 1989	-1990 1992	-1993 1996	-1997 1998
Expenditure	34.6	53.0	78.2	65.1	58.7	55.7	55.1
Income	39.2	45.1	63.6	64.6	54.7	53.2	52.6
Taxes	29.0	34.3	43.4	43.8	38.6	39.9	41.0
Deficit(-)	4.6	7.9-	14.6-	0.6-	4.0-	2.5-	2.5-
Net Debt[*]	52.3	62.1	114.8	139.6	111.9	93.9	89.5

[*] For the most recent period, in percent of GDP (end of year prices).

(B) Not Including Health Tax after 1995

Years	-1960 1966	-1967 1972	-1973 1984	-1985 1989	-1990 1992	-1993 1996	-1997 1998
Expenditure	34.6	53.0	78.2	65.1	58.7	54.9	53.6
Income	39.2	45.1	63.6	64.6	54.7	52.4	51.1
Taxes	29.0	34.3	43.4	43.8	38.6	39.1	39.5
Deficit(-)	4.6	7.9-	14.6-	0.6-	4.0-	2.5-	2.5-
Net Debt	52.3	62.1	114.8	139.6	111.9	93.9	89.5

Source: Bank of Israel (1998), Tables 5.A.1a and 5.A.1b, and Bank of Israel Data (Net Debt).

Table 2:
International Comparison of Fiscal Variables (Central and Local Government) in 1993-1996 (% of GDP)

Country	Expenditure	Income	Surplus(+)/Deficit(-)	Gross Debt
Sweden	68.8	58.8	-10.0	67.6
France	52.7	47.8	-4.9	50.6
Netherlands	52.4	52.7	0.3	63.2
Israel	51.5	47.3	-4.2	123.9
Germany	51.2	48.5	-2.7	33.9
Italy	49.1	47.2	-2.0	123.5
Spain	43.0	37.3	-5.7	53.1
United Kingdom	43.3	38.8	-4.5	57.9
United States	34.0	33.6	-0.4	50.0

Source: IMF (1998) and OECD Country Surveys.

*For the purpose of comparison we removed the indexation part of interest payments in all countries except Israel, using the CPI and the average gross debt.

Table 3:
Expenditure and Income: Johansen Cointegration Test
(5% Significance Critical values in parenthesis)

	1960-1998		1980-1998		1986-1998		1987-1999[*]	
	Lags	F-statistic	Lags	F-Statistic	Lags	F-Statistic	Lags	F-Statistic
E-I	5	20.0 (20.0)	4	34.9 (20.0)	1	21.0 (20.0)		
E-T	5	23.9 (20.0)	4	31.8 (20.0)	2	34.8 (20.0)		
EQ-IQ							10	21.5 (20.0)

*1987:02-1999:01

Table 4:

A shift in coefficients after 1985 Sample Period : 1960-1998, Standard errors in parenthesis

VARIABLE	E-T	T-E	E-I
C	-5,718	4,797	-4,599
	(2,266)	(1,508)	(2,171)
E			1.26
			(0.04)
I		0.64	
		(0.02)	
T	1.52		
	(0.05)		
D85	34,773	-32,197	-11,727
	(8,421)	(7,579)	(10,175)
D85*T	-0.61		
	(0.09)		
D85*E		0.42	
		(0.06)	
D85*I			-0.26
			(0.09)
ADF	-5.67	-6.15	-5.49
Critical value (1%)[*]	-5.47	-5.47	-5.47
AdjR^2	0.98	0.99	0.99
D.W.	1.87	1.74	2.17
ERROR CORRECTION	**d(E)**	**d(T)**	**d(E)**
C	2,336	1,808	2,992
	(1,172)	(808)	(1,264)
RES(-1)	-0.52	-0.74	-0.67
	(0.17)	(0.16)	(0.23)
D(E(-1))	0.19	0.02	0.39
	(0.16)	(0.10)	(0.22)
D(I(-1))			-0.19
			(0.23)
D(T(-1))	0.27	0.45	
	(0.22)	(0.15)	
AdjR^2	0.28	0.39	0.14
D.W.	2.05	2.07	1.92

*Critical values for regime shifts according to Gregory and Hansen (1996).

Table 5
The Distribution of Public Expenditures (% of GNP): 1980-1998

Years	1980-1984	1985-1989	1990-1992	1993-1996	1997-1998
Public Consumption	39.0	33.4	29.4	28.0	28.0
Defense	20.7	16.1	12.3	9.8	9.2
Administration Services	4.8	4.4	3.7	3.3	3.1
Education	7.4	7.2	7.5	8.5	9.2
Health	3.6	3.5	3.7	4.5	4.6
Welfare Services	2.4	2.2	2.2	2.0	2.0
Public Investment	2.5	2.4	3.3	3.8	3.4
Transfers	33.9	28.7	25.9	23.2	22.2
Transfers to Households	8.6	10.1	11.2	11.7	12.9
Transfers to the Business Sector	12.8	6.1	5.9	4.3	2.7
Finance Expenses	12.5	12.4	8.8	7.2	6.6

Source: Bank of Israel (1998), Tables 5-A-4.

Table 6
Expenditures of Various Government Agencies (% of GNP): 1990-1998

Expenditures by:	1990-1992	1993-1996	1997-1998
Central Government	37.2	32.7	30.3
National Insurance	7.0	7.6	8.3
Municipalities	6.4	7.1	7.0
Public Non-Profit Organizations	6.0	7.0	7.9
National Institutes	1.1	0.9	0.7

Source: Bank of Israel (1998), Tables 5-A-5.

Table 7
Defense Expenditure Sample Period: 1966-1997, (Standard Errors in parenthesis)

Independent Variable (in levels or in first differences*)	Cointegration Equations Dependent Variable				Error Correction Equation Dependent Variable
	log(ISRAEL)		log(ISRAEL_D)	ISRAEL_Y	d(log(ISRAEL))
Equation	(1)	(2)	(3)	(4)	
C	6.03 (4.15)	15.67 (4.56)	11.09 (3.28)	32.34 (3.82)	0.03 (0.03)
log(RIVALS)	1.22 (0.19)	0.82 (0.36)	0.79 (0.24)		0.56 (0.30)
log(PD_PFF)	0.95- (0.66)	0.12- (1.19)		9.47- (9.85)	0.65 (0.43)
log(USA)	1.03- (0.32)	1.19- (0.29)	0.80- (0.22)		0.27- (0.81)
Trend	0.02 (0.01)	0.06 (0.02)	0.04 (0.01)		
log(RIVALS)*d85		1.19- (0.32)	1.21- (0.22)		
log(PD_PFF)*d85		2.50- (1.20)		0.35 (11.73)	
log(USA)*d85		0.73 (0.24)	0.80 (0.17)		
log(PDD_PFF)			0.94 (0.94)		
log(PDD_PFF)*d85			1.02- (0.85)		
RIVALS_Y				0.71 (0.13)	
USA_Y				4.54- (0.74)	
RIVALS_Y*d85				0.36- (0.21)	
USA_Y*d85				5.64 (0.96)	
d85				30.53- (5.22)	
Residuals(-1)					0.73- (0.21)
Adj R^2	0.63	0.81	0.87	0.88	0.31
D.W.	1.01	1.56	1.28	1.82	1.71
ADF	3.96-	6.23-	6.26-	6.14-	
CRITICAL VALUE**	4.43-	6.00-	6.00-	6.00-	

*   In the Cointegration equations - levels. In the Error Correction equation - first differences.

** The critical value in equation 1 is based on Davidson and MacKinnon (1993). In the equations with a regime shift (eq. 2 to 4), they are based on Gregory and Hansen (1996).

Table 8
Current Transfers (standard errors in parenthesis)

Independent Variable (in levels or first differences.)	1960-1997 log(TR_P) (1)	1970-1997 log(TR_P) (2)	(3)	TR_Y (4)	1960-97 d(log(TR_P))
C	-8.65 (0.78)	-1.29 (0.90)	2.67 (0.15)	-4.79 (2.46)	0.05 (0.01)
FAM4C	0.06 (0.03)				0.04 (0.02)
POP65	4.12 (0.22)	0.36 (0.05)	0.40 (0.04)	3.20 (0.21)	1.74 (0.49)
TREND	0.01 (0.00)				
BOT_TOP		1.09 (0.31)	0.81 (0.27)		
MEAN_MEDIAN		-2.46 (0.81)	-1.31 (0.46)	-10.11 (2.88)	
U		0.012 (0.007)	0.011 (0.007)	0.20 (0.07)	
LOG(Y_P)		1.09 (0.31)	0.81 (0.27)		
DUM85					-0.19 (0.02)
Residual(-1)					-0.24 (0.14)
Adj R^2	0.99	0.97	0.97	0.93	0.42
D.W.	1.04	1.77	1.48	1.75	1.66
AEG**	-4.38	-3.88	-3.67	-3.68	
Critical Value 5%	-4.12	-4.72	-4.42	-4.12	

* In the Cointegration equations -levels. In the Error correction equation - First Differences with a one-period lag.

** Augmented Engle-Granger statistic, according to Davidson and MacKinnon (1993).