



Inflation, Unemployment, Openness to International Trade and Income Inequality in Israel between 1967 and 1999

Claude Berthomieu, Joseph Deutsch, Albert Marouani, Jacques Silber

► **To cite this version:**

Claude Berthomieu, Joseph Deutsch, Albert Marouani, Jacques Silber. Inflation, Unemployment, Openness to International Trade and Income Inequality in Israel between 1967 and 1999. *Notas Economicas*, 2003. halshs-01965158

HAL Id: halshs-01965158

<https://halshs.archives-ouvertes.fr/halshs-01965158>

Submitted on 13 Feb 2019

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Inflation, Unemployment, Openness to International Trade and Income Inequality in Israel between 1967 and 1999¹

Claude Berthomieu* / Joseph Deutsch** / Albert Marouani* / Jacques Silber**

*CEMAFI, Université de Nice-Sophia-Antipolis; **Department of Economics, Bar-Ilan University

resumo

Este artigo analisa os efeitos, em Israel, sobre os rendimentos desiguais de variáveis macroeconómicas como a inflação e o desemprego, e do grau de abertura ao comércio internacional. Faz-se uma distinção entre inflação não esperada e inflação esperada. Os resultados da investigação empírica, correspondente ao período entre 1967 e 1999, revela que a taxa de inflação não esperada, a taxa de desemprego e o grau de abertura ao comércio internacional não afectam do mesmo modo os diferentes decis de rendimento.

résumé / abstract

Cet article analyse les effets sur les revenus inégaux, en Israël, de variables macroéconomiques telles que l'inflation et le chômage ainsi que du degré d'ouverture au commerce international. Il y est fait une distinction entre inflation non prévue et inflation prévue. Les résultats de la recherche empirique, correspondant à la période comprise entre 1967 et 1999, révèlent que le taux d'inflation non prévue, le taux de chômage ainsi que le degré d'ouverture au commerce international n'affectent pas de la même manière les différents déciles de revenu.

This paper analyzes the effect on income inequality in Israel of macroeconomic variables, such as inflation and unemployment, and of the degree of openness to international trade. A distinction is made between unexpected and expected inflation. The results of the empirical investigation that covers the 1967-1999 period indicate that the rate of unexpected inflation, the rate of unemployment and the degree of openness to international trade do not affect equally all the income deciles.

1. Introduction

During the past twenty years numerous papers have attempted to analyze the effect of macroeconomic variables on income inequality (see, Slottje, 1994, for a detailed analysis of this issue). Following a pioneering study by Blinder and Esaki (1978), most of these studies tried to look at the impact of inflation and unemployment on income inequality. In recent years however, following what is now called the phenomenon of globalization, there has been also a growing literature attempting to look at the impact that openness to international trade may have on economic growth. Much scarcer however are the studies which tried to analyze the impact of such an openness on income inequality and poverty.

This paper is an attempt in this direction in so far as its goal is to determine the impact which the increasing degree of openness to international trade had on income inequality in Israel. In order to implement such a study we have collected data covering a period of thirty years (1967-1997). Since however this was a period during which Israel at some stage was close to experiencing hyperinflation we had to take into account inflation when analyzing the impact of openness on inequality. Moreover during this same period there was, during a very short period, a huge inflow of immigrants, coming mainly from the former U.S.S.R., so that Israel experienced also, for a while at least, relatively high levels of unemployment. We decided therefore to include also the unemployment rate in our analysis.

This study combines therefore two strands of analyses. A first type that focuses more on the short term effect of macroeconomic variables, such as inflation and unemployment, on inequality and a second type which is rather more interested by the long run effect of openness to trade on income inequality. In order to implement our analysis we have also tried to make a distinction between unexpected and expected inflation, following here an earlier study by Silber and Zilberfarb (1994).

The results of our empirical analysis indicate that the various variables that have been introduced had a significant effect on inequality, so that inflation, at least unexpected inflation, unemployment and openness to international trade do not affect equally all the income deciles. Naturally additional studies based on time series collected in other countries are needed before more definitive conclusions may be drawn as to the impact of openness to international trade on income inequality.

The paper is organized as follows. Section two summarizes the main measurement issues we had to deal with while section 3 gives a short survey of the macroeconomic conditions in Israel during the years 1967-1997. In section 4 we look into more details at the degree of openness of Israel to international trade, emphasizing in particular the various agreements which have been signed over the years between Israel and the European Union. The econometric model is described in section 5, section 6 gives the results of our empirical analysis while concluding comments are given in section 7.

2. Measurement Issues

Size distributions of incomes are usually constructed by assigning incomes to income units and classifying these units by increasing or decreasing income size. Such an operation assumes that income has been chosen as the variable which is most appropriate to analyze inequality, that an agreement has been reached concerning the most relevant income concept as well as the most suitable income unit. One also has to make sure that the data collected over time or across areas cover the same type of population. Finally if one desires to use an index summarizing the extent of inequality, one also has to make a choice among various possible inequality measures.

a) The definition of income

Income may be limited to labor income or it may include additional income sources such as property income, capital gains or pensions. It may be measured before taxes in which case it is

¹ A previous version of this paper was part of the research undertaken for the FEMISE project of the European Union.

called gross income or be a net after-tax income. One may also define a before taxes but after transfers income or an after tax and transfers income. Sometimes one may have to decide whether income in kind should be included, provided such data are available. Another question concerns the inclusion of imputed income such as the potential rent an owner of an apartment or a house could obtain, if she would rent her apartment (house). The same kind of problem arises concerning the ownership of a car. Finally if a concept of net of taxes income is adopted one may also consider deducting local and not only national taxes. (see, Menirav, 2000, for an interesting comparison of all these income concepts, and the implications concerning the measurement of income inequality). The income data used in this study refer to gross income.

b) Inequality of incomes or of consumption expenditures?

Another dilemma involves the choice between income and consumption as the basis of inequality analysis. Although most studies of inequality use one or another of the various possible definitions of income, it has been argued that consumption is more relevant than income to study inequality. The idea is that current income fluctuates more than permanent income and since consumption depends more on permanent than on current income, consumption may be a better variable if the idea is to analyze permanent inequality. The results one obtains when basing the analysis on some concept of income may be often quite different from those derived from a study using consumption data (see, Menirav, 2000, for a comparison of the extent of poverty in Israel when income or consumption are used to derive poverty measures). Since in the 1970s and 1980s consumption surveys were conducted in Israel only every few years while there were income surveys each year, we had no choice but using income data.

c) The selection of the appropriate income unit:

Here also caution is required. In most consumption surveys data are collected at the household level and in such a case the data will include the consumption of all the individuals living in the household. Some consumption surveys preferred however to use the concept of family that refers to all the individuals living in the same household who are related by blood, marriage or adoption. The first consumption surveys that were conducted in Israel used for example the concept of family rather than that of household.

Another issue concerns the choice between, say, household income or per capita income. Often one also introduces a variable called income per standardized person, a concept that takes into account the size of the household and sometimes even the age of its members. The selection of one of these notions depends on the relative importance one wishes to give to "private" or "public" goods in the household. If it is assumed for example that all the goods and services acquired by the household are ultimately appropriated by a given member of the household, then the relevant concept is evidently income per person. In such a case to measure the actual standard of living of a household member, one evidently has to divide total household income by the number of its members. If on the contrary one were to assume that all the goods and services which one finds in a household may be considered as "public" goods, that is goods which may be shared by several members of the household at the same time (e.g., a refrigerator, a living room, etc...), then evidently total household income is the appropriate measure of the welfare level of the different household members. An intermediate and probably more appropriate solution is to assume that some goods and services are "private" whereas some others are "public". Then one may want to compute an "equivalized income", or what is often known as income per "standardized person" (see, Buhmann et al., 1988, for an interesting presentation of these ideas, or Cowell and Mercader-Prats, 1999, for a survey of the issue of equivalence scales and inequality). The income data used in this study refer to the (gross) income of households.

d) The population surveyed:

Income or consumption surveys may be conducted in the whole population, whether the household lives in a urban or a rural area, or it may be limited, as is often the case, specially in

developing countries, to urban areas. It may cover only households whose head participates in the labor force or only household whose head is employed (and hence exclude household whose head is unemployed) or only wage earners, in which case self-employed heads of household are not taken into account. One has therefore to be extremely careful when making international comparisons. In Israel for example the longest time series available refers to urban households whose head is employed and this is indeed the population whose income is analyzed in this study.

e) The selection of an inequality measure:

An index of inequality may be considered as a summary statistic of the dispersion of incomes. Since there exist many measures of inequality, the ranking of various income distributions may often depend on the inequality index that has been selected. There are various ways of choosing between inequality measures. One may want to relate inequality indices to social welfare functions and to select an inequality index on the basis of the properties that the implicit social welfare function to which it is related, fulfils. Note however that not all inequality indices may be linked to social welfare functions. Another possibility is to specify a set of properties which one would like an inequality index to possess and select the index that has the most desirable properties. Finally it should be stressed that it is also possible to use an ordinal rather than a cardinal approach to inequality, in which case one would be only able to rank income distributions but not say how much more unequal one distribution is compared to another. More details on these various issues may be found in Blackorby et al., 1999, Chakravarty, 1999, and Moyes, 1999. In this study the Gini index has been selected as measure of inequality. Although the Gini index has been criticized because it cannot be decomposed into the sum of a between and a within groups component, several economists (e.g., Sen, 1999) do not consider this feature as a handicap and in fact the Gini index remains until this day the most commonly used inequality measure. One of the reasons for such a popularity is certainly due to the fact that it has a simple graphical interpretation in terms of the Lorenz curve (see, Cowell, 1995). However since two Lorenz curves may cross and still correspond to the same Gini index (one distribution being more equally distributed at low incomes levels and the other at high income levels) we have also used the income shares of various population deciles as complementary measures of the distribution of incomes.

f) Measuring openness to international trade:

Openness to international trade has been measured in the standard way, that is, as the ratio of the sum of imports and exports over the GDP. These three variables were measured at current values but since we used only a ratio there was no need to transform the series in data at constant prices. These data are those published by Israel's Central Bureau of Statistics on the basis of standard procedures for deriving national accounts.

3. Macroeconomic Conditions in Israel during the Period Analyzed

a) Inflation:

We have analyzed a period covering the years 1967 to 1997. Macroeconomic conditions have varied considerably during such a period as is evident from Table 1 that gives the annual inflation and unemployment rates. Inflation was for example very low during the 1967-1969 period and it took more than thirty years for inflation to reach again similar levels (the inflation rate in 1999 was equal to 3.3%). Growing aggregate demand, following the Six Day War, put pressure on prices, and inflation increased to 12.1% a year in 1971. The Yom Kippur War and the first oil shock in October 1973 raised inflation to a new annual level of 30-40% that prevailed in 1974-1977. In October 1977 a new economic policy was adopted that liberalized the foreign exchange market and instituted a flexible exchange rate system. Due to inadequate monetary and fiscal measures, the new policy led to an increase in the annual inflation rate to about 120 % during the years 1979-1983 (see, Zilberfarb, 1990, for an analysis of this new policy). A run of foreign exchange led to the collapse of the Israeli stock market in the last quarter of 1983 and forced the

government to devalue the Israeli shekel by 23%. This led to another jump in inflation to a level of more than 400% per year in 1984 and in the first half of 1985. In July 1985 a national unity government introduced a new anti-inflation program. Its main elements were a major cut in the deficit of the government, a move to a regime of fixed exchange rates and temporary wage and price controls (see, Bruno, 1986, for a description and an analysis of this program). The new economic program was very successful and inflation went down to approximately 18% during the 1987-1991 period. As indicated earlier, it took another 8 years and a very restrictive monetary policy to bring down inflation to levels similar to those which existed at the beginning of the period we analyze.

b) Unemployment:

The path of unemployment was quite different. If one excludes the period of massive immigration during the late 1940s and early 1950s (see, Neuman, 1999, for an extensive survey of the immigration waves in Israel), unemployment was not a major problem in Israel until the second half of the 1960s. The unemployment rate was relatively low in 1965 (3.6%) but rose sharply in 1966 (7.4%) and 1967 (10.4%), two years during which there was a major recession in Israel. Unemployment decreased rapidly after the Six Day War and was less than 4% throughout the 1970s. The rising inflation rates in the early 1980s seem to have had negative effects on output growth and the unemployment rate reached 6.7% in 1985. The successful anti-inflation program reduced inflation and renewed economic growth but unemployment remained relatively high (6.4 to 7.1%). Mass immigration from the former Soviet Union in the early 1990s pushed unemployment rates to record levels after 1989 (the unemployment rate was equal to 11.2% in 1992). Unemployment decreased somewhat after 1992 to reach 6.7% in 1996 but afterwards it increased again reaching 8.9% in 1999.

4. Openness to Trade and Trade Agreements between Israel and the European Union

Europe, especially Western Europe, has always been in several respects a natural trading partner for Israel. This is so first because of proximity and Israel's restricted commercial relations with her geographical neighbors. Another reason is related to the structure of Israeli exports. Thus, for climatic reasons, agricultural products should be of interest to countries in Northern Europe. Manufactured goods produced in Israel are also of great interest to countries with the kind of standard of living prevailing in Western Europe. This explains why Israel has always attempted to promote close trade relations with European countries. Such a policy was made easier by the decision taken by Israel to liberalize its own trade policies, at least during the period which is analyzed in this paper, so that reciprocal concessions in the form of improved access to Israeli markets for European exports were made possible.

A first commercial agreement was signed in 1964. It implied reductions in the European Community's most favored nation tariff on some goods of special interest to Israel.

In 1970 a preferential trade agreement was signed with Israel which reduced by 50% the tariffs of the European Community on Israeli manufactured exports and by 40% those imposed on some agricultural exports. There was however an exception list for sensitive industrial exports (corresponding more or less to one third of the Israeli manufactured exports to the European Community) for which full duties were to be levied. Moreover most agricultural exports were not covered by the agreement. The impact of this agreement is not easy to evaluate essentially for two reasons. First, preferential agreements of a similar kind were signed between the European Community and other Mediterranean countries. Second, the United Kingdom, an important trading partner for Israel, joined the European Community in 1974.

In 1975 a free trade agreement was signed between the European Community and Israel. This agreement led to the abolition of all trade barriers on Israeli manufactured exports by July 1977, subject to ceilings on some goods until the end of 1979. Israeli tariffs on manufactured exports by the European Community were removed progressively, those on the most sensitive imports being removed by the end of 1989. More details on the various agreements signed between

Israel and the European Community may be found in Greilsammer and Weiler, 1988, (see also Berrebi and Silber, 1988, for an analysis of the impact of the 1975 Free Trade Agreement on Israeli exports).

One should add that in 1978 a trade agreement was signed between Israel and the United States which removed duties on the most important items that Israel was exporting to the United States.

Finally on November 20 1995 Israel signed an Association Agreement with the European Union. This "Association Agreement" replaces the earlier Cooperation Agreement of 1975. Among the main features of this Agreement one may note the planning of a regular political dialogue, provisions concerning the freedom of establishment, the liberalization of services and the free movement of capital. In addition competition rules have been defined with, in particular, a request for transparency in state aid and adjustment in state monopolies, the strengthening of economic cooperation and finally cooperation on social matters and cultural cooperation.

An Agreement has also been signed on Scientific and Technical Cooperation that provides for the participation of Israel research entities in European scientific programs. Finally there is also an Agreement on Procurement by Telecommunications Operators and on Government Procurement which provides for a mutual opening of procurement by telecommunications operators through granting an exchange of national treatment.

Since the period covered in the present analysis ends in 1997, it is too early to attempt to detect the impact of such an agreement but, needless to say, future analyses will have to take it into account.

These agreements as well as Israel's deliberate policy of openness to international trade have had an important impact on the degree of Israel's openness to international trade. We present in Table 1 the yearly data on openness to international trade, this variable being equal to the ratio of the sum of imports and exports to the Gross Domestic Product.

It appears clearly that there was a tremendous increase in the degree of openness to international trade during the past 40 years. The index more than doubled, since it was equal to 0.33 in 1959 and to 0.79 in 1999. There were naturally fluctuations over the years in its value (e.g. the index was higher in 1996 than in 1999) but the upward trend is clear.

5. The Econometric Model

In accordance with Blinder and Esaki (1978) who were probably the first to attempt to analyze the impact of macroeconomic variables on income inequality, we have first estimated the following equations:

$$S_i(t) = a_i + b_i U(t) + c_i \Pi(t) + d_i O(t) + \varepsilon_i(t) \quad (1)$$

where $S_i(t)$, $U(t)$, $\Pi(t)$ and $O(t)$ measure respectively for each year t the share of decile i in total income, the unemployment rate, the actual inflation rate and the degree of openness to international trade. To solve the problems of autocorrelation we used the method of feasible generalized least squares and adopted the Prais-Winsten (1954) estimator (see Greene, 1993, for more details on this estimation technique).

The only variable which did not appear in Blinder and Esaki (1978) study is the openness to trade variable and we added it because it is evidently the central element of our inquiry.

We have also run a regression where the dependent variable was not the share of some decile i at time t but the Gini index of inequality $G(t)$ at time t , the exogenous variables being the same as those which appear in (1).

Since, as indicated earlier, inflation, during the period covered, reached between 1980 and 1985 very high levels, we have also attempted to decompose the actual inflation rate into an expected and an unexpected inflation rate. The idea is that it may be easier for individuals to protect

themselves against expected than against unexpected inflation. It might also be easier for richer individuals to protect themselves against unexpected inflation. Given that $E\Pi(t)$ and $U\Pi(t)$ denote respectively the expected and unexpected rates of inflation and time t , the second type of regressions we have run may be expressed as

$$S_i(t) = a_i + b_i U(t) + c_i E\Pi(t) + d_i U\Pi(t) + e_i O(t) + \varepsilon_i(t) \quad (2)$$

Here also we ran another regression where the dependent variable was the Gini index of inequality $G(t)$ at time t .

To compute the expected rate of inflation $E\Pi(t)$ during year t we have used monthly data on the inflation rates and proceeded as follows. We first regressed the actual rate of inflation during month τ , $M\pi(\tau)$, on the monthly rate at time $\tau-1$, that is, $M\pi(\tau-1)$, assuming an autoregressive process of the sixth order AR(6) (see, Greene, 1993, for more details on the estimation technique to be adopted in such a case). We were thus able to estimate for each month τ the expected monthly rate of inflation $E M\pi(\tau)$. This allowed us to compute for each month the expected price index $EP(\tau)$.

We then regressed, separately for each year, that is on the basis of the monthly observations $EP(\tau)$ of the corresponding year, the logarithm of the expected price index $EP(\tau)$ on the time variable τ by writing that

$$\ln EP(\tau) = a + b\tau$$

The estimate b' of b derived on the basis of such a regression was then used to compute the expected annual rate of inflation for year t , $E\pi(t)$, by writing that

$$E\pi(t) = 12b'$$

6. The Empirical Results

The results for the regressions of the type presented in expression (1) are presented in Table 2. We do not give the results for each decile. We rather prefer to show what happens at the lower and at the higher end of the distribution as well as in its middle. This should allow us to find out whether a given variable had a greater impact on the poor, the rich or on the middle class.

If we look first at the determinants of overall income inequality when the latter is measured by the Gini index it appears that inflation and unemployment increase inequality while the degree of openness to international trade had no significant impact. These results are confirmed by an analysis of the impact of these three variables on the two poorest and richest deciles. It appears that inflation and unemployment tend to increase the share of the richest and decrease that of the poorest in total income, openness to international trade having, here also, no significant impact. Similar effects are obtained when we define the poor as the five poorest deciles and the rich as the five richest deciles.

To analyze the effect of inflation, unemployment and openness to trade on the "middle class" we defined the latter in several ways. It included successively all the deciles from the third to eighth, the fifth to the eighth, the sixth to the eighth or the fifth to the seventh. The results given in Table 2 indicate that whatever the way we define the middle class, inflation and unemployment have a negative effect on the share of the middle class. Openness to international trade appears to have a negative and significant effect on the income share of the middle class when we define the latter as including either the fifth to eighth deciles, the fifth to seventh deciles or the sixth to eighth deciles. In other words it seems that openness to trade has a negative impact on the lower section of the middle class while it has no effect on the poor or on the rich deciles.

In Table 3 we have extended our analysis by making a distinction between expected and unexpected inflation, using the estimation method described previously. On one hand it appears that expected inflation does not have any impact on inequality, whether we take as dependent variable the Gini index or the share of any income decile or of any grouping of deciles. Unexpected inflation on the other hand has a positive effect on inequality when the latter is measured by the Gini index. One may also observe that unexpected inflation increases the share of the two or even five richest deciles. Note however that its effect on the richest decile is not really significant. Similarly unexpected inflation decreases the income share of the two or five lowest deciles but does not seem to have a significant impact on the poorest decile. Finally one should also observe that unexpected inflation decreases the share of the middle class, whatever the way we define the latter (third to eighth deciles, fifth to eighth deciles, sixth to eighth deciles or fifth to seventh deciles).

The effect of unemployment is similar to that of unexpected inflation since it raises the income share of the rich and decreases that of the poor as well as of the middle class. Note however that it has no significant effect on the poorest decile.

Finally when we look at the impact of openness to international trade the results are very similar to those observed in Table 2. Openness to trade has no significant effect on the rich or on the poor but it decreases the income share of the middle class, especially of the lower middle class.

7. Concluding Comments

In this paper an attempt has been made to analyze the impact of openness to international trade as well as of inflation and unemployment on income inequality in Israel during the period 1967-1997. We regressed either the Gini index of income inequality or the share of various income deciles on the three variables that were assumed to have a possible impact on inequality: the rate of inflation, the rate of unemployment and the degree of openness to international trade. A quick look at the annual values of these three variables shows that the degree of openness to international trade almost doubled in a period of 30 years, that unemployment was very high at the beginning of the period considered as well as in the early 1990's. Finally, as is probably well known, Israel experienced almost hyperinflation during this period of thirty years since in 1984 the annual inflation rate was close to 500%. In the regression analysis we tried also to make a distinction between expected and unexpected inflation. The expected inflation rate in a given month was assumed to be a function, in a sixth order autoregressive process, of the inflation rates experienced during the past sixth month. Then an annual expected inflation rate was estimated on the basis of the inflation rates expected on a monthly basis. Unexpected inflation was then defined as being equal to the difference between actual and expected inflation.

The regression results indicate first that expected inflation had no significant on inequality (on the Gini index) as well as on the income share of any income decile. We also observed that unemployment and unexpected inflation had as a whole similar effect in so far as they tended to increase the income shares of the rich and decrease that of the poor and of the middle class. Finally the degree of openness to international trade had no effect on the rich or on the poor but had a significant negative impact on the income share of the middle class, essentially of the lower section of the middle class.

These results as a whole tend to confirm that in a developed country like Israel the rich have usually the means to protect themselves against the dangers of inflation or unemployment. They may even benefit from a situation of high inflation or high unemployment. The poor on the contrary seem to suffer in periods of higher inflation or unemployment (remember that our data refer to gross income so that we did not take into account the impact of the tax and transfer system). As to the main concern of our study, the role that openness to international trade may play, our analysis has shown that it has no significant impact on the poor or on the rich but it has a negative effect on the income share of the lower middle class. Naturally such conclusions are at this stage specific to the Israeli case. Additional national studies based on time series are needed before one may derive strong conclusions as to the impact of openness to international trade on income inequality.

Table 1 – Basic data for the period analyzed*

Year	Inflation rate (in %)	Unemployment rate (in %)	Gini Index**	Openess to International Trade (in %)
1959	0.6	5.5		33.8
1960	4.9	4.6		37.7
1961	6.7	3.6		41.1
1962	9.6	3.7		43.3
1963	5.0	3.6		42.9
1964	3.3	3.3		42.7
1965	5.7	3.7		40.7
1966	5.7	7.3		41.6
1967	-0.7	10.4	0.359	44.4
1968	0.3	6.1	0.327	49.6
1969	2.8	4.5	0.315	49.4
1970	11.9	3.8	0.306	52.7
1971	12.1	3.5	0.292	54.5
1972	10.9	2.7	0.298	51.3
1973	24.1	2.6	0.3	60.4
1974	40.3	3	0.313	58.6
1975	21.4	3.1	0.289	58.3
1976	40.0	3.6	0.281	59.3
1977	47.0	3.9	0.29	59.6
1978	47.9	3.6	0.304	61.9
1979	115.2	2.9		60.8
1980	135.7	4.8	0.32	58.3
1981	97.6	5	0.32	60.2
1982	136.4	5	0.324	59.7
1983	181.0	4.5	0.324	61.0
1984	496.7	5.9	0.353	62.5
1985	222.8	6.7	0.327	62.1
1986	22.3	7.1		64.5
1987	14.3	6.1	0.319	70.1
1988	15.7	6.4	0.315	66.2
1989	16.6	8.9	0.33	64.7
1990	19.7	9.6	0.325	64.6
1991	21.5	10.6	0.337	65.8
1992	9.3	11.2	0.345	68.2
1993	9.9	10	0.336	74.2
1994	15.7	7.8	0.359	77.4
1995	9.0	6.9	0.356	78.3
1996	10.2	6.7	0.352	81.0
1997	7.6	7.7	0.353	80.0
1998	9.8	8.6		79.0
1999	3.3	8.9		

* Data Sources: Statistical Abstracts of Israel's Central Bureau of Statistics

** The Gini index varies between 0 and 1.

Table 2 – Regression results with the actual inflation rate as one of the exogenous variables

Dependent Variable	Inflation rate	Unemployment rate	Openess to trade	Constant	R-Square and Durbin-Wats
Gini Index**	0.0074 (2.8)	0.0060 (4.3)	0.045 (1.0)	0.256 (8.9)	0.95 (1.63)
Share of first (richest) decile	-0.084 (-1.47)	0.469 (4.8)	3.012 (1.0)	19.4 (10.2)	0.95 (1.92)
Share of tenth decile	-0.084 (-1.47)	-0.045 (-1.46)	0.751 (0.80)	2.44 (3.83)	0.63 (1.33)
Share of two richest deciles	0.515 (2.56)	0.513 (4.71)	3.80 (1.13)	34.3 (15.1)	0.98 (1.82)
Share of two lowest deciles	-0.207 (-2.21)	-0.132 (-2.59)	-0.024 (-0.015)	7.94 (1.07)	0.84 (1.34)
Share of five richest deciles	0.540 (3.09)	0.380 (4.16)	4.01 (1.45)	67.7 (36.7)	0.99 (1.58)
Share of five lowest deciles	-0.540 (-3.09)	-0.380 (-4.16)	-4.01 (-1.45)	32.3 (17.6)	0.96 (1.58)
Combined share of third to eighth deciles	-0.299 (-1.96)	-0.377 (-4.67)	-3.948 (-1.61)	57.8 (35.2)	0.99 (1.98)
Combined share of fifth to eighth deciles	-0.375 (-3.04)	-0.303 (-4.90)	-4.73 (-2.60)	34.4 (28.9)	0.98 (1.87)
Combined share of sixth to eighth deciles	-0.317 (-3.22)	-0.239 (-4.97)	-4.197 (-3.02)	24.5 (27.2)	0.97 (1.80)
Combined share of fifth to seventh deciles	-0.280 (-2.97)	-0.233 (-4.50)	-3.15 (-2.09)	27.2 (27.0)	0.99 (1.90)

* Data Sources: see, Table 1. The numbers in parentheses are t-values.

**The Gini index varies between 0 and 1, hence the small value of some of the coefficients in this regression.

Table 3 – Regression results with expected and unexpected inflation rates among the exogenous variables*

Dependent Variable	Expected Inflation	Unexpected Inflation	Unemployment	Openess to trade	Constant	R-Square and Durbin-Watson
Gini Index**	0.0047 (1.07)	0.0076 (2.85)	0.0060 (4.32)	0.043 (1.01)	0.259 (9.09)	0.95 (1.70)
Share of first (richest) decile	0.203 (0.65)	0.312 (1.58)	0.464 (4.76)	2.99 (1.04)	19.5 (10.2)	0.95 (1.93)
Share of tenth (poorest) decile	-0.047 (-0.47)	-0.086 (-1.48)	-0.045 (-1.45)	0.802 (0.84)	2.38 (3.67)	0.63 (1.40)
Share of two richest deciles	0.337 (0.97)	0.519 (2.52)	0.510 (4.73)	3.77 (1.15)	34.5 (15.4)	0.98 (1.85)
Share of two lowest deciles	-0.140 (-0.84)	-0.211 (-2.21)	-0.131 (-2.55)	0.056 (0.035)	7.84 (7.16)	0.84 (1.41)
Share of five richest deciles	0.367 (1.26)	0.558 (3.12)	0.378 (4.14)	3.82 (1.40)	67.9 (36.8)	0.99 (1.66)
Share of five lowest deciles	-0.367 (-1.26)	-0.558 (-3.12)	-0.378 (-4.15)	-3.82 (-1.40)	32.1 (17.4)	0.96 (1.66)
Combined share of third to eighth deciles	-0.072 (0.23)	-0.629 (-2.0)	-0.358 (-4.6)	-3.99 (-1.75)	57.5 (37.4)	0.99 (1.94)
Combined share of fifth to eighth deciles	-0.053 (-0.22)	-0.710 (-2.08)	-0.291 (-4.8)	-4.51 (-2.56)	34.0 (29.0)	0.98 (1.87)
Combined share of sixth to eighth deciles	-0.111 (-0.57)	-0.549 (-2.62)	-0.231 (-4.78)	-4.015 (-2.86)	24.2 (26.0)	0.98 (1.82)
Combined share of fifth to seventh deciles	-0.033 (0.18)	-0.557 (-2.94)	-0.207 (-4.59)	-3.073 (-2.33)	26.9 (30.6)	0.99 (1.88)

*Data sources: See, Table 1. The numbers in parentheses are t-values.

** The Gini Index varies between 0 and 1.

References

- Berrebi, M.; Silber, J. (1988) The 1975 Free Trade Agreement and its Impact on Israeli Exports to the E.E.C., in I. Greilsammer and J. H. H. Weiler (eds.), *Europe and Israel: Troubled Neighbours*, de Gruyter, Berlin, The European University Institute, 136-155.
- Blackorby, C.; Bossert, W.; Donaldson, D. (1999) Income Inequality Measurement: The Normative Approach, in J. Silber (ed.), *Handbook on Income Inequality Measurement*, Boston, Kluwer Academic Publishers.
- Blinder, A. S.; Esaki, H. Y. (1978) Macroeconomic Activity and Income Distribution in the Postwar United States, *Review of Economics and Statistics*, 60, 604-609.
- Bruno, M. (1986) Sharp Disinflation Strategy: Israel 1985, *Economic Policy*, 2, 379-402.
- Buhmann, B.; Rainwater, L.; Schmaus, G.; Smeeding, T. (1988) Equivalence Scales, Well-Being, Inequality and Poverty: Sensitivity Estimates Across Ten Countries Using the Luxembourg Income Study (LIS) Data Base, *The Review of Income and Wealth*, 34, 115-142.
- Chakravarty, S. (1999) Measuring Inequality: The Axiomatic Approach, in J. Silber (ed.), *Handbook on Income Inequality Measurement*, Boston, Kluwer Academic Publishers.
- Cowell, F. A. (1995) *Measuring Inequality*, LSE Handbooks in Economics Series, London, Prentice Hall Harvester Wheatsheaf.
- Cowell, F. A.; Mercader-Prats, M. (1999) Equivalence Scales and Inequality, in J. Silber (ed.), *Handbook on Income Inequality Measurement*, Boston, Kluwer Academic Publishers.
- Greene, W. H. (1993) *Econometric Analysis*, London, Prentice Hall International.
- Greilsammer, I.; Weiler, J. H. H. (eds.) (1988) *Europe and Israel: Troubled Neighbours*, de Gruyter, Berlin, The European University Institute.
- Menirav, U. (2000) The Analysis of Poverty in Israel, Bar-Ilan University, mimeo (in Hebrew).
- Moyes, P. (1999) Stochastic Dominance and the Lorenz Curve, in J. Silber (ed.), *Handbook on Income Inequality Measurement*, Boston, Kluwer Academic Publishers.
- Neuman, S. (1999) *Immigration: The Israeli Case*, Bar-Ilan University, mimeo.
- Prais, S.; Winsten, C. (1954) *Trend Estimation and Serial Correlation*, Discussion Paper 383, Chicago, Cowles Commission.
- Sen, A. (1999) Foreword in *Handbook on Income Inequality Measurement*, J. Silber (ed.), Boston, Kluwer Academic Publishers.
- Silber, J.; Zilberfarb, B. (1994) The Effect of Anticipated and Unanticipated Inflation on Income Distribution: The Israeli Case, *Journal of Income Distribution*, 4, 41-49.
- Slottje, D. (1994) Symposium on The Macroeconomy and Income Inequality Across Countries, special issue of the *Journal of Income Distribution*, 4.
- Zilberfarb, B. (1999) Foreign Exchange Market Liberalization: Anatomy of a Failure, in A. L. Hillman (ed.), *Markets and Politicians*, Boston, Kluwer Academic Publishers.