EXTERNAL SHOCKS AND DOMESTIC RESPONSE:
ISRAEL'S MACROECONOMIC PERFORMANCE, 1965-1982

Michael Bruno

External Shocks and Domestic Response:
Israel's Macroeconomic Performance, 1965-1982

ABSTRACT

The paper applies an aggregate supply and demand framework for the study of Israel's brand of stagflation. After a very rapid growth period between 1967-1973 Israel's subsequent share growth slowdown and accelerated inflation seem particularly marked by any international comparison. The unemployment rate and the current account deficit have on average risen less.

An attempt is made to disentangle the effects of supply shifts (raw material price and real wage changes) and the role of demand management and the main macro policy trade-offs. Unlike other middle-income countries which continued to expand by borrowing heavily, Israel could not substantially increase an already large foreign debt and had to sacrifice growth and price stability to overcome the large post-1973 current account deficit. This trade-off was considerably exacerbated on the domestic front by the inability to reverse an earlier trend of rapidly rising public expenditure and employment. While this accounts for a relatively low unemployment rate it also hampered the growth potential, particularly of exportables. After 1977 developments are dominated by very much higher, self-perpetuating, inflation which was set in motion by an ill-fated foreign exchange liberalization plan and the loss of monetary control. This has further worsened the current-account/inflation trade-off and seems to have locked the economy into a low-growth, high inflation trap.

Michael Bruno
Department of Economics
Hebrew University
Mt. Scopus
Jerusalem, Israel

CONTENTS

Michael Bruno

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INTRODUCTION

In retrospect, the period beginning in the mid-1950s and ending
in 1972-73 may be considered the 'golden age' of Israel's
economic development. With the exception of a brief slump in
1966-67, the years until 1972 were characterized by very rapid
growth: during 1960-72 real GDP grew at 10 percent per annum (13
percent during 1968-72), capital stock at 9 percent, labor input
at 4 percent (7 percent during 1968-72), and total factor
productivity at 4 percent (6 percent during 1968-72).

This period was also marked by relatively harmless changes
in the price level, with inflation running at an annual rate of
6-7 percent and with workable institutional solutions to its
potential distortive effects (wage and savings indexation). Even
the balance of payments did not seem to pose an insurmountable
problem. By 1972 exports financed about two thirds of imports
(compared with one seventh in 1950, and half in 1960), with the

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remaining third easily covered by abundant foreign capital in the form of unilateral transfers and well phased long-term loans. These were accompanied by a renewed surge of immigration during the post-1967 euphoria, and combined with a very flexible labor market (once the Israeli labor market was opened to Arab workers from the Gaza Strip and the West Bank in 1968) which enabled the continued rapid expansion of industry, directed particularly towards export markets.

The only signs of impending trouble appeared on the internal social front. An Israeli version of a Black Panther movement was formed towards the end of the war of attrition on the Suez Canal, drawing growing attention to hitherto neglected domestic problems. In the 3-4 years preceding the 1973 war Israel allocated an ever-increasing share of its domestic resources to the expansion of social services (education, health, and welfare) and developed an income- maintenance scheme which is one of the most advanced in the world—while defense expenditures were rising. Little thought, if any, was given to the possibility that a major crisis was lying ahead, one which would turn internal political commitments into a heavy economic liability.

The 1973 war marked a watershed in almost any field conceivable, and certainly in economics. The broad aggregates for the period since 1973 seem to come from an entirely different economy. Growth came to a virtual standstill; in almost no year after 1973 did GDP grow by more than 4-5 percent, and usually by much less; inflation soared by 30-40 percent annually during 1974-77 and reached triple digits by 1980. The current account

deficit in current dollar prices quadrupled during 1972-75, and though it fell sharply by 1977 it grew again in 1978-79, and once again in 1981-83. The foreign debt continued to grow—albeit at a slower rate, commensurate with the much reduced GDP growth. While the system for a time adapted to the phenomenal rates of inflation with relative ease, the ensuing economic and social frictions worsened considerably.

The object of the present discussion is to put some of these developments in their proper perspective, especially in view of the crisis in the entire industrial world. Once a stylized description is given of the typical response of countries to supply shocks, one can examine the extent to which developments in Israel fit in with a more-or-less explainable broader worldwide pattern or differed from it. Such a perspective also helps in avoiding two pitfalls: placing the entire blame on external causes, or attributing all the developments to home-made blunders.

Section I gives an overview of the main developments in growth, balance of payments, and inflation against the background of worldwide stagflation. Section II lays out a theoretical framework within which the roles of supply and demand shifts are analyzed. This is followed by an empirical analysis of output, employment, and relative price changes by sub-period (Section III), and related developments in the current account (Section IV) and in the inflationary process (Section V). A short summary of Israel's macroeconomic performance is given in the concluding section (VI).

I. ISRAEL'S BRAND OF STAGFLATION: AN OVERVIEW

The world economy suffered several serious shocks during the period investigated here. The first was the collapse of the Bretton Woods system of fixed exchange rates at the end of the 1960s following the massive outflow of dollars from the United States in the wake of the wars in South-East Asia. This was followed by substantial monetary expansion in most OECD countries at a time of full employment, which generated world-wide inflationary pressures. Both of these trends had weakened by the beginning of 1973.

The second, heavier shock was the commodity-price 'explosion' at the end of 1973. The most significant factor was the oil crisis, but the combined increase in the prices of most other industrial raw materials also had quite a substantial, though less permanent, effect. Typically, the inflationary process in most western countries started with a first wave of price increases that crested in 1974 and 1975 (OPEC I) and then receded; by 1978 the inflation rate was almost back to its pre-shock (1970-73) level just before another price hike set in (OPEC II, 1979-80). While these waves hit all economies more or less simultaneously, their amplitude and duration differed from one country to another.

The most striking feature of the 1970s was the fall in output and the doubling of unemployment that accompanied accelerated inflation in most countries, more or less at the same

time. High unemployment rates persisted throughout the 1970s in spite of a modest (and temporary) remission in 1976-78. The second oil shock and consequent contraction in economic activity in the industrial world brought about a further increase in unemployment. This time, unlike the OPEC I pattern, real interest rates in world capital markets rose substantially and remained high into the renewed upswing of economic activity in 1983.

The difference between these shocks and the familiar business-cycle fluctuations of the previous two decades lies mainly in their effect on the supply and real cost of productive factors: a real wage push at the end of the 1960s, steep increases in energy and raw-material prices in the 1970s (in face of rigid real wages), and sharp fluctuations in the real cost of capital. The typical response to an input price shock in a developed industrial economy is a rise in output prices and a fall in profitability, output and employment. The slow-down in economic activity is further exacerbated by demand contraction, which may result from a combination of a direct terms-of-trade effect on real income, anti-inflationary (plus current-account motivated) internal contractionary macroeconomic policies, and inter-country repercussions of analogous developments among trading partners. Both the profit squeeze and stronger fluctuations in output reduce the demand for investment and thus also hamper the development of productive capacity.

While output, employment, and productivity in the industrial countries slowed down sharply after 1973, many middle-income

industrializing countries (MICs) continued to grow quite rapidly,
enjoying a virtually "free ride" on the recycled OPEC surpluses.
They could finance their rising investments and corresponding
government and external account deficits by borrowing on the
newly emerged private capital markets at low or negative real
interest rates, while their domestic labor markets remained
flexible, at least for a while.   The cost of faster growth was
deeper indebtedness and increased acceleration in inflation
rates.   But by the time the second oil shock set in (1979),
conditions in these countries, too, had worsened substantially.
Rising real interest rates on world capital markets and the
growing real cost of domestic labor (and falling oil prices for
some of the exporters) precipitated a series of financial crises
in 1981-82.

Table 1 puts the main macroeconomic developments before and
after 1973 in a broad international perspective.   The Israeli
data are presented along with a group of 19 OECD countries and 10
MICs.[1] This summary comparison suggests some initial
impressions:

1.   While in the 1960s and early 1970s Israel enjoyed much
faster GDP and labor productivity growth rates than its fellow
MICs, its growth decelerated sharply to only slightly above the
slow OECD rate of the more recent period.   There is some
indication (lines 2 and 3) that this slowdown may be closely
linked to a sharp contraction in final demand.

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1. For more details see Bruno (1983).

2. Israel's inflation rate was only slightly above the MIC average in the first period, but rose to more than three times the MIC average (and more than five times the average OECD inflation rate) in the second period.

3. The real current account deficit relative to GDP was on average minimal and hardly grew in the OECD countries while growing substantially among the MICs, reflecting their expansionary borrowing and growth policies in the 1970s. Israel's relative deficit, which was already very high by international standards in the earlier period, grew only slightly. As we shall see, the response of current account policy to external shocks has a lot to do with the slowdown in overall economic activity and with the rise in inflation during part of this period.

4. Israel seems to have survived the crises with only a modest rise in unemployment, compared to the OECD average, and in spite of its sharp growth slowdown. As we shall see, this apparent departure from the general pattern is misleading. The growth of employment in the Israel's business sector contracted sharply (Table 1, line 2)—very much in line with the typical industrial-country performance—and the public sector took up most of the slack.

So far we have only looked at period averages. To visualize the main temporal developments we cast growth and inflation into a quasi-Phillips-curve framework (Figure 1). Rather than plot unemployment rates (which mean little in the present context), we use deviations from mean GDP growth during 1964-81 as our

horizontal measure of less and more than reference 'capacity'
growth, while the vertical axis measures the rate of inflation of
consumer prices.

An argument could be made in favor of applying different
capacity growth rates for the periods before and after 1973.
However, in the case of Israel this affects mainly the size of
output deviations before 1972 without qualitatively changing the
overall picture.[2] The procedure used here has the advantage of
simplicity and, moreover, requires no prior information on
capacity growth.

The OECD figures (broken line) are here calibrated on the
working assumption that Israel's 'normal' growth and inflation
rates were double the OECD average so that a similar rule of
thumb could be applied to the deviations from the average. While
'eye-econometrics' maybe misleading, this does suggest a number
of plausible hypotheses for further study and fits in with the
following tentative economic history.

The period 1965-67 was a very deep Keynesian recession: the
implied Phillips 'curve' is very flat and its slope closely
resembles the one implied by the OECD 1965-69 group of points.
Next comes an almost horizontal line from 1967 to 1969---a
phenomenal output expansion with virtual price stability; in 1968

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2. The mean output growth for Israel, 6.2 percent, is
slightly above Metzer's estimate of capacity growth after 1972
(5.5 percent), but considerably below his estimated rate for
1960-72 rate (9.5). Thus, $y - \bar{y}$ shifts during the 1967-72
upturn are excessive while the slowdown, especially after 1977,
may be slightly overstated.

alone output in manufacturing grew by 25 percent (capital by only 3.6 percent), and by another 15 percent in 1969 (capital by 5.9 percent). The rest of the economy also expanded rapidly. This large jump must be seen against the background of the unusually high capacity reserves built up earlier and left idle during the recession, and the considerable slack in the labor market. By the beginning of 1967 unemployment had reached 12 percent, which provided considerable reserve, on top of which came the renewed immigration and the inflow of Arab labor from the territories after the Six Day War. These temporarily made the labor market look like an epitome of Arthur Lewis' "economic development with unlimited supplies of labor." By 1969-70 full employment was gradually being approached and while growth continued at a rapid pace, the strain of maintaining very high rates of public expenditure (on defense, on social services and income maintenance) was beginning to tell. The movement from 1969 to 1972 now suggests a very much steeper Phillips curve, though still with the 'right' negative slope.

The phenomenal spurt in growth petered out by 1973. When seen in an international comparison, the next period (1973 to mid-1977) looks quite similar to the general bell-shaped curve shown for the OECD countries in Figure 1. The upward slope in 1973-74 may be understood in terms of the price shock impact which, in the case of Israel, was exacerbated by a large devaluation and indirect tax measures, continued in the form of a crawling peg in 1975-76. The inflationary process of both periods can be fully accounted for within a conventional

wage-price adjustment mechanism (Artstein and Sussman, 1979;

Bruno and Sussman, 1979, 1980), to which we return in Section V.

The story for 1975-77 is associated with the stabilization

policy adopted in 1976 which resulted in a real cut in the

government deficit and a very stringent monetary policy whose

most spectacular effect was on the current account (see below).

One might also suggest that while the output slack of 1974 (and

part of 1975, in the case of Israel) reflects a shift in the

aggregate supply curve, that of 1976-77 probably reflects

primarily shifts in aggregate demand in response to the earlier

supply shock. (Figure 1 includes a separate point for Israel in

January-May 1977, not only because May 1977 marked a shift in

political regimes, but because it clearly shows that inflation

was at that time decelerating in a way that appears quite similar

to that of the OECD reference curve).[3]

Any analysis of the main macroeconomic trade-offs in an open

economy would be incomplete without an examination of the main

simultaneous developments in the external account. Inflation is,

after all, a measure of the strain on internal (non-tradable)

resources. Excess demand in an open economy spills over into the

tradable-goods sector and widens the import gap. The effects of

the 1973-74 events on the external accounts thus dominate the

macroeconomic responses of a small country like Israel.

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3. The relative vertical distance of the two curves in May
1977 was almost down to that of 1973. Part of this deceleration
of inflation has to do with the slowing down of the creeping
devaluation and a temporary increase in food subsidies (see
Temkin, 1983).

A convenient way of observing the developments in relative external dependence is to consider a quasi-Phillips curve diagram in which the vertical axis of Figure 1 is replaced by an 'external dependence ratio', here measured as the ratio to GDP of either the total or the civilian current account deficit (the total deficit minus defence imports, which are not directly related to economic activity). Interestingly enough, Figure 2 suggests an analogous time-phasing.[4] During the recession (1965-67) the civilian deficit ratio fell sharply (from 14.7 percent to 6.8 percent) subsequently returning to the earlier level (13-14 percent by 1969-71), illustrating an obvious trade-off between growth and the current account.[5] This trade-off was dominated by the key relationship between imports of raw materials and investment goods and domestic demand (more on this in Section IV). The end of the 'euphoric' boom, 1972, is marked by an exceptionally low deficit ratio, largely accounted for by a remarkable export performance. Next came the Yom Kippur War/OPEC I shock,[6] again showing up as a 'perverse' upward-sloping stagflationary shift.

This diagram illuminates the attempt made to move out of the crisis. During the years 1975-77 the deficit ratio dropped sharply (from 36 to 22 percent in the total and from 21 to 12

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4. Figures for the sub-periods are given in Table 2.
5. A simple regression for 1964-81 of the civilian deficit ratio on $y - \bar{y}$ (elasticity of 0.26) and the lagged terms of trade (elasticity of -0.18) gives $R^2 = 0.29$.
6. The growth in the civilian deficit ratio is already noticeable in the first 3 months of 1973 due to a sharp rise in imports.

percent in the civilian deficit), clearly at the cost of a sharp
deceleration in GDP growth.

Returning to Figure 1, its most remarkable feature may be
Israel's departure from the OECD pattern after 1977. While the
horizontal shifts in deviations from GDP trend remain quite
similar, it is the vertical (inflation) co-ordinate which seems
to have taken on a life of its own, in an almost complete
dichotomy between the nominal and the real economy. The
inflationary process from the end of 1977 onwards may be viewed
as an expectations- driven monetary 'bubble', resulting from a
change in the monetary regime. It seems to have relatively
little to do either with external world-wide shocks or with real
developments in the rest of the economy.

In Figure 2, the years after 1977 follow a zigzag path
closely related to different policy regimes of three consecutive
Ministers of Finance: Ehrlich (a rise in the civilian deficit
ratio from 12 to 17 percent during 1977-79), the brief austerity
regime of Hurowitz [the ratio came down to 8 percent (!) in
1981],[7] and an upward surge in the deficit during Aridor's
ill-fated anti-inflation real exchange rate appreciation policy
(the civilian deficit ratio rose to 14 percent in 1982, and has
risen further to 16.5 percent in 1983).

We now turn to consider a theoretical framework within
which the more detailed empirical analysis is to be conducted.

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7. Note that this was achieved in spite of a substantial
worsening in the terms of trade and a world-wide slump.

II. AGGREGATE SUPPLY AND AGGREGATE DEMAND IN THE SHORT RUN--A THEORETICAL FRAMEWORK

In order to analyze the effects of input price shocks on the economy one has to incorporate raw materials (n) as a separate factor of production of gross output (q) along with GDP (y) which in turn depends on conventional labor (ℓ) and capital (k) inputs.[8] The determination of output and prices in a system like this can be described in terms of aggregate supply (S) and aggregate demand (D) schedules, as drawn in Figure 3. For convenience we express net output in terms of GDP along the horizontal axis.[9] On the vertical axis we measure a relative price (π)--the price of final goods (p) relative to the domestic price of a competitive basket of goods, $p^* + e$,[10] where p^* represents the world price of final goods and e the exchange rate. π is also the reciprocal of the real exchange rate.

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8. I.e., gross output (q), material inputs (n) and GDP (y) are assumed to be related in a two-stage production relation: q = q[y(k, ℓ); n]. For detailed analysis see Bruno and Sachs (1981).

9. Alternatively one could measure gross output (q) on the horizontal axis (this is the more relevant measure for a subsector like manufacturing--see below).

10. We here define variables in terms of their logarithms; there- fore, the product of the exchange rate by the world price (which is the domestic price of the world good) is the sum of the logarithms ($p^* + e$) and the ratio of the two prices is the difference of the logarithms [p - ($p^* + e$)].

Two other relative prices play a major role in accounting for aggregate shifts in this system. One is the relative world price of material inputs $(\pi_n^* = p_n^* - p^*)$, where p_n is the nominal world price of materials. The other is the real cost of labor in terms of output units or the product wage (w).

The aggregate supply of goods in the short run can be described as an upward-sloping curve, S, which represents the marginal short-run cost schedule. Along a given S the productive capacity (represented here by capital stock, k), the level of technology or total factor productivity (T), and the real cost of the two variable factors of production, materials and labor (i.e., π_n and w, respectively) are held constant. Below a certain output level, as capacity becomes underutilized, the supply curve may be horizontal while at a certain maximum output level (y_f) S becomes vertical as full employment is reached. Under fairly reasonable assumptions it can be argued that an increase in the real cost of either materials (π_n) or labor (w) will shift the supply curve (S) up and to the left, while an increase in the capital stock (k) or in total factor productivity (T) will in the long run shift S down and to the right.[11]

The curve D marks the aggregate demand schedule for this economy. It can be derived from a conventional Keynesian open economy framework. Other things being equal, the demand for

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11. The various parameters are thus marked on respective sides of the curve S in Figure 3.

final goods (such as consumer goods or exports) rises with a fall in the relative final goods price (π). In drawing D we again hold constant the relative price of materials (π_n) which may affect demand through real income and wealth, and not only through the supply side. When the real price of materials such as oil rises, a net importer of these goods suffers a real income loss while a net exporter (such as OPEC) benefits. For a country like Israel a rise in the real cost of material inputs certainly shifts the aggregate demand schedule to the left (this is why π_n is placed on the left hand side of D in Figure 3). A rise in real world income (y^*), which affects export demand or expansionary domestic fiscal and monetary policy (denoted by FM in Figure 3) which affects domestic demand for consumption and investment goods, will each shift the D curve up and to the right.

We can now use this framework to analyze the output and price effects of rising input prices as well as the derived effects of the policy response to such input price shocks. The first impact of rising input prices is a leftward shift of the aggregate supply curve from S to S'—rising real costs of inputs reduce profits and the output that producers will be willing to supply at each given relative price level. Suppose, for example, that there is sufficient compensatory expansionary policy on the demand side to neutralize the contractionary effect of rising material prices on real income, so that the demand curve (D) stays put. In this hypothetical case, with everything else (including real wages) held constant, rising

material prices cause a move of the economy from the equilibrium point A to a new equilibrium point B. There is a fall in output and employment, and a rise in prices. This is the essense of a stagflationary impact effect. Note that a similar stagflationary effect of a supply shock would be observed if there were an autonomous real wage push, exceeding productivity growth.

The size of a material price shock depends on the behavior of real wages. If they are downward flexible, mitigating the squeeze on profits, this in itself may impart a compensatory rightward shift to the S curve. If wages are rigid (or rise), relative to productivity (T), the leftward shift in S, for a given upward push on material prices, will be more pronounced. The associated profit squeeze which hampers investment depresses capital growth (change in k), which may further strengthen the supply shock effect in the medium- and long-run. Such supply shock stands in marked contrast to a shift in aggregate demand, with the S curve held constant. In that case, prices and output would tend to move together (compare, for example, the points A' and B).

Consider the demand side now. Other things being equal, a rise in raw material prices (π_n), we have argued, depresses net importers' real income and demand, shifting the D schedule leftward and exerting further downward pressure on output and employment. Contractionary demand management policy (a fall in FM), and the mutual interaction of falling incomes in the export markets of other industrial countries (reducing y^*), cause a

further contraction of economic activity.

Suppose D shifts to D' while supply is now represented by S'. A new equilibrium in the commodity market, given the configuration of Figure 3, will be at the point A', output having fallen further and the final goods relative price also falling in this case (a real depreciation) from π_1 to π_0.[12] The price level need not fall, however, since this level also depends on the world prices of final goods (p^*) and on the exchange rate (e). If π is downward rigid or there is a temporary real appreciation, production may actually take place at a lower level, C, where a disequilibrium between supply and demand may for a time exist.

A system like this can be used to write down the determinants of gross output in a subsector like manufacturing or for determining GDP in the aggregate business sector. GDP or gross output can be expected to be inversely related to π_n and w, and positively related to all other demand and supply factors (FM, y^*; k, T). A labor-demand schedule can also be derived, depending on whether producers maximize profits on their normal supply schedule or if production is effectively constrained on the demand side (see the earlier example of the point C in Figure 3). Real wages will adjust gradually downwards when for the whole economy GDP is less than y_f, namely there is unemployment in the labor market (see subsequent discussion of

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12. When both S and D contract the outcome for π may obviously be either way.

the Phillips curve).   Thus over time S'may shift back to the right.

The commodity (and labor) market framework described here can be directly linked to the current account of the balance of payments, by noting, as we shall do in greater detail in Section IV, that imports are positively linked to GDP (and possibly also to π) and exports are negatively linked to the relative price π and to domestic demand pressure.   Thus, any leftward movement along the horizontal axis or downward movement along the vertical axis of Figure 3 will also signal a reduction in the real external (civilian) deficit, and a movement in the opposite direction---a deterioration in the deficit.   In fact, changes in the commodity market (e.g., a demand contraction) may be deliberately designed to achieve a current-account objective (see below).

The system could be expanded further by specifying an independent adjustment process for the exchange rate, e (as a function of monetary policy, asset markets, and current account imbalances), and for investment and capital stock (k) (a function of profits, credit policy, housing needs of immigrants, etc.). While these may be important for a more complete picture of the adjustment process in a typical industrial economy, in the case of Israel we may assume these variables to be determined outside the system.

In the following sections we shall take up, in turn, the application of this type of framework to output, employment, and relative prices (Section III) and to the implications for the

current account (Section IV). A complementary short discussion
of the nominal price system is deferred to Section V (a more
complete discussion of inflation is relegated to another chapter
of this volume).

III. THE INTERNAL BALANCE--OUTPUT, EMPLOYMENT, AND RELATIVE
PRICES

In trying to apply the framework outlined in Section II to real
data we shall make two modifications. First, it is easier to
confine the analysis of output and relative price determination
to the business sector of the economy (we shall occasionally
narrow down the illustrations even further and refer to the
manufacturing sector only) and consider the government sector as
exogenous. Thus, the vertical part of the aggregate supply curve
will refer to 'full employment' in the business sector, i.e.,
after accounting for the labor taken up by government employment.
Second, since the emphasis is on short-run adjustments relative
to trend, rather than on the trends themselves, it is convenient
to think of the analysis given in Figure 4 in terms of
deviations of the main variables from their respective mean
trends - 6.0-6.2 percent growth for GDP and domestic demand
shifts (6.9 percent for foreign demand), 2.1 percent for the
growth of labor supply, and 4 percent for the productivity trend
in real wages.

Table 3 presents the growth in the business sector's labor
supply in terms of three main components:

1.   Population growth, whose main fluctuations are due to immigration---very high in 1960-65 and 1967-73, low during the recession period (1965-67) and immediately after the 1973 war.

2.   The influx of workers from the administered territories after the Six Day War (1967). After 1973 their number stayed on a more or less even level, between 65,000-75,000 workers or 5-6 percent of the total labor force.

3.   That part of the labor force entering the public sector has to be subtracted from the potential growth of the business sector.   The share of the public sector in total employment rose from 20 percent at the beginning of the 1960s (it was still only 23 percent in 1967-73) to over 29 percent at the beginning of the 1980s. The most rapid increase coincided with the exogenous supply shock of the mid-1970s. On average, during the decade 1973-82 a potential employment growth of 1.5 percent annually in the business sector labor force was thus diverted to public services. Another indication of the importance of this factor is shown by comparing lines 7 and 8 of Table 3, suggesting that if the share of the public sector in total employment had stayed constant at its 1969 level,[13] unemployment would have reached 11.7 percent at the end of the period (1981)---more than the OECD average-rather than the actual level of 5 percent.

Next, we may compare the growth of the net supply of labor with actual employment growth (lines 4 and 5 in Table 3) as well

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13. One must also assume that the participation rate of women would have risen at the same rate as it actually did.

as the growth of the product wage[14] relative to trend (see Table
4, line 2). The data indicate a positive real wage push in the
early and mid-1960s, followed by a considerable slack in the
labor market. The economy was recovering from the depths of 10
percent unemployment during the recession, with an increase in
immigration and an inflow of workers from the territories. Thus,
in spite of the very rapid output growth 'full' employment was
probably reached only in 1973 (the unemployment rate of 2.6
percent was the lowest ever). From then on, employment growth
was only slightly lower than that of labor available to the
business sector.

We note that real wages were downward flexible during
1967-72, 1974-75, and again in 1980 (see also Figure 5 and
related discussion). The real wage push of 1975-79 can be partly
accounted for by the increased pressure of public sector demand
for labor, and partly by the accelerated inflation which, under
one version of the Phillips curve (Elkayam, 1982; see regression
8 in Table 6), accounts for this particular increase.[15]
Regressions for nominal or real cost-of-living-deflated wages
carried out by various authors (Artstein and Sussman, 1977;

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14. Defined as the nominal wage in the business sector
deflated by GDP prices.
15. A complementary explanation rests on the repercussions on
the business sector of an exogenous wage explosion in the
strongly unionized and sheltered public sector. During 1976-79
the real wage of public sector employees grew at an average 11
percent per annum while the total economy's real wage growth was
7 percent. There is some evidence of a 'reverse Scandinavian
Model' at work in those years (i.e., the 'sheltered' sector
dictating the wage of the 'exposed' sector, rather than the

Kondor, 1982; Elkayam, 1982) all point to the importance of labor-slack variables (overall unemployment as well as the share of workers from the territories) in accounting for aggregate real wage behavior during this period.[16]

Let us now turn to actual output and relative price data by subperiod, and attempt to associate the development with underlying shifts in supply and demand schedules. Lines 6-8 of Table 4 give output growth rates, relative to trend, for total GDP,[17] business sector GDP, and gross output in manufacturing, all showing more or less the same pattern. Line 9 gives the mean growth rate of the relative consumption to export price ratio, revealing a fall (i.e., real depreciation) in the first and last two sub-periods,[18] and an increase in the two middle periods.

The upper part of Table 4 gives the data for various elements of the supply curve (capital stock, product wage and relative import prices) followed by *two* measures of demand shifts: domestic demand (represented by changes in public consumption and investment, which are deemed quasi-exogenous) and world market demand.

There are three sub-periods with unambiguous supply shifts:

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reverse).

16. In Elkayam's study the change in real wages is regressed on the lagged real wage level as a proxy for labor demand in the measure of unemployment.

17. These are identical mirror images of the horizontal shifts in Figures 1 and 2. We repeat our earlier reservation concerning the implied uniform trend. This does not affect the subsequent regression results, however (see below).

18. In the latter part of the period (1979-81) this variable shows an increase (real appreciation), as does the subsequent period (1981-83) which was excluded here.

negative in 1965-67 (real wage push), positive in 1967-69 (large
real wage drop) and negative again in 1972-75 (OPEC I input price
shock). In other sub-periods the various indicators give
conflicting signals and are in any case small.[19] The direction of
demand shifts is almost always the same as that of the output
shifts, with the exception of 1972-75 which is ambiguous: here
domestic demand continued to grow for a while (mainly on account
of defence expenditures) in spite of the crisis. The output
contraction in that period is thus dominated by the supply
shock.

The story that emerges from this impressionistic analysis is
best told in terms of the trajectory and curves in Figure 4.
The recession (1965-67) came as a reaction to an earlier boom
(including a real wage explosion) and was largely a Keynesian
demand (mainly investment) contraction. This was followed after
the Six Day War by a sharp positive supply shift (S_1 to S_2)
in which unprecedented demand expansion (D_1 to D_2) could be
sustained at no inflation with a concommitant real

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19.   Weighting of the various factors, using regression
results for manufacturing, gives a small positive number for
1969-72, a small negative one for 1975-77, and ambiguous results
for 1977-81 which is an uneven period anyway (see below).
20. There was a formal nominal devaluation of 17 percent in
1967, absorbed with only a slight price increase (see Figure
1).21 The official rate was devalued from 4.20 IL/$ prior to

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depreciation.[20] The period 1969-72 saw continued demand expansion
with only slight (or no) additional supply reserves. Full
employment was reached only around 1972 (the point A_{72} was thus
marked at the junction of the vertical line on curve S_2). Then
came a negative supply shock (S_2 to $S_2"$), while domestic
demand continued to rise for a while (to D_3). The years 1974-77
were dominated by a sharp demand squeeze together with a series
of nominal devaluations targeted towards the current account.[21]
At the same time no unemployment emerged as the public sector
continued to grow (see earlier discussion and Table 3).[22]

The subsequent years, 1977-81, are much harder to
characterize in terms of the underlying model. These are the
years of runaway inflation which probably affected the real side
of the economy (productivity slowdown?) in ways that elude
quantification. Detrending the main variables (output, demand,
real wages) at the mean rate for 1964-81 may here bias the
picture if the underlying potential output trend declined. One
year for which a demand contraction can clearly be identified is
1980 (the Hurowitz austerity program). During the rest of the
period the fluctuations in Figure 4 are dominated by irregular

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1974 to about 10 in the course of 3 years. The real depreciation
shown here was, of course, much smaller---of the order of about
20 percent of the nominal depreciation.

21. The official rate was devalued from 4.20 IL/$ prior to
1974 to about 10 in the course of 3 years. The real depreciation
shown here was, of course, much smaller---of the order of about
20 percent of the nominal depreciation.

22. This is shown in Figure 4 by a leftward shift in the
vertical portion of S_2'. It is possible that the supply curve
itself also continued to shift up during this period.

relative price changes. There was a sharp temporary devaluation in 1978 (with Ehrlich's October 1977 turnabout), a real appreciation episode in the second half of 1978 followed by another import price shock and devaluation in 1979-80, an artificial deceleration of inflation during the 1981 election campaign, and a more recent real appreciation episode in 1981-82. While these fluctuations show up in the numbers for relative prices, it is not clear whether the associated output observations can be cast into the earlier mold of equilibrium supply and demand configurations. They seem, in part at least, more like temporary disequilibria (see analysis in Section II).

With demand fluctuations dominating the scene, it is hard to suggest a simple formal econometric model for the aggregate economy that includes independent demand variables not inherently correlated with the GDP fluctuations which they are supposed to 'explain'. A model that incorporates the above elements can, however, be applied to a large sub-sector like manufacturing. The equations shown in lines 1-3 of Table 5 follow the logic of the above model by regressing gross output per unit of capital in manufacturing on two relevant real cost variables (real manufacturing wage relative to trend and the relative price of industrial inputs) as well as the two demand variables[23] shown in Table 4. The signs and sizes of the coefficients are quite reasonable (except for the effect of foreign demand which is

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23. The variables actually used are the residuals from a regression of each variable on its lagged value. Thus the uniform trend problem is avoided.

relatively small and insignificant). We note that when the last
three years (1979-82) are omitted the regression results (line 1)
improve substantially, which supports the earlier argument and
casts doubt on the relevance of the model to the more turbulent
recent period.

While we cannot run the same model for the aggregate
business economy, a partial attempt is shown in Table 6
(regressions 1-2) with the change in real credit (a quasi-
exogenous variable)[24] proxying for the pressure of demand and a
significant and large coefficient for the terms of trade,
probably catching both supply and demand side-effects. Table 6
also shows a number of aggregate labor demand regressions in
which GDP is the dominant factor, while real wages, though
negative, are insignificant. Note that when one allows for
differences in labor demand response to an upward $[\Delta \dot{y}(+)]$ or
downward $[\Delta \dot{y}(-)]$ change in growth rates, the differences in
coefficients come out as expected (once 1968 is dummied out--see
regression 5). During an upswing the growth of labor per unit of
output $(\Delta \dot{\ell} - \Delta \dot{y})$ slows down (i.e., productivity growth
accelerates) while the reverse is true for a downswing. All of
this lends support to the argument that the fall in demand after
1973 may partly account for the productivity slowdown (see
Metzer's chapter in this volume).

The behavior of the product wage and the fluctuations in
output growth $(\Delta \dot{y}$ is the acceleration in GDP growth) give a

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24. See Brezis, Leiderman and Melnik (1982).

good explanation of the changes in the rate of profit on capital for the business sector. The underlying observations are given in Figure 5, referred to earlier in the context of real wage flexibility observed for some periods, and the estimated factor-price-curve is presented in line 6 of Table 6 (note the high R^2 in spite of first differences). An earlier factor price curve estimated for the manufacturing sector by Bar-Nathan (1983) is reproduced in line 6 of Table 5. Here the basis is a gross output framework (rather than GDP) with wages deflated by the output price. Thus, raw material prices appear separately in the regression. Demand fluctuations are proxied by labor intensity (hours per worker). The combination of the factor price and productivity equations (Table 5, lines 4-5) gives a reasonably good account of profit and productivity changes in manufacturing. Raw materials alone account for 35 percent of the slowdown in total productivity after 1973, the demand proxy accounts for another 24 percent, leaving 41 percent as an unexplained residual in Bar-Nathan's analysis. Bar-Nathan has recently successfully estimated a similar model for the construction sector in Israel, where demand fluctuations have played a particularly important role.

The behavior of the rate of profit, though interesting in itself, is not further analyzed here as its effect on actual investment behavior in Israel is at best tenuous (see Mayshar's chapter in this volume).

We have shown that the behavior of output, employment, and the related real cost of raw materials (π_n) and of labor (w)

conveniently fall into the framework of short-run supply and demand shifts suggested in Section II. The demand shifts, especially in 1975-77, were closely related to current account developments, to which we now turn.

IV. THE EXTERNAL BALANCE ON CURRENT ACCOUNT

In Section II we indicated how developments in the commodity market may be linked with (or even driven by) the size of the current-account balance. The following discussion does not purport to be an exhaustive analysis of the external account;[25] it merely provides a complementary link in the overall picture of the domestic response to the external shocks during the period under discussion.

A relatively simple way of analysing the behavior of the current account is to consider both imports and exports as functions of a shift variable and of relative prices. After we weed out imports for defence and the import component of production for exports we are left with the import component of domestic uses. These imports (n) will be related to the growth of domestic uses (h) and to the relative price of imports $(p_n - p)$, with elasticities γ_n and η_n, respectively.[26] Likewise, we may relate net exports (x) to the expansion of Israel's

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25. Much greater detail may be found in Halevi (1983).
26. η_n is defined so as to be a positive number (i.e., it is _minus_ the normal price elasticity).

external markets (z) and to the relative price of exports and
domestic uses $(p_x - p)$, with elasticities γ_x and η_x,
respectively. The change in the real civilian deficit (D), may
thus be related to the change in the various variables according
to the following formula:[27]

(1) $\dot{D} = N\gamma_n\dot{h} - X\gamma_x\dot{z} - [N\eta_n(\dot{p}_n - \dot{p}) + X\eta_x(\dot{p}_x - \dot{p})]$.

The change in the real current account can thus be
decomposed into three major components: the shift in imports in
response to domestic demand, the shift in exports in response to
external demand, and a third term (in square brackets),
constituting the competitive factor---the response to changes in
relative prices. This last term mainly represents the role of an
effective real depreciation or appreciation of the exchange
rate.

In applying equation (1) to the data we employed two
alternative sets of coefficients. One set (A)   assumes $\gamma_n = \gamma_x$
$= 1$, $\eta_n = 0.25$, $\eta_x = 1$, and is based on earlier published
studies of import and export demand.[28] The other set of
coefficients (B) is based on a simple regression performed on
the relevant data: $\gamma_n = 1.5$, $\gamma_x = 1.14$, $\eta_n = 0$, $\eta_x = 1.41$. In

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27. Capital letters denote the actual variables (like
imports, N, and exports X) while small letters denote their
logarithms and dotted variables are time shifts of the same
(i.e., $\dot{n}$ is the growth <u>rate</u> of N, etc.).
28. See, e.g., Weinblatt (1972) for imports and Halevi (1972)
for exports. These elasticities were used in an earlier version
of this analysis (Bruno, 1980). They are also confirmed by more
recent econometric work by Melnik (work in progress, Bank of
Israel).

case B imports are assumed to be price-inelastic but with a
considerably higher expenditure elasticity (probably
unrealistically high---see below), while the export price
elasticity comes out higher than in earlier estimates. However,
the difference between the two models in the estimated role of
the competitive factor is rather small. Table 7 presents the
results of this analysis for the two sets of coefficients. Line
(1) gives the change, by sub-period, in the current account at
current prices, line (2) is an estimate of the effect of changes
in the external terms of trade

$(p_n^* N - p_n^* X)$ from which the residual, the civilian deficit at

constant prices (line 3), is obtained.

While the models differ in the extent of overall
'explanation' by sub-period (e.g., A gives a better fit in
1968-72, B in 1973-74), they both seem quite off the mark in
1978-80. Most of this can be traced to a larger-than- expected
temporary drop in the deficit in 1980.[29] Both models give very
similar estimates of the role of relative competitiveness [lines
(6) and (7)]. Comparing the two price shock periods we note that
in both 1973-74 and 1978-80 the terms of trade cost almost $1
billion. The first period saw a worsening of the real deficit
primarily on account of continued import expansion. This was

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29. A temporary rise in private savings and a fall in
investment (plus inventory movements) suggests the explanation
given in Lavie and Sussman's account (forthcoming). Note that in
our model A, when both adjacent periods are taken together
(1978-1982), the estimate fits in well.

halted in 1975-77 with the large domestic squeeze described in Section III. During the second price shock (1979-80) the large terms-of-trade loss was absorbed with greater ease.

1981-82 seems to have been the worst period from the point of view of macro-economic performance. In spite of an improvement in the terms of trade (of about $300 million) the rise in domestic import demand and the substantial real appreciation brought about a very large increase in the deficit. The most marked development is the real appreciation episode of 1981-82 which cost around $450 million in those two years alone (and further exacerbated in 1983), more than the total gain earlier obtained with real depreciation between 1974 and 1980. As we shall see, this was the price paid for a stabilization policy that did not even pay off in terms of disinflation.

While an import-export view of the current account seems to fit the short-term movements of the deficit reasonably well, in the long- and medium-run an alternative, or supplementary, savings-investment view is no less - perhaps even more - instructive. Here we take the increase in net indebtedness as financing net investment, the difference being made up out of domestic savings. Table 8 shows that in both 1962-67 and 1968-72 the economy managed to finance, on the margin, 80-90 percent of its total net capital accumulation from domestic savings (line 4). When we subtract non-business investment (mainly housing) from both numerator and denominator, this ratio drops to 50 percent in the second period (line 4a).

The picture after 1973 is radically different: while annual

investment dropped sharply, particularly in the business sector,
the foreign debt continued to increase and domestic savings were
negative, due to rising government deficits and falling private
savings ratios (see Mayshar, forthcoming). Defence imports fail
to provide an explanation of rising total indebtedness since
these were largely financed by grants. As line 5 of Table 8
shows, the defence imports that had to be financed from other
sources fell between the two periods. The price of a much
reduced growth rate while consumption, particularly private
consumption, continued to grow almost unabated, shows up most
clearly here.

The net domestic savings ratio as a percentage of GNP plus
transfers from abroad dropped sharply after 1972-75, from around
15 percent at the height of the boom, to an annual average of 2
percent in 1974-81.[30] This drop is fairly evenly divided between
a reduction in the private savings ratio after 1973 and a rise in
the public sector deficit, which first emerged during the
recession. As shown in Berglas (1983), the public sector's
sharply rising gross tax receipts (reaching over 50 percent of
GNP in the late 1970s) failed to keep up with the rise in public
outlays, mainly on account of transfers and subsidies (which
reached 30 percent of GNP in the second half of the 1970s
compared to 12-15 percent in the earlier period).

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30. See Bank of Israel Report for 1982, Table 5a. In 1981
the number came down to -1.5 and in 1982 to -4.4. When
unilateral transfers are left out the numbers are negative
throughout.

Even though the foreign debt, as we have seen, continued to
increase after 1973, it grew much more slowly (see bottom of
Table 8), though still faster than the growth rate of GDP.
Compared with the group of LDCs whose average real debt grew by 9
percent annually in the decade 1972-82, Israel's debt grew by
only 4.6 percent annually.[31] Having started from a very high
debt level, Israel avoided the strategy followed by many other
semi-industrialized countries. Whether voluntary or otherwise,
the cost of the response to the external shocks in terms of
growth and investment forgone was very high.

V. THE TRADE-OFF BETWEEN THE EXTERNAL BALANCE AND INFLATION

Looking again at Figure 1 we note the general similarity between
the inflation-output trade-off in Israel and the industrial
countries during the period 1965-77. Admittedly, the OECD data
have to be blown up by a factor of 2 for this comparison. Also,
we note that during the OPEC I shock and its aftermath Israel's
inflation was considerably higher than the pre-shock relative
'norm' would suggest. However, the pattern of inflation during
that period can be explained once we take into account the series
of devaluations undertaken between 1974 and 1977 as part of the
current-account targeted adjustment policy. In the face of
quasi-full employment, growing public sector outlays, and an

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31. By 1982-83 the real debt again rose much more rapidly.

already well-indexed economy, such large-scale devaluations (from 4.2 IL/\$ before November 1974 to 10.5 IL/\$ just before the devaluation of October 1977) were bound to result in an accelerated inflation rate, with only a very partial pay-off in real competitiveness. The analysis of the relationship between exchange rate adjustments and the wage-price mechanism has been discussed in considerable detail elsewhere (e.g., Bruno and Sussman, 1979, 1980). A much quoted pair of wage and price equations estimated by Artstein and Sussman (1977) for annual data, 1955-1974, gives

$$(2) \qquad \dot{p} = -0.04 + 0.67\dot{w} + 0.25\dot{p}_n + 0.14(\dot{m} - \dot{y}) + \dot{t}$$
$$\qquad\qquad\qquad (0.11) \quad (0.06) \quad\; (0.08)$$

$$(\bar{R}^2 = 0.94)$$

$$(3) \qquad \dot{w} = -0.04 + 0.82\dot{p} + 0.47(1/U_{-1}) - 20.76\ell_a - 0.03d$$
$$\qquad\qquad\qquad (0.10) \quad (0.10) \qquad\qquad (11.88) \quad (0.01)$$

$$(\bar{R}^2 = 0.95)$$

Here p is the (log) consumer price index, w is the <u>nominal</u> wage, p_n are import prices, m is the log of narrowly-defined money (M_1) (dots, as before, are time changes), t is the log of an indirect tax factor (1 + tax rate, u is unemployment, ℓ_a is the share of workers from the territories, and d is a dummy variable for years of wage freeze.

Combining equations (2) and (3), yields a reduced-form equation:

$$(4) \quad \dot{p} = -0.14 + 70(1/U_{-1}) - 3087\ell_a^2 - 0.04d + 0.56\dot{p}_n$$

$$+ 0.31 \; (\dot{m} - \dot{y}) + 2.22\dot{t} \; .$$

The model gave a fairly accurate account of the inflationary process for both the earlier years of relative price stability as well as the subsequent acceleration, including an out-of-sample forecast to 1975 and 1976.

The coefficients of equation (4) suggest that an increase in the annual rate of devaluation from 6.6 percent in 1967–72 to 32.5 percent in 1974–77 could by itself account for 14.5 percent acceleration in the annual inflation rates between the two periods. A 5 percent drop in unemployment would account for a further acceleration of 3.5 percent. This may have been all that was needed to account for the higher rate of inflation in Israel during the said period, not counting the acceleration in money growth, on the one hand, and the mitigating effect of a 4 percent wage-freeze (in 1974) on the other.[32]

In discussing Figure 1, we noted the very different pattern of accelerated inflation after 1977. The above model in its original form can indeed be shown to predict much less well for that period. The wage equation, in particular, has to be modified (see, e.g., Elkayam, 1982) and one would also have to reinterpret the meaning of 'money' in the price equation.

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32. To the extent that there was some indexation of money to inflation already during that period equation (4) could be applied to work out the implied larger role of devaluation on inflation. For example, if the elasticity of money with respect to prices is 1/3, the indirect effect would be to augment the total role of the other factors in equation (4) by about 10

However, there is more to this matter than merely applying a set
of updated coefficents. The data indicate an inherently
different process associated with the change in the nature of the
exchange rate regime (probably starting with the crawling peg in
1975--see Gottlieb and Peterman, 1982) and in particular with
the liberalization of foreign exchange control in 1977. This
process, as well as the explicit introduction of financial asset
formation, merit a separate detailed discussion. The apparent
dichotomy between the real economy and the 'nominal' system
during the latter period also justifies confining our emphasis in
the present paper to the narrower aspects of the
inflation/balance-of-payments trade-off.

Having mentioned the relationship between the balance of
payments and inflation via devaluations one may raise an
obviously related question: in what way is this a symmetric
two-way relationship; has the exchange rate ever served as a
stabilizing device? This question rises particularly in the
context of the 1981-83 real appreciation episode (see earlier
discussion). While we return to the general issue in another
paper, we should point out here that the experience of both this
and earlier periods suggests that the effect of upward and
downward adjustments in the exchange rate is not symmetric.[33]

The following is a quarterly regression of inflation
acceleration $(\Delta\dot{p} = \dot{p} - \dot{p}_{-1})$ run on its own three lags and on

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percent.
  33. See Bruno and Sussman (1979) for earlier quarterly
evidence on this asymmetry.

the acceleration $(\Delta\dot{e}+)$ and deceleration $(\Delta\dot{e}-)$ of the exchange rate—the data are for 79 quarters from 1964:1 to 1983:3 (numbers in brackets are standard errors of coefficients):

$$(5) \quad \Delta\dot{p} = 0.29 - 0.51\Delta\dot{p}_{-1} - 0.30\Delta\dot{p}_{-2} - 0.47\Delta\dot{p}_{-3} + 0.32\Delta\dot{e}+$$
$$\phantom{(5) \quad \Delta\dot{p} =} (0.37)\ (0.09)\phantom{\Delta\dot{p}_{-1}} (0.10)\phantom{\Delta\dot{p}_{-2}} (0.09)\phantom{\Delta\dot{p}_{-3}} (0.07)$$

$$-0.16\Delta\dot{e}-$$
$$(0.09$$

$$(\bar{R}^2 = 0.55,\ DW = 1.80)$$

The coefficient for upward adjustment (0.32) is double that for downward changes (0.16).[34]

When the separate exchange rate terms are combined into one $(\Delta\dot{e})$ the coefficient becomes 0.22 (0.07), similar to that found in earlier studies. When the period is broken down into subperiods, the results show relative symmetry in response before and larger asymmetry since the institution of the crawling peg (1975:3). The coefficients for upward and downward adjustment in a regression run over 1975:3 to 1983:3 are, respectively, 0.29 (0.11) and 0.10 (0.15), the second coefficient being statistically insignificant.

A model like the one given above can be used to evaluate the recent attempt to lower the inflation rate by slowing down the rate of devaluation. Even on the conservative assumption implied by equation 5 (which may be unduly optimistic) consider the implication of a one-time reduction of $\dot{e}$ by 6 percent per

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34. The implied coefficient for the rate of inflation on its own lags can be worked out from the equation by subtraction of 0.51 from 1, 0.30 from 0.51, etc.

quarter or a 1.5 percent monthly rate such as was started in the
third quarter of 1982. The contemporaneous effect in the same
quarter is estimated to be an inflation deceleration of only 0.24
percent a month (relative to a monthly inflation of 7-8 percent)
followed by further deceleration in the subsequent quarters of
0.12, 0.11, 0.12, -0.01 percent in the monthly rates, adding up
after one year to a monthly deceleration of about 0.6 percent.
Even if such deceleration had in fact taken place (for which the
evidence is not conclusive) the cumulative implication is a
marginal real appreciation, after 4 quarters, of 16 percent.
Real appreciation of at least that order of magnitude accounts
for the loss of net foreign exchange receipts which was discussed
in Section IV. Moreover, the accelerated inflation that
followed the large correcting devaluation in the last quarter of
1983 turned this particular experiment into a dismal failure. A
large foreign exchange loss was incurred with zero or even
negative net gain on the inflation front. By the end of 1983,
balance of payments pressures had thus returned to the forefront
of economic policy.

While the costs of inflation in a highly indexed economy are
hard to measure directly, indirect indicators suggest that the
cost in real resources may be quite high. One aspect is
obvious--the resources now devoted to financial activities, i.e.,
attempts by individuals and firms 'to run in order to stay in
place', must be very high. One published aggregate statistic is
the share of employment in the financial sector--of the total
increase in employment in the business sector from 1977 to 1981

(87,000 employees on a 903,000 base in 1977) 38 percent (i.e.,
33,000 employees) went into financial and business services, a
sector that by 1977 already accounted for 7.2 percent of total
employment.[35]   There is no doubt that many more of the employees
formally classified as belonging to the production part of the
business sector are kept busy mending corporate financial fences
against inflation. Likewise, it is a common observation that the
allocation of time of households has shifted from work and
leisure alike to the more lucrative business of portfolio
management under three-digit inflation.

Another cost item that eludes quantification is the loss of
efficiency caused by the deterioration of the price system as a
signalling device both for household consumption and for company
investment decisions. The unexplained residual in productivity
slowdown calculations (see Metzer, 1983) and the erratic
movements in the real economy, already discussed in Section III,
must be closely related to the high and variable inflation rate.

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35. Leaving out business services, a comparable number for
financial services alone during the shorter period 1977-81 is 23
percent on the margin, on a 5 percent base. Kleiman has recently
prepared a more detailed estimate of these costs of inflation.

CONCLUDING REMARKS

We have tried to account for the macroeconomic developments throughout most of the period since 1967 within a rather simple macroeconomic supply and demand framework. The exogenous shocks of the 1970s came at the end of the unprecendented 1968-72 boom period and were particularly severe in Israel. The contractionary bias of domestic policy was at first dictated by the balance of payments squeeze. The results of the 1975-77 effort were impressive in terms of the improved external balance, less so in terms of inflation, and quite poor in terms of long-term structural change. Public sector employment continued to grow almost unimpeded, investments in the tradable goods sector did not return to their desired long-term level, thus preventing a replay of the successful shift of resources into manufacturing exports that took place in the 1960s and before the 1973 crisis.

Slowing down the growth of the public sector would have meant abandoning or delaying ambitious social programs undertaken at a time when the balance of payments constraint seemed a remote issue. But indirectly this inflexibility must have taken its toll in terms of the subsequent loss of economic growth potential. Unlike some of the semi-industrialized countries mentioned at the beginning of this essay, Israel could probably not afford to increase its foreign debt in the mid-1970s---its debt had already set a world record before this troublesome decade started. Israel thus suffered from the typical

industrial-country slowdown, without the accompanying overt signs
of massive unemployment. At the same time, it did not display
the internal flexibility of monetary and incomes policies that
characterized a small low-unemployment country like Austria. Nor
could it afford the expansionary stance of countries like Korea
or Singapore.

The failures of the post-1977 period are in some ways much
more serious, mainly on account of Israel's rapid inflation. The
most marked difference between the post-1977 inflationary
'bubble' and the earlier (1973-75) two-digit inflation is the
loss of monetary control that characterized the later episode.
While the earlier period was highly inflationary by international
standards, it could at least be argued that inflation was to
some extent 'functional'. It was a costly, and probably only
partly avoidable, by-product of a conscious attempt to improve
the country's competitiveness in the face of a severe foreign
exchange shortage. Nothing of the sort can be said for the
period after 1977. By 1977 the foreign exchange constraint had
been alleviated, at least temporarily, foreign capital markets
were more accessible, inflation was receding, and an effort could
have been made at that time to stabilize the economy further,
restructure its productive system, and embark on a more rapid
growth path even at the cost of some additional long-term
borrowing.

In retrospect, 1977 turned out to be a crucial cross-roads.
During the 2-3 years before the next oil shock set in, the
economy could have used the time to correct its 'structural'

mistakes (a lesson well learned in some other small European
economies; Finland, for example, embarked on a successful
medium-term plan at about that time). Instead, the change of
political regimes signalled only one institutional economic
change which proved disastrous. The financial opening-up of the
economy to short-term external capital flows (and the
unnecessarily large devaluation that signalled its start) without
any accompanying fiscal or liberalization measures locked the
economy into a new inflation-cum-low-growth trap from which it
can apparently no longer extricate itself without another major
institutional reform.

Table 1. Annual Average Rate of Change, Selected Variables, Israel and Major Country Groups: 1960-73 and 1973-80[a]

	Israel		19 OECD countries		10 MICs	
	1960 -73	1973 -80	1960 -73	1973 -80	1960 -73	1973 -80
1. Gross domestic product[b]	9.2	3.3	4.7	2.6	6.7	6.0
	5.7	2.5	1.8	2.2	4.9	3.8
2. Employment[b]	3.7	1.1	1.2	0.7	4.0	2.9
3. GDP per employed person	5.5	2.2	3.6	2.0	2.7	3.0
4. Gross investment	11.0	-2.9	6.4	0.4	8.9	6.6
5. Public consumption	15.1	-0.1[c]	4.8	2.3	9.9	6.6
6. Import/export prices	-0.5	0.8	-0.5	1.5	-0.5	-0.5
7. Consumer prices	7.4	57.8	4.7	10.8	6.3	18.5
	4.9	33.2	1.8	2.9	3.8	9.0
8. $\frac{\text{Current-account deficit}}{\text{GDP}}$ [d]	18.5	19.7	1.5	0.9	3.9	8.0
	4.2	4.8	1.5	2.0	4.6	4.6
9. Percent unemployment at end of period	2.6	4.8	3.6	6.2[e]	-	-

[a] Small numerals are mean standard deviations.

[b] Israel's data refer to the business sector; see Metzer (1983).

[c] The figure for 1972-80 is 5.5 percent (in the 1973 war year public consumption grew by 45 percent).

[d] 1965-73 for the first period, 1973-79 for some MICs in the second period. Figures give percentage ratios in constant 1975 prices.

[e] Unemployment at the end of 1982 was 8.8 percent.

Sources: Lines 1, 4 through 6, and 8--OECD, National Income Accounts, and IBRD World Tables (for MICs and Israel).
Line 2--ILO statistics.
Line 7--IMF, International Financial Statistics.

Table 2. Selected Series by Subperiod, 1960-1981

(Mean percentage growth rates)

	1960-65	1965-67	1967-72	1972-75	1975-77	1977-81
Business sector						
GDP	9.4	-0.2	13.9	3.5	2.8	3.8
Capital stock	10.6	7.3	7.8	8.6	5.7	4.1
Manhours	4.4	-5.8	7.4	-0.5	-0.1	2.0
Product wage	6.0	11.3	0.9	3.0	7.6	1.5
Real rate of return[a/]	14.3	9.6	21.6	19.5	16.3	16.3
National accounts						
Private consumption	9.7	2.1	8.1	5.4	4.0	5.8
Public consumption	9.9	24.6	10.3	19.5	-11.1	3.8
Investment	10.9	-19.3	24.5	1.8	-10.3	-1.7
Exports	12.7	10.4	17.8	4.3	13.6	4.7
Imports	12.0	6.9	15.2	14.1	-3.8	4.2
Import/export prices	-1.2	-1.3	0.0	3.3	-1.3	0.3
Key macro-economic targets						
Deficit/GDP (current prices)[a/]	18.3	14.2	19.4	36.2	21.5	22.6
Unemployment rate[a/]	3.6	10.4	2.8	3.2	4.1	5.3
Consumer prices	7.2	5.0	7.1	33.0	33.0	94.2

[a/] End-of-period levels; in percent.

Sources: Business sector data based on Metzer (1983).

National accounts and other data--CBS, Statistical Abstract of Israel, various years.

Table 3. Labor Supply to the Business Sector, Employment, and
Unemployment, 1960-1982

(Annual growth rates and percentages)

	1960 -65	1965 -67	1967 -73[a]	1973 -75	1975 -77	1977 -82
Sources of labor supply to						
business sector						
1. From population growth	5.2	1.0	4.1	2.2	3.2	3.3
2. Workers from the admi-nistered territories	0.0	0.0	1.3	0.1	-0.2	0.3
3. <u>Less</u>: Employment in the public sector	-0.9	-0.2	-1.8	-2.6	-1.2	-1.3
4. <u>Equals</u>: Growth rate in labor supply (1. + 2. + 3.)[b]	4.3	0.8	3.6	-0.3	1.8	2.3
5. Growth in employment, business sector	4.3	-3.7	5.4	-0.6	1.2	1.9
<u>Aggregate unemployment rate (percent)</u>						
6. Mean	3.0	9.8	3.9	3.0	3.9	4.3
7. End-of-period	3.8	11.6	2.6	3.2	4.1	5.0
8. Hypothetical[c]	3.7	10.4	4.6	7.5	9.0	11.7

[a] We have chosen 1973, rather than 1972, as the end year here because the definitions of the labor force were changed in that year.

[b] Net labor supply to the business sector is defined as total labor force including workers from the territories, <u>minus</u> employment of the public sector.

[c] Defined as end-of-period aggregate unemployment <u>plus</u> excess of public sector over 1969 percentage.

Source: CBS, <u>Statistical Abstract 1983</u> (and earlier years).

*Table 4. Supply and Demand Shifts, Output, and Relative Price Changes
by Subperiod, 1965-1981*

(Mean percentage growth rates relative to trend[a/])

	1965 -67	1967 -69	1969 -72	1972 -75	1975 -77	1977 -81	Mean trend
Supply shifts							
1. Capital stock	1.2	1.6	2.4	1.4	-1.9	-2.8	6.5
2. Product wage	7.3	-6.5	-0.9	-1.0	3.6	-2.5[b/]	4.0
3. Relative import/ export price	-1.3	0.1	-0.1	3.3	-1.3	0.3	-
Demand shifts							
4. Domestic (G + I)	-6.2	16.9	5.9	4.4[c/]	-17.3	-4.1	6.1
5. Foreign (y*)	-0.5	5.3	1.7	-2.1	2.5	-4.2	6.9
Output							
6. Total GDP	-4.4	8.1	4.4	-1.7	-4.8	-2.3	6.0
7. Business sector	-6.4	11.2	5.4	-2.7	-3.4	-2.4	6.2
8. Manufacturing output	-7.9	15.3	3.6	-2.8	-2.3	-3.8	7.0
9. *Relative domestic price (π)*[d/]	*-0.7*	*-5.4*	*0.8*	*0.7*	*-7.1*	*-2.5*[e/]	-

[a/] Except for lines 3 and 8, in which figures are not detrended.

[b/] The numbers for subperiods are--1977-79: +0.5 percent, 1979-81: -4.5 percent. In 1982-83, the real wage again rose sharply.

[c/] Leaving out defense and aircraft imports the number is only 0.9 percent.

[d/] Measured in terms of domestic consumption/export prices.

[e/] 1979-81: +0.6 percent.

Sources: See Table 2. Foreign demand variable (y*) is based on Bank of
Israel, Annual Report, various years.

Table 5. Selected Regressions for Manufacturing

	$\bar{R}^2$	DW	Period
Gross output			
1. [a] $\dot{q} - \dot{k} = -0.10 - 0.62w^u - 0.57\pi_{n-1} + 0.29d^u + 0.17x^u$ $0.090.360.220.150.11$	0.37	2.75	1964-79
2. [a] $\dot{q} - \dot{k} = -0.04 - 0.34w^u - 0.42\pi_{n-1} + 0.35d^u + 0.08x^u$ $0.090.340.210.160.10$	0.26	3.02	1964-82
3. [b] $q - k = 0.49w - 0.18\pi_{n-1} + 0.39d$ $0.140.360.14$	0.66	1.87	1964-82
Rate of return and total productivity (Bar-Nathan) [c]			
4. $r = 0.13t - 1.50w - 2.81\pi_n + 0.029j$ $4.653.02.152.49$	0.73	1.36	1965-80
5. $q - 0.4k - 0.6h = 0.05t - 1.21\pi_n + 0.019j$ $14.32.643.88$	0.99	1.80	1965-80

[a] $\dot{q} - \dot{k}$ are rates of change. Superscript u denotes unanticipated change of variables.

[b] Regression run in log-levels with correction for auto-correlation.

[c] Here small numerals are t-values. The variable j is a demand-pressure proxy, measured by the intensity of hours worked.

Table 6. Selected Regressions for the Business Sector

GDP

Equation	$\bar{R}^2$	DW	Period
1. $\dot{y} = \underset{2.08}{2.07} - \underset{0.48}{1.05}(\dot{p}_m - \dot{p}_x) + \underset{0.07}{0.12}\Delta\dot{C}_r + \underset{0.25}{0.64}\dot{y}_{-1}$	0.23	2.17	1964-81
2. $\Delta\dot{y} = \underset{1.31}{-0.29} - \underset{0.43}{1.37}\Delta(\dot{p}_m - \dot{p}_x) + \underset{0.07}{0.16}\Delta\dot{C}_r$	0.39	2.45	1964-81

Employment

Equation	$\bar{R}^2$	DW	Period
3. $\dot{l} = \underset{1.01}{-3.23} - \underset{0.067}{0.052}\Delta\dot{w}_{-1} + \underset{0.12}{0.83}\dot{y}$	0.72	2.30	1961-81
4. $\Delta\dot{l} = \underset{1.16}{-0.54} + \underset{0.17}{1.23}\Delta\dot{y}(+) - \underset{0.30}{0.87}\Delta\dot{y}(-)$	0.80	2.72	1961-81
5. $\Delta\dot{l} = \underset{1.34}{0.40} + \underset{11.82}{15.59}D_{68} + \underset{0.56}{0.52}\,\dot{y}(+) - \underset{0.32}{1.04}\,\dot{y}(-)$	0.81	2.48	1961-81

Rate of return (factor price curve)

Equation	$\bar{R}^2$	DW	Period
6. [a] $\dot{r} = \underset{4.10}{7.09} - \underset{0.30}{1.60}\dot{w} + 0.92\Delta\dot{y}$	0.81	1.69	1962-81

Consumption wage (Phillips curve) [b]

Equation	$\bar{R}^2$	DW	Period
7. (Kondor, 1982) [c] $\dot{w}_c = \underset{6.3}{0.24}(1/u_{-1}) - \underset{2.7}{2.9}\dot{l}_a$	0.34	1.38	1965-81
8. (Elkayam, 1982) [d] $\dot{w}_c = \underset{3.4}{0.60}\Delta\dot{p}_{c+1} - \underset{4.62}{0.53}\dot{w}_{c-1} + \underset{4.32}{0.003}t$	0.54	1.97	1968.I-80.I

[a] Regression corrected for auto-correlation ($\rho = 0.63$).

[b] Here small numerals are t-values.

[c] Here $\dot{w}_c$ is defined as change in nominal wage minus $(0.7\dot{p}_c + 0.3\dot{p}_{c-1})$. $\dot{l}_a$ denotes the growth in labor from the administered territories.

[d] Based on quarterly data. $\Delta\dot{p}_{c+1}$ is the expected acceleration in inflation.

Table 7. Components of Change in Civilian Deficit, by Subperiod:
1965-1982

($ millions, 1975 prices)

	1965 -67	1968 -72	1973 -74	1975 -77	1978 -80	1981 -82
1. Change in deficit at current prices	-203	307	1,433	-444	527	1,002
2. International terms of trade	28	-418	781	-108	993	-318
3. Change in deficit at constant 1975 prices	-231	788	652	-336	-466	1,320
Of which:						
Change in relative prices[a]						
4.　A	42	-159	94	-204	-194	449
5.　B	7	-126	77	-191	-128	441
Estimated import shift						
6.　A	51	1,597	555	3	456	797
7.　B	76	2,396	833	5	684	1,196
Estimated export shift						
8.　A	-187	-691	-292	-377	-318	-205
9.　B	-213	-788	-333	-430	-363	-234
10. Total explained　A	-94	747	357	-578	-56	1,041
11.　　　　　　　　　　B	-130	1,482	577	-616	193	1,403

[a] This consists mostly of the effect of real depreciation or apprecia-
tion.

Table 8. Annual Investment, Savings, and Debt Accumulation by Subperiod, 1962-1982

($ millions, 1975 prices)

	1962-67	1968-73	1974-77	1978-82	1962-82
1. Net domestic capital formation: Total[a/]	1,279	2,244	2,750	1,805	1,960
1a. Business sector	628	1,052	1,088	668	846
2. Increase in net foreign debt	125	536	1,433	770	645
3. Net domestic savings: Total [1. minus 2.]	1,154	1,708	1,317	1,035	1,315
3a. Savings for investment in business sector [1a. minus 2.]	503	516	-345	-102	201
4. Share of domestic savings [3. ÷ 1.]	0.90	0.76	0.48	0.57	0.67
4a. Share for business sector [3a. ÷ 1a.]	0.80	0.49	-0.32	-0.15	0.24
5. Defense imports net of grants	221	595	364	70	319

Annual growth of real foreign debt (%)

	1962-72	1972-82
LDC's		9.1
Israel	13.6	4.6

a/ The total includes investment in housing and public-sector buildings.

Sources: National accounts and balance-of-payments data expressed in dollars and deflated by Israel's export price for manufacturers.

      Line 5: See Berglas (1983).

      LDC debt: World Development Report, 1982.

Figure 1. Inflation and Output Slack, Israel and OECD*: 1965-1982
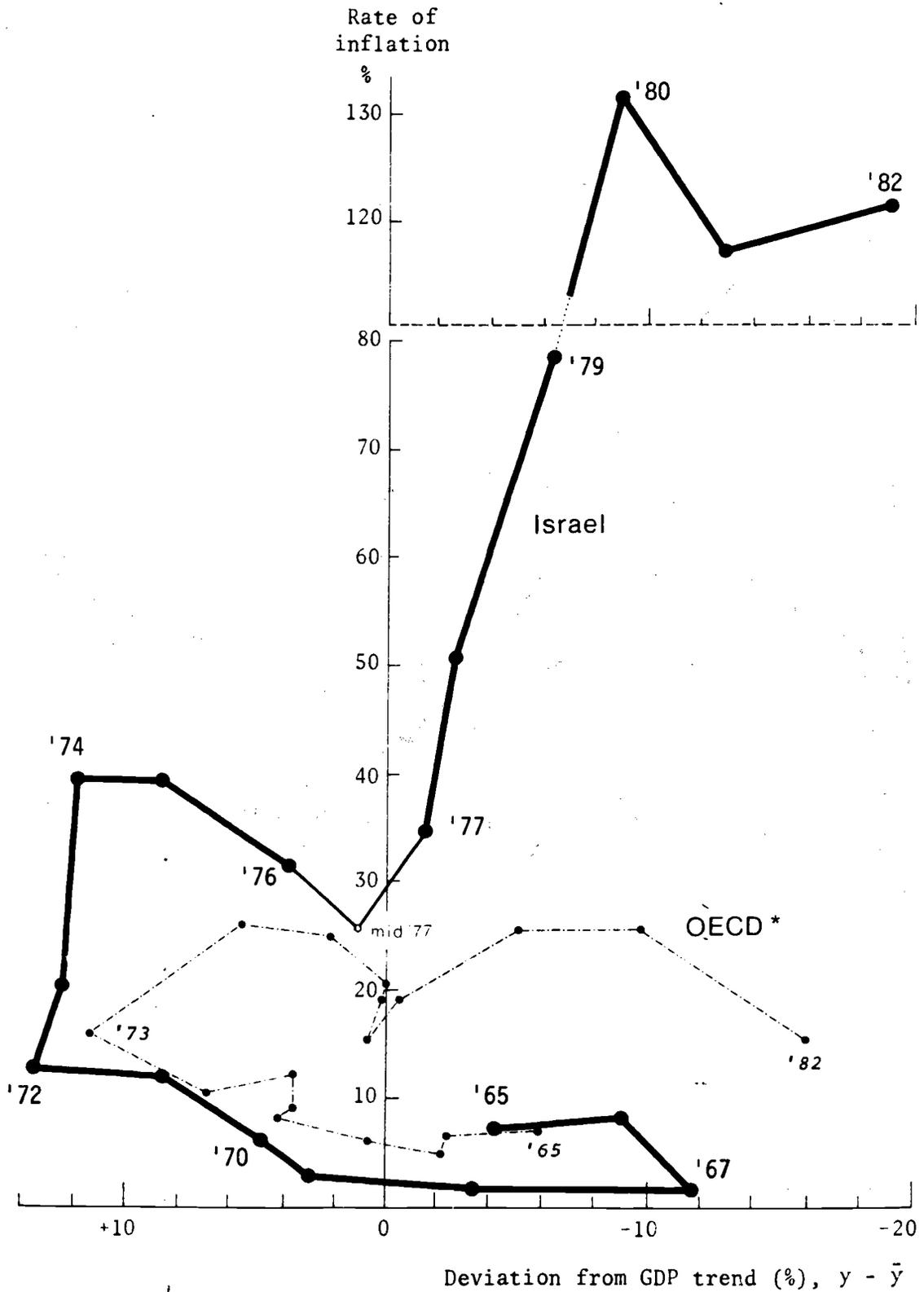
* Real OECD figures × 2.

Figure 2. External Deficit Ratio and Output Slack: Israel, 1965-1982

Deficit
ratio (D/Y)

(a) TOTAL

(b) CIVILIAN

Deviation from GDP trend (%), $y - \bar{y}$
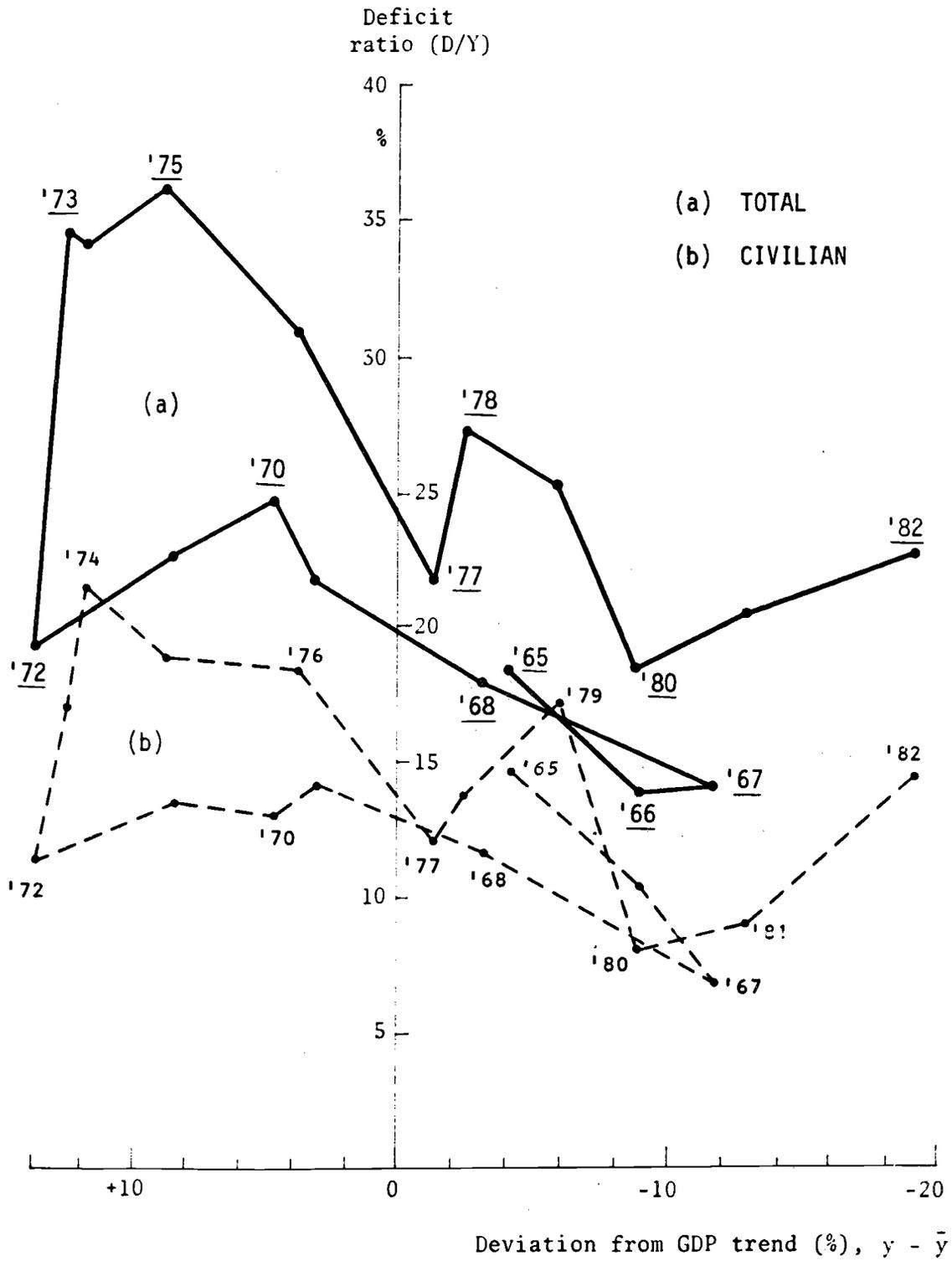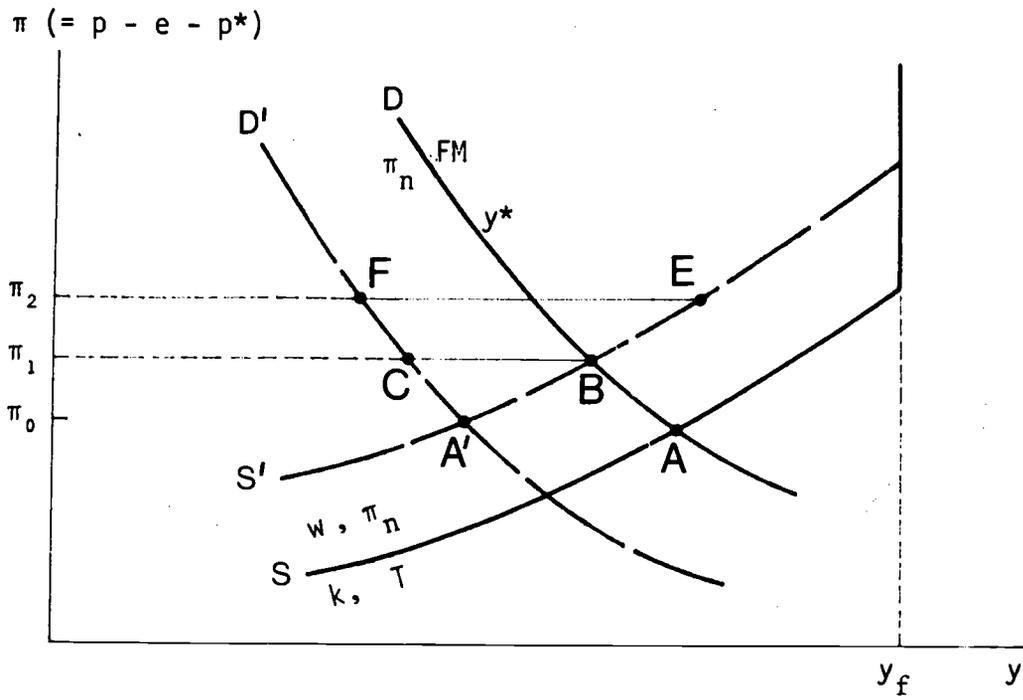
Figure 3

Figure 4. Stylized Account of Supply and Demand Shifts, 1965-1980
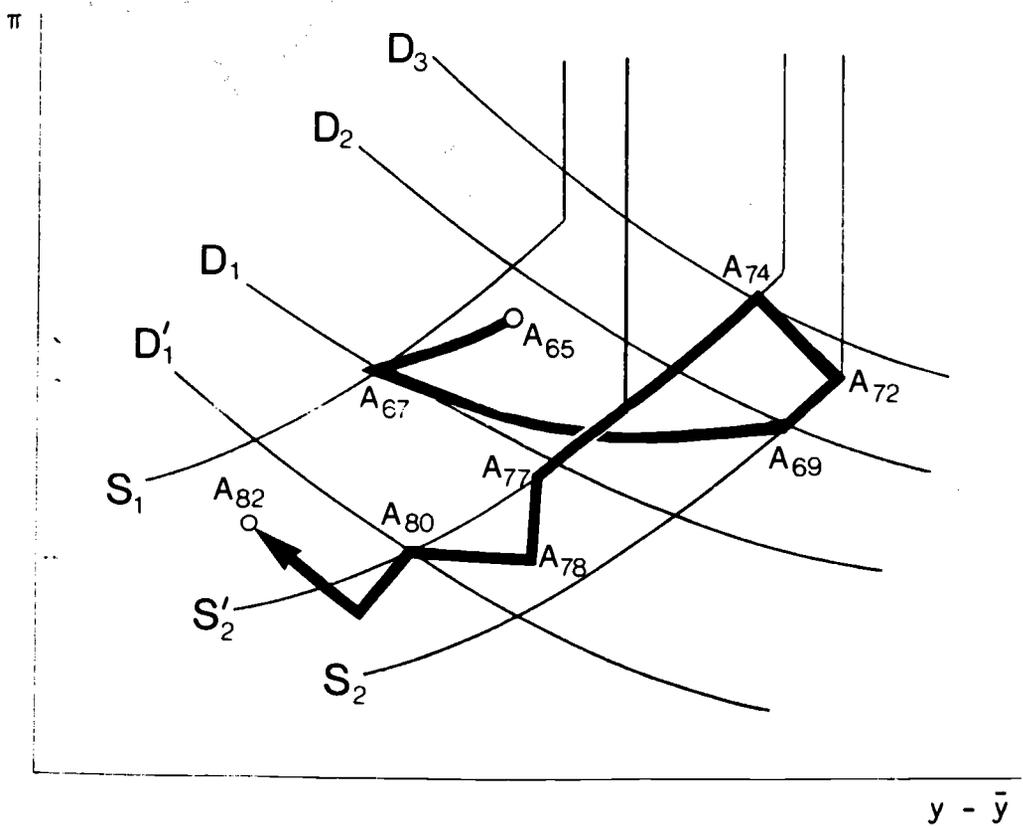
Figure 5. Rate of Return (1975 prices) and Product Wage (detrended at 3.9 percent), Business Sector, 1960-1981
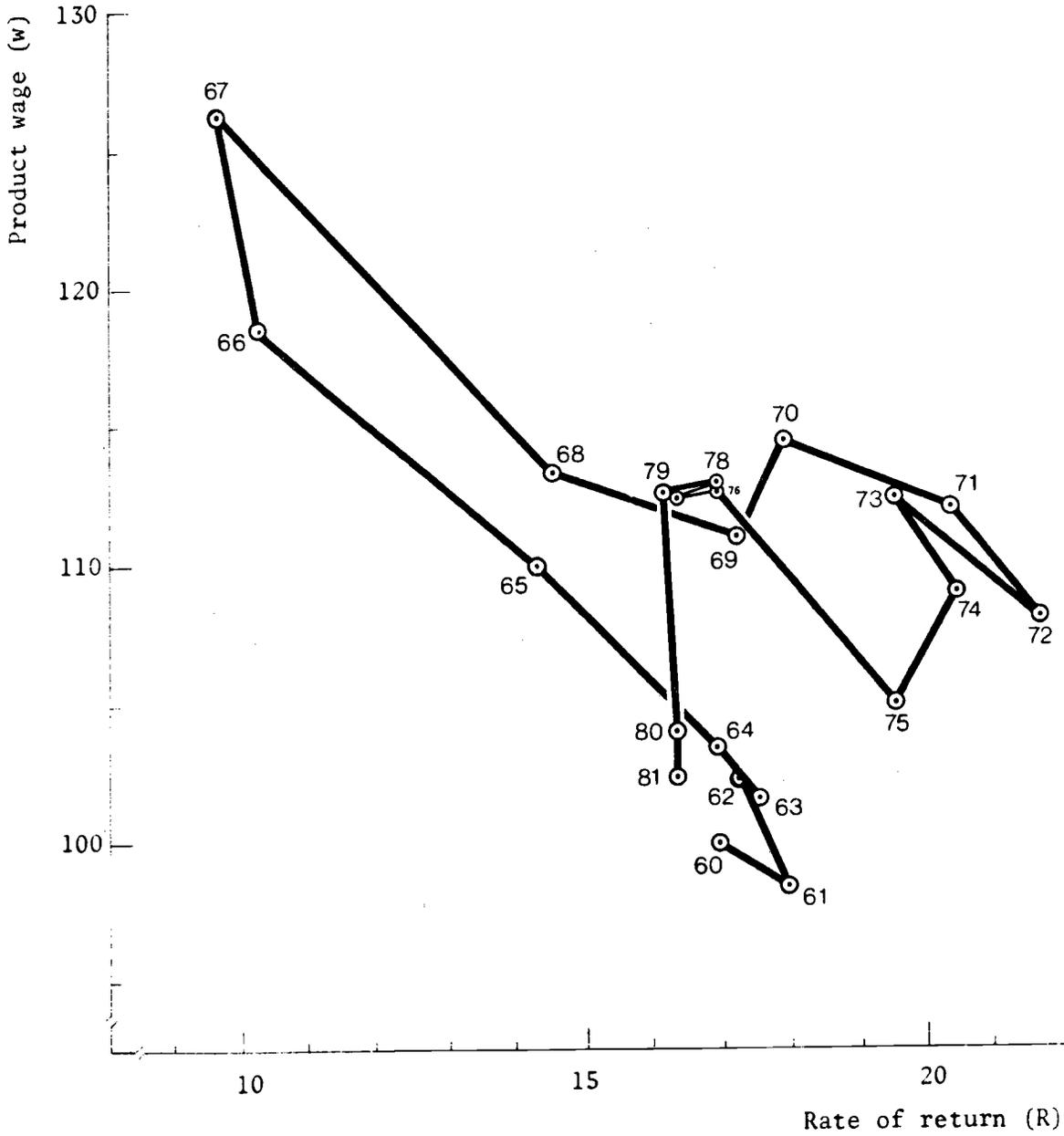
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