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Israel: Selected Issues

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ISRAEL

Selected Issues

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Content Page

I. Corporate Balance Sheets and Investment: Empirical Estimates for Israel[1]

Abstract

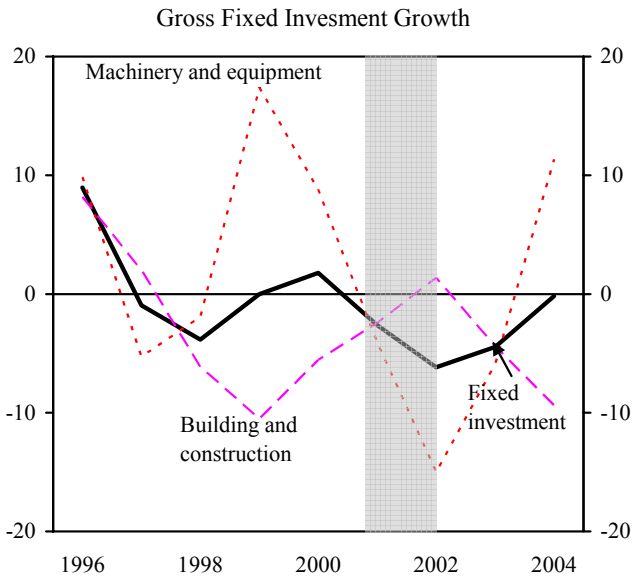
Although the financial robustness of the Israeli business sector has shown some improvement in recent years, corporate leverage has been on an upward trend and is high by international standards. This paper analyzes the empirical relationship between corporate leverage— and other indicators of financial health— and investment in Israel , using dynamic panel data techniques. Our results suggest that weak balance sheets may well have contributed to the investment decline of recent years. The impact of financial variables on investment is more pronounced for firms under financial pressure. However, there is little evidence that weak balance sheets' impact on corporate investment increases during real downturns or following an equity market bust. Going forward, business investment is expected to pick up in line with the improvement in the financial strength of the corporate sector. One exception, however, is building and construction investment, which is expected to remain subdued, given the increasing leverage in the real estate sector.

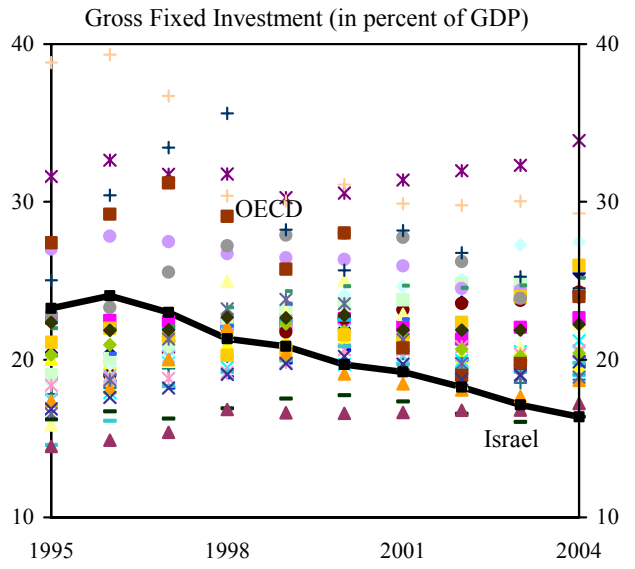
A. Introduction

1. **After a prolonged period of depressed activity, Israel's growth is picking up pace, but investment has yet to recover to its prerecession levels**. The high-tech slump, coupled with the global downturn and the deterioration in the Israeli security situation, led to a deep recession with negative GDP growth in 2001 and 2002. In the event, business investment collapsed and residential construction remained sluggish. The economy has since recovered, driven by high-tech exports and consumption. Nevertheless, investment in the business sector has been lackluster (particularly investment in structures), whereas investment in residential buildings has continued to fall, in contrast to past recovery experiences. As a result, Israel now has one of the lowest ratios of physical investment to GDP relative to OECD countries.

[1] Prepared by Marialuz Moreno-Badia. I thank Sigal Ribon for her valuable comments.

2. **Why has Israel's investment been so weak?** The empirical literature started by Fazzari, Hubbard, and Petersen (1988) has found substantial evidence that firm investment is dependent on liquidity and the strength of the balance sheet. In a world with asymmetric information, lenders might require collateral to overcome agency problems, and, therefore, the strength of the balance sheets may determine the availability and terms of the credit. Therefore, weak balance sheets can restrict firm financing and, as a result, firm investment. Although the financial robustness of the Israeli business sector has shown some improvement in recent years, corporate leverage has been on an upward trend and is high by international standards (Figure 1). Increasing corporate leverage may have been perceived as raising corporate default risks, resulting in higher costs of external financing, which, in turn, could have led to low investment. The purpose of this paper is to analyze to what extent the rise in corporate indebtedness or developments in other balance sheet indicators has undermined investment in Israel or could do so in the future—a critical issue while the economy is recovering. Specifically, the paper poses the following questions:





- ***Are balance sheet positions significant determinants of firm investment in Israel?*** The paper estimates two types of investment equations—an error-correction model and an Euler equation specification—to test whether investment is affected by the composition of a firm's balance sheet.

- ***Does the firm's size matter?*** The paper analyzes whether the financial position of firms affect investment differently depending on the firm's size.

- ***Are weak balance sheets more important in explaining firm investment during downturns?*** The paper tests the presence of asymmetric balance sheet effects over the cycle, looking at both real sector downturns and stock market busts.

- ***Does the sensitivity of firm's investment increase above certain threshold values?***

3. **The econometric results suggest the following**:

- Firms' balance sheet position do affect investment decisions. This effect is relatively large for highly leveraged firms.

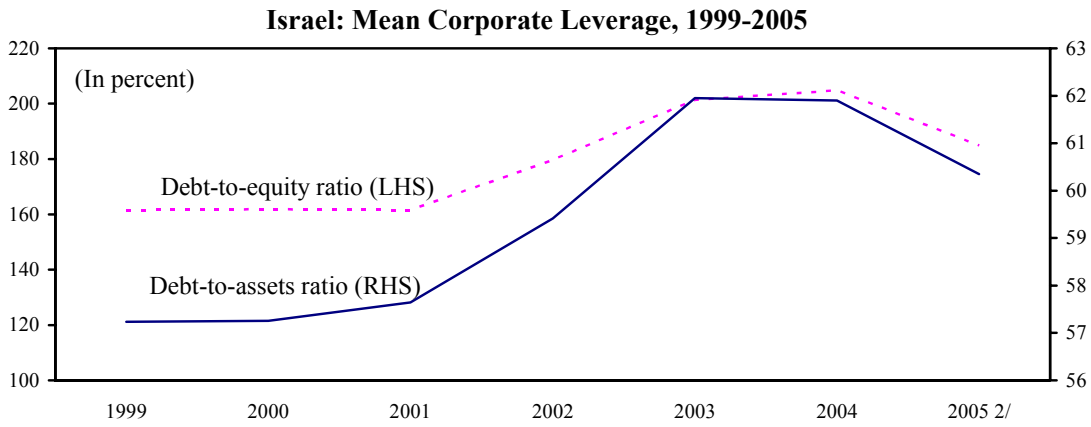
- Weak balance sheets are particularly important for medium-sized firms. Nonetheless, small firms are the most vulnerable to high levels of indebtedness.

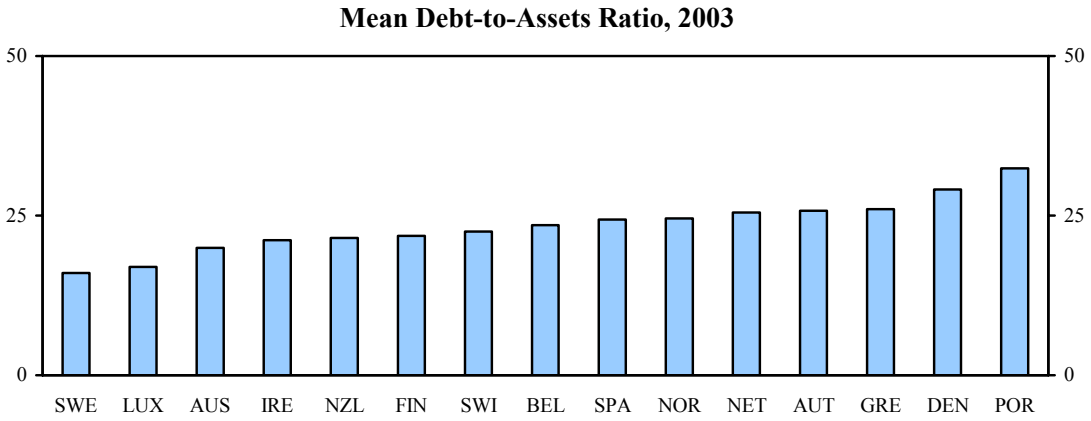
- There is little evidence that weak balance sheets' impact on corporate investment increases during real downturns or following an equity market bust.

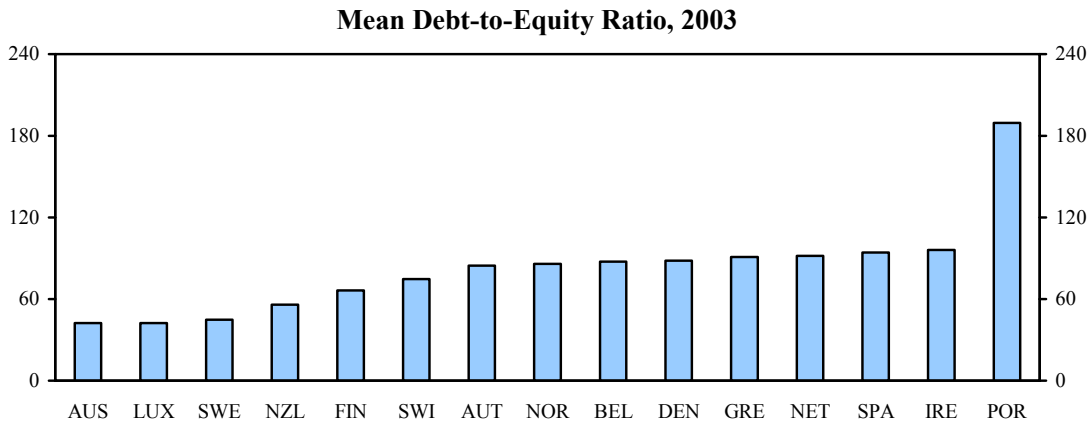
- The impact of financial variables on investment is more pronounced for firms under financial pressure.

The econometric results in this paper imply that business investment should pick up in the short term in line with the recovery in the financial health of the corporate sector. The one exception, however, is building and construction investment, which is expected to lag, given the increasing leverage in the real estate sector.

Figure 1. Corporate Leverage 1/







Sources: Bank of Israel, and Brooks and Ueda (2005).
1/ International data come originally from Thomson Analytics and may not be fully comparable with Israel's data because of differences in definitions and coverage.
2/ As of June 2005.

4. **The rest of the paper is organized as follows**. Section B briefly reviews the literature. Section C describes the model specifications and discusses several econometric issues. Section D discusses the data set and provides a preliminary analysis of the Israeli corporate sector. Section E presents the empirical results. Section F analyzes Israel's short-term prospects for investment, and Section G concludes.

B. Literature

5. **A large body of literature has emerged to explain the impact of corporate balance sheets on investment**. Modigliani and Miller (1958) show that, under certain assumptions, including perfect capital markets, firms should face the same cost for external and internal finance. Therefore, a firm's liquidity and capital structure should not affect its investment decisions. Since this seminal paper, however, an extensive theoretical literature has shown that capital market imperfections can make external financing more expensive than internal financing, due to informational asymmetries, costly monitoring, contract enforcement, and incentives problems.[2] As a result, firms with weak balance sheets may have limited access to external finance. For example, if lenders cannot monitor the risks involved in the investment project they finance, they may use the share of investment financed by internal funds as a signal of the risk of lending. Hence, the financial health of the firm will determine the cost of external funds. A related body of the literature based on the financial accelerator (Bernanke, Gertler, and Gilchrist, 1996) points out that the effects of real or monetary shocks can be amplified by firms with weak balance sheets.

6. **The majority of the empirical literature has found that firms with greater asymmetric information and incentives problems tend to have greater sensitivity of investment to weak balance sheets.** Fazzari, Hubbard, and Petersen (1988) find that cash flow-capital ratios affect investment and interpret these results as evidence supporting financial constraints arising from imperfect capital markets. Several empirical studies have also found linkages between investment and liquidity and leverage measures. For example, Kashyap, Lamont, and Stein (1994) find that liquidity has a positive impact on inventories of U.S. manufacturing firms. Vermeulen (2002) finds the existence of a financial accelerator with different strength across size classes and asymmetric effects over the cycle for a sample of firms in Germany, France, Italy, and Spain. Finally, Aivazian, Ge, and Qiu (2005) show that leverage is negatively related to investment and this effect is significantly stronger for firms with low growth opportunities for a sample of Canadian publicly traded companies.[3]

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[2] See Stein (2001) and Hubbard (1998) for reviews of the theoretical and empirical literature, respectively.

[3] Some studies have found, however, that financial variables are insignificant. For example, Bond and others (2003) show that financial variables are insignificant in Belgium and have small and only weakly significant effects in Germany and France.

C. Empirical Model

7. **We estimate two types of investment equations, an error-correction model and an Euler equation specification**. Although there is an extensive empirical literature on the effects of financial indicators on investment, there is some disagreement on the appropriate testing framework.[4] Therefore, we estimate two different econometric models of investment to test the sensitivity of our empirical findings to the choice of model specification. The error-correction model specifies a target level for the capital stock and allows for a flexible specification of the short-run dynamics. In particular, the reduced-form error-correction model is given by[5]

$$IK_{it} = \alpha + \beta_1 IK_{it-1} + \beta_2 \Delta S_{it} + \beta_3 (k_{it-1} - y_{it-1}) + \beta_4 B_{it-1} + \delta_t + u_i + \varepsilon_{it}, \qquad (1)$$

where i indexes firms, t indexes years. Δ denotes first difference, IK is the investment rate, S is the log of real sales, k is the log of real capital stock, B is a corporate balance sheet measure, u_i are firm-specific fixed effects, δ_t are time effects that control for macroeconomic influences, and ε_{it} is a serially uncorrelated error term. The Euler equation specification is given by[6]

$$IK_{it} = \alpha + \beta_1 IK_{it-1} + \beta_2 SK_{it} + \beta_3 B_{it-1} + \delta_t + u_i + \varepsilon_{it}, \qquad (2)$$

where SK is the ratio of sales to capital.

8. **We use five different corporate balance sheet indicators to measure the financial health of a firm**. The first two indicators, debt-to-assets (DA) and debt-to-equity (DE) ratios, measure the leverage of a firm. The third indicator, short-term debt on current assets ($SDCA$), is an indicator of short-term liquidity. The last two indicators are cash flow-to-assets (CA) and cash-to-capital (CK) ratios. The interpretation of these last variables is ambiguous since they could reflect the presence of financial constraints or future investment opportunities. As in Bond and others (2003), we use both the current and lagged cash-flow variables to see whether they forecast future profitability differently. The higher the debt-to-assets, debt-to-equity, and short-term debt-to-current ratios, the weaker the balance sheet. On the other hand, the higher the cash flow-to-assets and cash-to-capital ratios, the stronger the balance sheet.

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[4] The error-correction model has the advantage that the short-term investment dynamics are derived from an empirical specification search rather than being imposed a priori. The Euler equation has the advantage that the model reflects the impact of current expectations of profitability on current investment. However, the structure of the adjustment cost is too restrictive.

[5] See Bond and others (2003) for a derivation of an error-correction model.

[6] The Euler equation model is a structural model, explicitly derived from a dynamic optimization problem under the assumption of quadratic adjustment costs. For a complete derivation of this model, see Forbes (2003).

9. **We estimate the investment equations using a Generalized Method of Moments (GMM) difference estimator.** The fixed-effects estimator explicitly controls for firm-specific effects. However, even though the within transformation eliminates the u_i s, by construction the transformed-error term ($\varepsilon_{i,t} - \frac{1}{T}\sum_{t=1}^{T}\varepsilon_{i,t}$) is still correlated with the lagged dependent variable. The bias (which influences all variables) is a function of *T*, and only as *T* tends to infinity will the within estimator of β be consistent. In addition, some regressors are endogenous. In order to address these issues, we use a GMM-difference estimator developed by Arellano and Bond (1991). This estimator takes the first difference of each variable to eliminate the firm-specific effects and then uses lagged levels of the variables as instruments. Consistency of estimates depends on the assumption of no serial correlation in $\varepsilon_{i,t}$ and the validity of instruments.[7] We consider two tests suggested by Arellano and Bond (1991) to check the validity of our assumptions. The first test looks at whether the error term is second-order serially correlated. The second test is a Sargan test of overidentifying restrictions, where the null hypothesis is that the instruments are uncorrelated with the residuals. Failure to reject the null hypothesis of both tests gives support to our estimation.

D. Data

10. **Our data come from the Thomson Analytics data set and cover the period 1994-2003**.[8] I include all nonfinancial firms located in Israel that reported any information in the database between 1994 and 2003. Table 1 reports the number of firms in the sample by year and by broad industry group. The number of firms is substantially lower at the beginning of the period, largely because Thomson Analytics is a relatively new data set and coverage has improved only over time. Another caveat is that the Thomson Analytics database only reports information for publicly traded companies. This has the disadvantage that, since many smaller firms are not publicly listed, they are underrepresented in the data.[9] This will most likely impart a downward bias in our results since information asymmetries are more likely to appear among smaller firms for which markets have less information. As a result, if financial conditions are important for traded companies, they will at least be as important for

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[7] If $\varepsilon_{i,t}$ does not display serial correlation there should be evidence of significant first-order correlation in difference residuals ($\varepsilon_{i,t} - \frac{1}{T}\sum_{t=1}^{T}\varepsilon_{i,t}$), but no evidence of second-order correlation in the differenced residuals.

[8] Because of differences in coverage and definitions, these data are not fully comparable to the data reported by Bank of Israel (BOI). For a detailed description of the data set and definitions, see Appendix I.

[9] Because of data availability, many empirical studies estimate investment equations using publicly listed companies only—see, for example, Aivazian, Ge, and Qiu (2005), Bond and others (2003), or Forbes (2003).

nontraded companies. In any case, the results in this paper should be interpreted with caution and only as referring to different-sized, publicly traded companies. Table 2 presents summary statistics of the variables used in the econometric analysis.

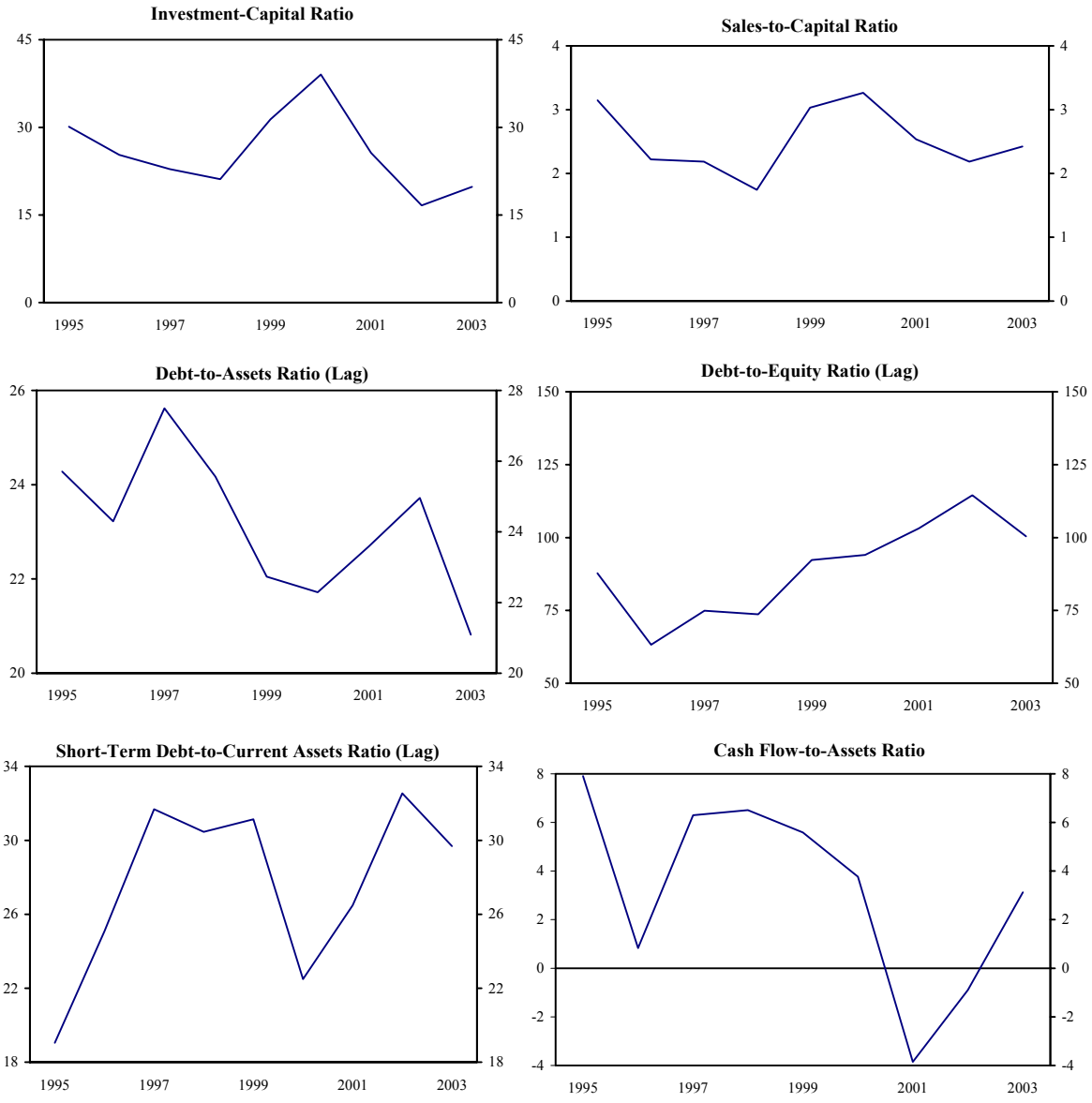
11. **Mean values of balance sheet indicators seem to suggest that the Israeli corporate sector became more vulnerable in the run-up to the 2001-02 recession**. As expected, investment was procyclical (Figure 2). In particular, it increased sharply during the boom of the late 1990s and peaked in 2000, from which point it has declined steadily. In contrast, corporate leverage (particularly, debt to equity) has been on an upward trend since the late 1990s, easing somewhat only recently. Similarly liquidity—measured as the ratio of short-term debt to current assets—deteriorated after the turn of the century. On the other hand, profitability, measured as the ratio of cash flows to assets, began to fall at the end of the 1990s but has since increased as growth resumed following the recession of 2001-02. A comparison across industries reveals that firms in the petroleum, construction, utilities, and leisure industries have the highest leverage and lowest liquidity (Figure 3).[10] Meanwhile, the worst-positioned industries in terms of profitability are the consumer durable goods and services industries.

12. **Balance sheets indicators differ widely by firm size, particularly between large and small firms**. We classify each firm into one of three size categories (small, medium-sized, and large) by pooling firms from all industries and forming three quantiles based on the real value of assets. Figure 4 shows that large firms are more highly levered than medium-sized and small firms for the whole sample period.[11] For example, leverage—defined as debt-to-equity ratio— is 160 percent on average for large firms while it is only 80 percent for medium-sized firms and 48 percent for smaller ones. Moreover, while medium-sized and small firms have shown relatively stable or declining leverage ratios since the end of the 1990s, large firms have continued increasing their leverage at a rapid pace. Interestingly, however, liquidity conditions seem to be similar for large and medium-sized firms, which have increased their ratio of short-term debt to total assets since the late 1990s, in contrast to small firms. The ratio of cash flow to total assets has declined as a result of the economic downturn across the board, but have remained positive for both medium-sized and large firms. Overall, small firms seem have been the hardest hit by the economic slowdown, as illustrated by their negative cash flows and sharp declines in investment.

[10] The exception with respect to liquidity is the construction industry, where liquidity seems to be quite high.

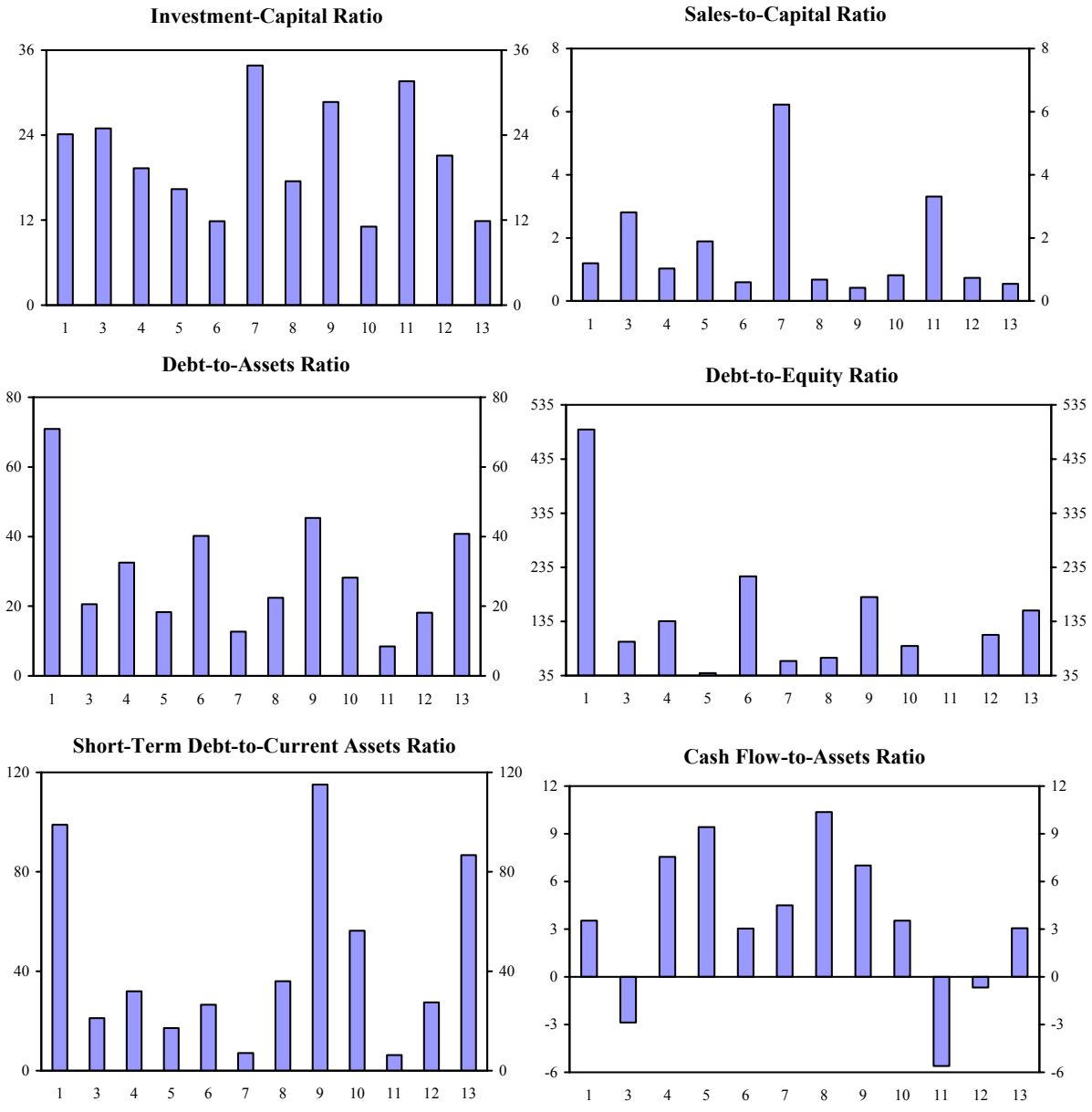
[11] This is consistent with the findings of Shamshtein (2002), who uses a sample of 250 industrial firms registered for trading on the Tel Aviv Securities Exchange and dually listed firms.

Figure 2. Israel: Mean Values by Year, 1995-2003
(In percent)



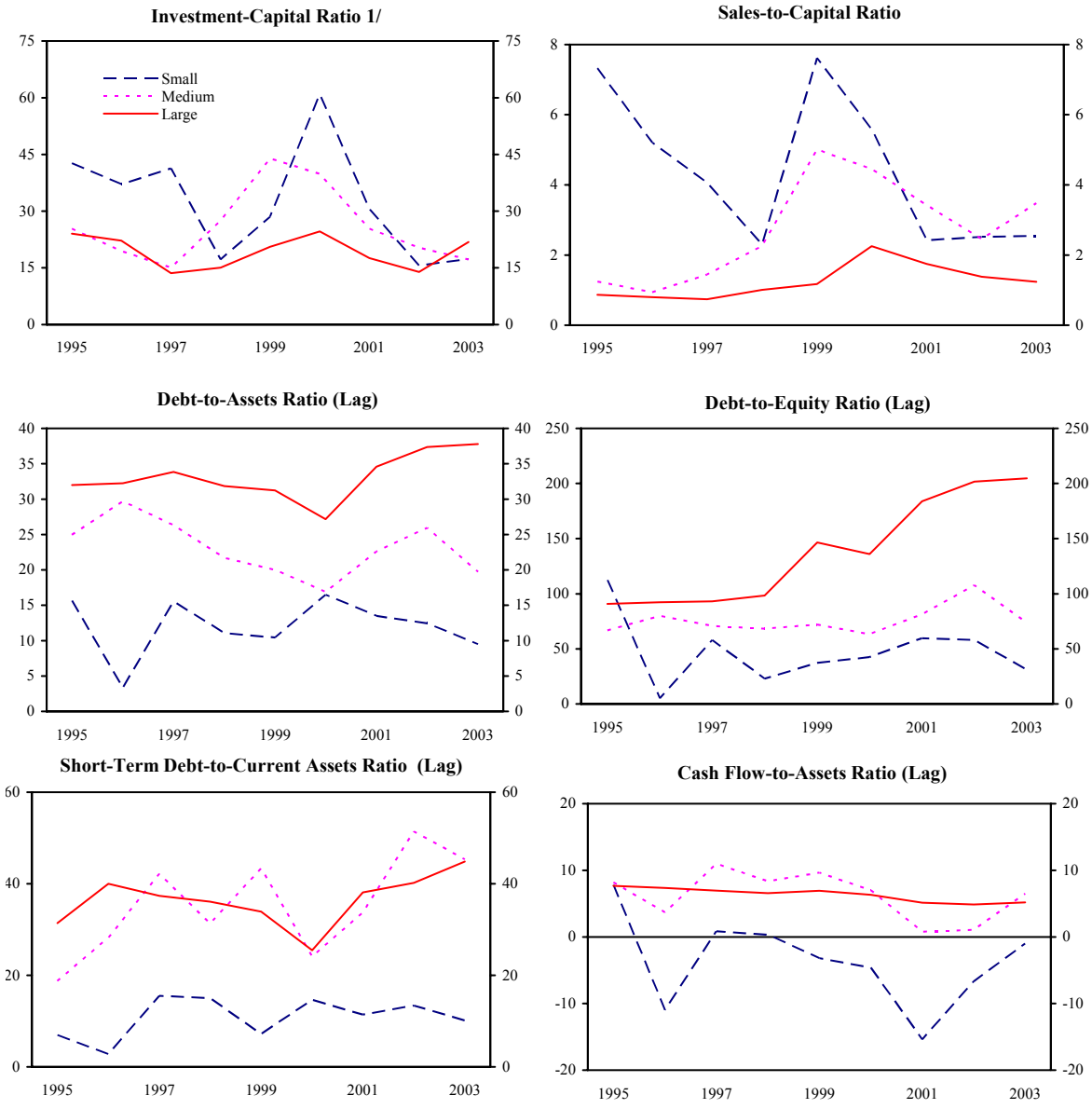
Source: Thomson Analytics.

Figure 3. Israel: Mean Values by Industry, 1995-2003
(In percent)



Source: Thomson Analytics.

Figure 4. Mean Values by Firm Size, 1995-2003
(In percent)



Source: Thomson Analytics.
1/ Legend applies to all panels.

E. Results

Basic specification

13. **In order to estimate the investment equations, we use the GMM-difference estimator developed by Arellano and Bond (1991)**. Tables 3 and 4 report the estimation results of the dynamic investment models described in equations (1) and (2), respectively. We focus on one-stage robust estimates that have been corrected for heteroscedasticity, using a maximum of two lags of each of the explanatory variables as instruments.[12] For all regressions, there is no sign of second-order serial correlation of the first-differenced residuals. Also, the Sargan test accepts the null hypothesis that the overidentifying restrictions are valid.

14. **The estimated coefficients suggest that firms' balance sheet positions affect investment decisions**. The coefficients on all balance sheet variables have the correct sign although not all of the indicators are significant.[13] First, the Euler equation model suggests that higher leverage—measured as the ratio of debt to assets— tends to lower investment rates as predicted by agency models. A one-standard-deviation increase in the debt-to-assets ratio leads to a drop in the investment capital ratio of 0.10 percentage point.[14] Second, the firm's liquidity position—measured as the ratio of short-term debt to current assets—has a statistically significant negative impact on investment in both specifications, though the effect is small. Third, the ratio of current cash to capital has a small positive effect on the investment capital ratio in both specifications. The estimation results do not provide evidence, however, of the sensitivity of investment to cash flows.

Does size matter?

15. **To examine whether balance sheet effects differ across firm size classes we include size dummies in our baseline specifications.** In particular, we interact the balance sheet indicators with dummy variables representing the size of the firm (small, medium-sized or large). A priori, it is expected that small firms show larger balance sheet effects than medium and large firms. The precision of the coefficients is expected to be low, however, since there are only 90 firms on average in our sample. The results of our estimation are presented in Tables 5 and 6.

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[12] Using the full possible instrument matrix adds little explanatory power and weakens the power of the instruments.

[13] The only variable that does not have the expected sign is the lag of the cash-flow-to-assets ratio, which is negative (although insignificant) in the Euler equation model.

[14] The regression coefficient associated with the debt-to-assets ratio is -0.44 (column (1), Table 4). The standard deviation of the debt-to-asset variable is 0.23. Thus, the effect of a one-standard-deviation increase is $-0.44 \times 0.23 = 0.10$.

16. **Balance sheet effects appear to be important for medium-sized firms.** Estimates of the Euler equation model indicate that corporate leverage—measured as debt-to-assets and debt-to-equity ratios—has a significant negative impact on the investment-to-capital ratio. In particular, a one-standard-deviation increase in the debt-to-assets ratio leads to a drop in the investment-capital ratio of 0.2 percentage point, which is much higher than the point estimate presented in the baseline specification.[15] The debt-to-equity ratio has a much smaller effect. The ratio of short-term debt-to-current assets has a negative impact on investment, while the current cash-to-capital ratio has a positive impact in both specifications. These estimates are larger than in the baseline, although small.

17. **The results are less clear for small and large firms**. For both these size classes, there is no evidence that the short-term debt-to-current assets ratio has any effect. For small firms, only the ratio of debt to assets has a negative impact on investment. This effect is larger than for medium-sized firms. In particular, a one-standard-deviation increase in the debt-to-assets ratio of small firms leads to a decline in the investment-capital ratio of 0.25 percentage point.[16] Estimates for large firms provide some evidence of investment-cash flow sensitivities: a one-standard-deviation increase in the cash-flow-to-assets ratio of large firms leads to an increase in the investment rate of 0.28 percentage point.[17] The interpretation of this result is ambiguous since the cash-flow variable could reflect the presence of financial constraints or just be a proxy for future investment opportunities. Estimates of the error-correction model also show that the cash-to-capital ratio of large firms has a positive effect on investment that is smaller than that for medium-sized firms.

Asymmetric balance sheet effects

18. **To test for the presence of asymmetric balance sheet effects over the cycle, we consider two types of downturns: real sector downturns and stock market busts.** Following Ruiz-Arranz (2003) and Vermeulen (2002), we consider there is a real downturn in year *t* if industrial production growth at time *t* is negative. As shown in the figure below, Israel experienced a slowdown in industrial production from 2001 to 2003. To identify equity price busts, we look at the Israeli stock market TA100 index and construct a dummy that takes on the value of 1 during stock price declines (periods of negative growth of the stock market index). According to this measure, Israel experienced equity market downturns in 1994, 2001, and 2002. We test for the presence of the financial accelerator by modifying

[15] The regression coefficient associated with the debt-to-assets-ratio is -0.88 (column (1), Table 6). The standard deviation of the debt-to-asset variable is 0.25.

[16] The regression coefficient associated with the debt-to-assets-ratio is -0.93 (column (1), Table 6). The standard deviation of the debt-to-asset variable is 0.26.

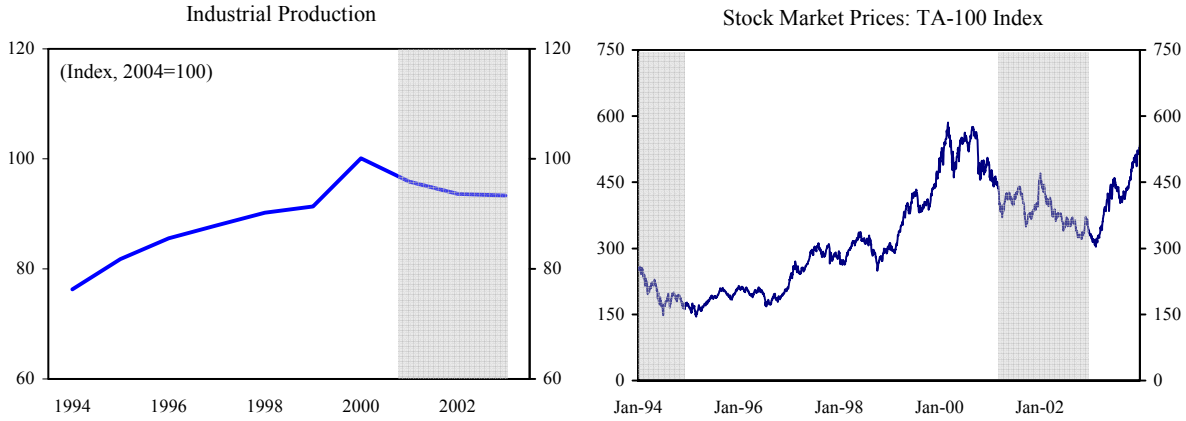
[17] The regression coefficient associated with the cash flow-to-assets ratio is 0.73 (column (4), Table 5). The standard deviation of the debt-to-assets variable is 0.38.

equations (1) and (2) and allowing a different parameter on the balance sheet indicator during a downturn. The regression equations become

$$IK_{it} = \alpha + \beta_1 IK_{it-1} + \beta_2 \Delta S + \beta_3 (k_{it-1} - y_{it-1}) + (\theta_1 + \theta_2 R_t) B_{it-1} + \delta_t + u_i + \varepsilon_{it} \qquad (1')$$

$$IK_{it} = \alpha + \beta_1 IK_{it-1} + \beta_2 SK + (\theta_1 + \theta_2 R_t) B_{it-1} + \delta_t + u_i + \varepsilon_{it}, \qquad (2')$$

where R_t is a dummy variable which indicates whether there is a downturn at time *t*. The coefficient θ_2 measures the existence of a financial accelerator in Israel.



19. **For most indicators, there is no evidence that balance sheet effects are stronger during real downturns.** Tables 7 and 8 indicate that leverage and liquidity do not have an additional impact on investment during downturns. In fact, the debt-to-equity ratio has the wrong sign during periods of economic weakness in the Euler equation specification. The short-term debt-to-current assets, current cash-flow-to-assets and current cash-to-capital ratios also have the wrong sign in the error-correction model.[18] However, the lagged cash-flow-to-assets ratio has a positive impact on investment during downturns, as predicted. Specifically, a one-standard-deviation decrease of the lagged cash flow-to-assets leads to an investment contraction of between 0.01 and 0.12 percentage point.[19] Likewise, the lagged ratio of cash to capital has a positive impact on investment during downturns, although the effect is very small.

[18] A possible explanation for the negative effect of CA_t on investment during periods of economic contraction is that cash flows contain less information about future profitability during downturns.

[19] In the error-correction model, the estimated coefficients of the CA_{t-1} are -0.78 outside downturns and 1.08 during downturns. The corresponding standard errors are 0.21 and 0.27, respectively. The estimated coefficients of the CA_{t-1} in the Euler equation model are -0.95 outside downturns and 1.00 during downturns (standard errors of 0.44 and 0.43, respectively).

20. **Similarly, firms' investment is not more sensitive to weak balance sheets during stock market busts.** As in the case of real sector downturns, leverage and liquidity do not have an additional impact on investment during downturns, while the current cash-flow-to-assets ratio has the wrong sign in one of the specifications. However, the lagged cash-flow-to-assets ratio has a positive impact on investment during downturns, as predicted by the theory, although the overall effect is small or even negative when taking into account the impact of cash flows outside equity market downturns.

Threshold effects

21. **We now analyze whether balance sheet effects become more intense when financial tightness exceeds a certain threshold.** In each regression, we test whether the companies facing high financial pressure—that is, those firms in the upper decile (or quartile) of the distribution defined in terms of the corresponding financial indicator—are more sensitive to their financial conditions. More precisely, we estimate the following specifications:

$$IK_{it} = \alpha + \beta_1 IK_{it-1} + \beta_2 \Delta S + \beta_3 \left(k_{it-1} - y_{it-1}\right) + \gamma_1 B_{it-1} D^B_{0-75} + \gamma_2 B_{it-1} D^B_{75-90} + \gamma_1 B_{it-1} D^B_{90-100} + \delta_t + u_i + \varepsilon_{it} \quad (1'')$$

$$IK_{it} = \alpha + \beta_1 IK_{it-1} + \beta_2 SK + \gamma_1 B_{it-1} D^B_{0-75} + \gamma_2 B_{it-1} D^B_{75-90} + \gamma_1 B_{it-1} D^B_{90-100} + \delta_t + u_i + \varepsilon_{it}, \quad (2'')$$

where D^B_{0-75}, D^B_{75-90}, and D^B_{90-100} are dummy variables for observations below the 75th percentile, between the 75th and 90 percentiles, and above the 90th percentile, respectively, of the distribution defined in terms of the balance sheet indicator *B*. When a corporate profitability measure—either *CA* or *CK*— is used as financial indicator, we replace these dummies by D^B_{0-10}, D^B_{10-25}, and D^B_{25-100}, which are dummy variables for observations below the 10th percentile, between the 10th and 25th percentile, and above the 25th percentile. In these cases, the lower the percentile, the lower the profitability, and the higher degree of financial tightness.

22. **The results suggest that the impact of financial variables on investment is more pronounced for firms with higher financial pressure.** Tables 11 and 12 report the results obtained for investment when threshold effects are considered. As can be seen, leverage—measured as the debt-to-assets ratio—has a negative impact for the firms between the 75th and 90th percentile in both specifications and a negative, though smaller effect, on firms in the upper decile.[20] As for the ratio of cash flow to total assets, we find a positive and

[20] The coefficient of the debt-to-assets ratio is significant for firms in the 90th–100th decile only in the Euler equation specification.

significant estimate for firms below the 10th percentile and between the 10th and 25th percentiles. However, cash-flow sensitivities are much stronger for firms in middle than those in the lower decile: a one-standard-deviation reduction in the cash flow-to-assets ratio decreases the investment-capital ratio by 0.6-0.7 percentage point for firms in the 10th-to-25th percentile but only by 0.08 percentage point for firms in the lower decile.[21] Furthermore, the lag of the cash flow-to-assets variable has a positive and significant impact only for firms in the middle decile of the distribution. Cash flow has a negative effect on investment for firms in the upper decile, probably indicating smaller investment opportunities for firms in this decile. Finally, a positive impact of the cash-to-capital ratio is found only for firms that are in the upper tail of the distribution.

F. Investment Outlook

23. **Recent data show an improvement in the financial health of the corporate sector, with the exception of real estate.[22]** Against the background of the ongoing economic recovery, the robustness of the corporate sector improved during 2004-05: leverage and the associated credit burden declined, profitability recovered to prerecession levels, and liquidity increased (Figure 5).[23] However, there are great disparities among sectors. In particular, the real estate sector still shows a large degree of vulnerability: (i) the leverage ratio has continued its upward trend and remains very high; (ii) the credit burden, although decreasing, is significantly higher than in the manufacturing and the trade and services sectors; and (iii) the current ratio is still lower than one, indicating liquidity shortages.

24. **The econometric results in this paper suggest that business investment should pick up in the short term in line with the recovery in the corporate sector's financial strength**. Data from the Bank of Israel indicate that the debt-to-assets ratio declined by about 2.5 percent during the first half of 2005. Using the regression coefficients from the main analysis (Table 4), the observed decline in the debt-to-assets ratio is estimated to increase the investment-capital ratio by around 1 percent in the first half of 2006.[24] However, the

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[21] The estimated coefficient of the CA_{t-1} in the error-correction model is 1.06 (standard error 0.6) for firms in the 10th to 25th percentile. The estimated coefficients of the CA_{t-1} in the Euler equation model are 1.36 (standard error 0.6) for firms in the 10th to 25th percentile and 0.4 (standard error 0.2) for firms in the lower decile.

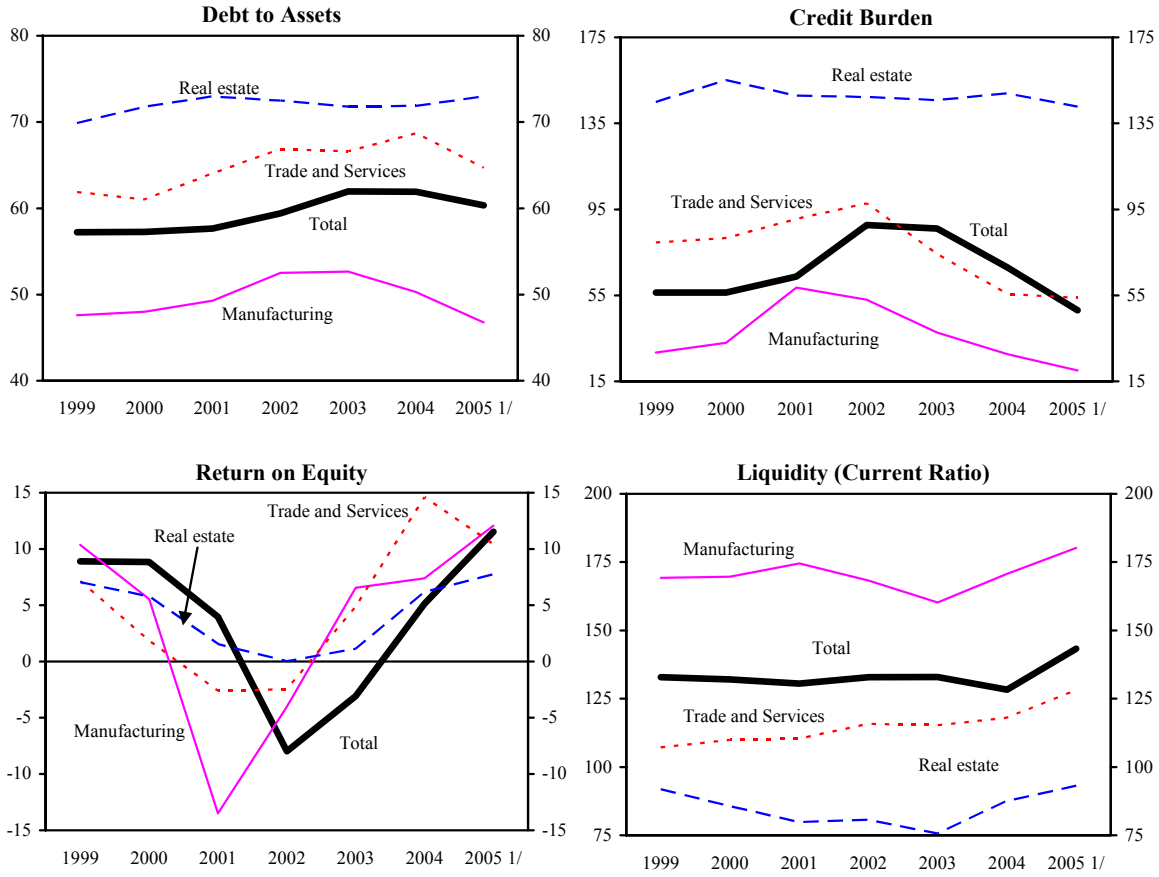
[22] The data for this section come from the Bank of Israel and cover only publicly traded companies.

[23] Credit burden is defined as the ratio of repayments of principal and interest on short- and long-term credit (excluding suppliers' credit), assuming repayments over 10 years, to operating profit. Liquidity, measured as the current ratio, is defined as the ratio of assets to liabilities up to one year.

[24] This estimate should be interpreted with caution, given that our econometric analysis is based on a small sample of publicly traded companies.

increasing leverage in the real estate sector has most likely dampened building and construction investment and could impede its recovery in the near future.[25]

Figure 5. Israel: Financial Strength of the Business Sector, 1999-2005
(Ratios in percent)



Source: Bank of Israel.
1/ As of June 2005.

[25] In fact, building and construction declined by about 4 percent during the first three quarters of 2005. In contrast, investment in transport, machinery, and equipment increased by about 7 percent during the same period.

G. Conclusions

25. **This paper has aimed to assess the impact of several indicators of financial health on investment in Israel using corporate-level panel data for the period 1994–2003.** Within the general topic of the relationship between financial conditions and investment, we have addressed four issues: first, we assess the relative importance of different financial variables in explaining firms' investment decisions; second, we analyze whether balance sheet effects vary by firm size; third, we test for the presence of a financial accelerator; and, finally, we study the existence of threshold effects.

26. **Our results suggest that weak balance sheets may well have contributed to the investment decline of recent years.** Several financial indicators turn out to be significant in the estimated equations. In particular, leverage, measured as the debt-to-assets ratio, has a large negative effect on investment in the Euler equation specification. Small firms are in fact the most vulnerable to high levels of indebtedness. Liquidity and corporate profitability indicators have also an impact, although small. With regard to asymmetric balance sheet effects, the evidence suggest that firms are equally affected by different financial indicators during and outside real/financial-market downturns. Finally, those firms facing a higher degree of financial pressure, which we identify as firms in the upper decile of the cross-sectional distribution of firms defined in terms of alternative financial indicators, have substantially lower investment.

27. **Going forward, business investment is expected to pick up in line with the improvement in the financial strength of the corporate sector.** One exception, however, is building and construction investment, which is expected to remain subdued, given the increasing leverage in the real estate sector.

Table 1. Sample Information for Israeli firms

Industry	Number of firms 1/	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
1	Petroleum industry	0	0	0	0	0	0	1	1	3	3
2	Finance/real estate	0	0	0	0	0	0	0	0	0	0
3	Consumer durable industry	4	3	2	2	4	5	9	19	22	27
4	Basic industry	6	6	5	5	6	7	7	7	7	8
5	Food/tobacco industry	1	1	1	1	3	3	3	4	5	6
6	Construction industry	2	1	1	2	1	1	4	4	4	4
7	Capital goods industry	1	2	2	4	3	4	9	10	15	17
8	Transportation industry	1	1	1	1	1	1	1	1	3	2
9	Utilities industry	1	1	1	2	2	2	3	4	3	4
10	Textiles/trade industry	1	1	1	1	1	1	2	4	5	5
11	Services industry	1	1	1	1	3	7	8	17	20	20
12	Other services	1	1	1	1	1	1	1	2	2	4
13	Leisure industry	2	2	2	2	3	2	2	2	2	2
	Total	21	20	18	22	28	34	50	75	91	102

Notes:

1/ SIC industry definitions are based on two-digit SIC groups defined in Campbell (1996). More speficically, SIC codes for each group: Petroleum (13, 29);Finance/real estate (60-69); Consumer durables (25, 30, 36-37, 50, 55, 57); Basic (8, 10, 12, 14, 24, 26, 28, 33, 39); Food/tobacco (1, 2, 9, 20, 21, 54); Construction (15-17, 32, 52); Capital goods (34-35, 38); Transportation (40-42, 44, 45, 47); Utilities (46, 48, 49); Textiles/trade (22-23, 31, 51, 53, 56, 59); Services (72-73), 75, 80, 82, 89); Other services (43, 76, 83, 84, 86, 87, 92, 95, 96, 99); and Leisure (27, 58, 70, 78-79).

Table 2. Summary Statistics

	Mean	Median	Std. Dev.	Min	Max
IK: Investment to capital ratio	24.5	15.9	28.2	0.6	198.8
ΔS: Real sales growth	0.1	0.0	0.4	-3.5	2.1
k-y: Capital minus sales	-0.9	-0.9	1.2	-3.7	2.3
SK: Sales to capital ratio	2.5	1.4	3.9	0.0	29.5
DA: Total debt to total assets	22.7	20.7	19.7	0.0	76.2
DE: Debt to equity	95.5	46.3	141.9	0.0	827.1
SDCA: Short-term debt to current assets	28.2	14.2	52.6	0.0	627.2
CA: Cash Flow to total assets	2.1	4.6	15.5	-88.5	72.4
CK: Cash to capital ratio	379.1	48.0	941.1	0.1	11786.0

Source: Thomson Analytics.

Table 3. Balance Sheet Indicators and the Investment-Capital Ratio (Error-correction Model) 1/

	(1)	(2)	(3)	(4)	(5)
IK_{t-1}	0.02	0.02	0.02	0.01	0.02
	(0.47)	(0.49)	(0.40)	(0.29)	(0.42)
ΔS_t	18.51	18.52	18.47	13.40	14.13
	(3.03)**	(2.99)**	(2.98)**	(2.11)*	(2.60)**
$(k-y)_{t-1}$	-33.39	-33.43	-33.49	-29.50	-23.28
	(4.59)**	(4.56)**	(4.58)**	(3.64)**	(4.04)**
DA_{t-1}	-0.18	...	...	...	...
	(1.07)	...	...	...	...
DE_{t-1}	...	-0.01	...	...	...
	...	(0.70)	...	...	...
$SDCA_{t-1}$	...	...	-0.03	...	...
	...	...	(1.85)+	...	...
CA_t	...	...	...	0.43	...
	...	...	...	(1.62)	...
CA_{t-1}	...	...	...	0.00	...
	...	...	...	(0.01)	...
CK_t	...	...	...	...	0.01
	...	...	...	...	(4.96)**
CK_{t-1}	...	...	...	...	0.00
	...	...	...	...	(0.35)
Observations	332	331	323	331	332
Number of firms	91	90	89	91	91
Sargan test[2/]	19.62	18.79	18.66	18.72	19.84
	(0.35)	(0.40)	(0.41)	(0.41)	(0.34)
Serial correlation[3/]	1.10	1.05	1.10	1.21	0.54
	(0.27)	(0.29)	(0.27)	(0.23)	(0.59)

Notes:
Robust z statistics in parentheses.
+ significant at 10%; * significant at 5%; **significant at 1%.
1/ Dependent variable is IK_{t-1}. All regressions include a constant and time dummies.
2/ Sargan test is the χ^2 statistics of a test of the null hypothesis that the overidentifying restrictions are valid. Statistics are based on two-step estimator. P-values are reported in parentheses.
3/ Serial correlation is the Z-statistic from a test of the null hypothesis of no second-order serial correlation in the residuals. P-values are reported in parentheses.

Table 4. Balance Sheet Indicators and the Investment-Capital Ratio (Euler Equation Model) 1/

	(1)	(2)	(3)	(4)	(5)
IK_{t-1}	0.00	0.02	0.02	0.02	0.04
	(0.09)	(0.41)	(0.45)	(0.40)	(0.52)
SK_t	8.17	8.04	7.99	8.21	6.09
	(5.65)**	(5.37)**	(5.17)**	(4.37)**	(3.70)**
DA_{t-1}	-0.44	...	...	...	...
	(1.89)+	...	...	...	...
DE_{t-1}	...	-0.02	...	...	...
	...	(0.59)	...	...	...
$SDCA_{t-1}$	...	...	-0.05	...	...
	...	...	(3.05)**	...	...
CA_t	...	...	...	0.12	
	...	...	...	(0.64)	
CA_{t-1}	...	...	...	-0.17	
	...	...	...	(0.75)	
CK_t	...	...	...	...	0.01
	...	...	...	...	(2.16)*
CK_{t-1}	...	...	...	...	0.00
	...	...	...	...	(0.42)
Observations	272	271	270	269	273
Number of firms	86	85	85	85	87
Sargan test[2/]	21.01	19.71	22.81	24.03	21.57
	(0.28)	(0.35)	(0.20)	(0.15)	(0.25)
Serial correlation[3/]	0.70	0.50	0.76	0.64	0.55
	(0.49)	(0.62)	(0.45)	(0.52)	(0.59)

Notes:
Robust z statistics in parentheses.
+ significant at 10%; * significant at 5%; **significant at 1%.
1/ Dependent variable is IK_{t-1}. All regressions include a constant and time dummies.
2/ Sargan test is the χ^2 statistics of a test of the null hypothesis that the overidentifying restrictions are valid. Statistics are based on two-step estimator. P-values are reported in parentheses.
3/ Serial correlation is the Z-statistic from a test of the null hypothesis of no second-order serial correlation in the residuals. P-values are reported in parentheses.

Table 5. Balance Sheet Indicators and the Investment-Capital Ratio, controlling for Size (Error-correction Model) 1/

	(1)	(2)	(3)	(4)	(5)
IK_{t-1}	0.02	0.02	0.01	0.03	0.02
	(0.44)	(0.49)	(0.29)	(0.75)	(0.43)
ΔSt	18.84	18.24	18.63	15.43	12.39
	(3.07)**	(2.98)**	(3.04)**	(2.46)*	(2.13)*
$(k-y)_{t-1}$	-33.62	-33.14	-33.53	-31.21	-21.90
	(4.61)**	(4.47)**	(4.60)**	(3.83)**	(4.11)**
DA_{t-1}* Small	-0.33	...	...	...	...
	(1.24)	...	...	...	...
DA_{t-1}* Medium	-0.38	...	...	...	...
	(1.64)	...	...	...	...
DA_{t-1}* Large	0.59	...	...	...	...
	(1.14)	...	...	...	...
DE_{t-1}* Small	...	0.00	...	...	...
	...	(0.23)	...	...	...
DE_{t-1}* Medium	...	-0.03	...	...	...
	...	(1.07)	...	...	...
DE_{t-1}* Large	...	0.02	...	...	...
	...	(0.37)		...	...
$SDCA_{t-1}$* Small	...	...	-0.23	...	...
	...	...	(1.28)	...	...
$SDCA_{t-1}$* Medium	...	...	-0.04	...	...
	...	...	(1.71)+	...	...
$SDCA_{t-1}$* Large	...	...	0.24	...	...
	...	...	(1.10)	...	...
CA_t* Small	...	...	...	0.31	...
	...	...	...	(1.11)	...
CA_t* Medium	...	...	...	0.05	...
	...	...	...	(0.13)	...
CA_t* Large	...	...	...	0.73	...
	...	...	...	(1.92)+	...
CA_{t-1}* Small	...	...	...	-0.28	...
	...	...	...	(0.94)	...
CA_{t-1}* Medium	...	...	...	-0.07	...
	...	...	...	(0.33)	...
CA_{t-1}* Large	...	...	...	-0.32	...
	...	...	...	(0.78)	...
CK_t* Small	...	...	...	...	0.02
	...	...	...	...	(1.47)
CK_t* Medium	...	...	...	...	0.01
	...	...	...	...	(4.49)**
CK_t* Large	...	...	...	...	0.01
	...	...	...	...	(2.51)*

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Table 5. Balance Sheet Indicators and the Investment-Capital Ratio, controlling for Size (Error Correction Model) 1/
(continued)

	(1)	(2)	(3)	(4)	(5)
CK_{t-1}* Small	...	...	...	...	0.00
	...	...	...	...	(0.11)
CK_{t-1}* Medium	...	...	...	...	0.00
	...	...	...	...	(0.82)
CK_{t-1}* Large	...	...	...	...	0.00
	...	...	...	...	(0.41)
Observations	332	331	323	331	332
Number of firms	91	90	89	91	91
Sargan test[2/]	16.58	18.15	18.74	16.85	26.74
	(0.55)	(0.45)	(0.41)	(0.53)	(0.08)
Serial correlation[3/]	1.13	1.21	0.94	1.28	0.35
	(0.26)	(0.23)	(0.35)	(0.20)	(0.73)

Notes:
Robust z statistics in parentheses.
+ significant at 10%; * significant at 5%; **significant at 1%.
1/ Dependent variable is IK_{t-1}. All regressions include a constant and time dummies.
2/ Sargan test is the χ^2 statistics of a test of the null hypothesis that the overidentifying restrictions are valid. Statistics are based on two-step estimator. P-values are reported in parentheses.
3/ Serial correlation is the Z-statistic from a test of the null hypothesis of no second-order serial correlation in the residuals. P-values are reported in parentheses.

Table 6. Balance Sheet Indicators and the Investment-Capital Ratio, controlling for Size (Euler Equation) 1/

	(1)	(2)	(3)	(4)	(5)
IK_{t-1}	0.04	0.02	0.03	0.05	0.03
	(0.92)	(0.51)	(0.68)	(1.08)	(0.75)
SK_t	8.54	8.00	7.99	8.49	6.41
	(5.98)**	(5.34)**	(5.26)**	(5.01)**	(3.80)**
DA_{t-1}* Small	-0.93	...	...	...	...
	(3.53)**	...	...	...	...
DA_{t-1}* Medium	-0.80	...	...	...	...
	(3.25)**	...	...	...	...
DA_{t-1}* Large	0.46	...	...	...	...
	-0.96	...	...	...	...
DE_{t-1}* Small	...	-0.02	...	...	...
	...	(0.36)	...	...	...
DE_{t-1}* Medium	...	-0.05	...	...	...
	...	(1.78)+	...	...	...
DE_{t-1}* Large	...	0.03	...	...	...
	...	(0.52)	...	...	...
$SDCA_{t-1}$* Small	...	...	-0.05	...	...
	...	...	(0.22)	...	...
$SDCA_{t-1}$* Medium	...	...	-0.07	...	...
	...	...	(3.21)**	...	...
$SDCA_{t-1}$* Large	...	...	0.22	...	...
	...	...	(1.04)	...	...

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Table 6. Balance Sheet Indicators and the Investment Capital Ratio, controlling for Size (Euler Equation)1/
(continued)

	(1)	(2)	(3)	(4)	(5)
CA_t* Small	...	...	...	0.09	...
	...	...	...	(0.54)	...
CA_t* Medium	...	...	...	-0.22	...
	...	...	...	(0.66)	...
CA_t* Large	...	...	...	0.69	...
	...	...	...	(1.30)	...
CA_{t-1}* Small	...	...	...	-0.50	...
	...	...	...	(1.31)	...
CA_{t-1}* Medium	...	...	...	0.25	...
	...	...	...	(1.05)	...
CA_{t-1}* Large	...	...	...	0.07	...
	...	...	...	(0.18)	...
CK_t* Small	...	...	...	...	-0.001
	...	...	...	...	(0.120)
CK_t* Medium	...	...	...	...	0.007
	...	...	...	...	(2.10)*
CK_t* Large	...	...	...	...	0.004
	...	...	...	...	(1.52)
CK_{t-1}* Small	...	...	...	...	0.01
	...	...	...	...	(1.87)
CK_{t-1}* Medium	...	...	...	...	-0.002
	...	...	...	...	(1.73)
CK_{t-1}* Large	...	...	...	...	0.00
	...	...	...	...	(0.62)
Observations	272	271	270	269	273
Number of firms	86	85	85	85	87
Sargan test[2/]	17.89	20.30	21.38	19.30	20.54
	(0.46)	(0.32)	(0.26)	(0.37)	(0.30)
Serial correlation[3/]	1.08	0.97	0.86	0.56	0.59
	(0.28)	(0.33)	(0.39)	(0.58)	(0.56)

Notes:
Robust z statistics in parentheses.
+ significant at 10%; * significant at 5%; **significant at 1%.
1/ Dependent variable is IK_{t-1}. All regressions include a constant and time dummies.
2/ Sargan test is the χ^2 statistics of a test of the null hypothesis that the overidentifying restrictions are valid. Statistics are based on two-step estimator. P-values are reported in parentheses.
3/ Serial correlation is the Z-statistic from a test of the null hypothesis of no second-order serial correlation in the residuals. P-values are reported in parentheses.

Table 7. Asymmetric Effects over Real Sector Downturns (Error-correction Model) 1/

	(1)	(2)	(3)	(4)	(5)
IK_{t-1}	0.02	0.02	0.02	0.04	-0.01
	(0.39)	(0.47)	(0.35)	(0.85)	(0.09)
ΔS_t	17.93	18.44	18.22	15.91	14.39
	(2.95)**	(2.98)**	(2.95)**	(2.85)**	(2.65)**
$(k-y)_{t-1}$	-32.94	-33.17	-33.28	-32.52	-23.64
	(4.60)**	(4.58)**	(4.59)**	(4.36)**	(4.27)**
DA_{t-1}	-0.30	...	...	...	...
	(1.53)	...	...	...	...
$DA_{t-1}* R_t$	0.23	...	...	...	...
	(1.49)	...	...	...	...
DE_{t-1}	...	-0.03	...	...	...
	...	(1.23)	...	...	...
$DE_{t-1}*R_t$	...	0.02	...	...	...
	...	(1.57)	...	...	...
$SDCA_{t-1}$	...	...	-0.07	...	...
	...	...	(2.09)*	...	...
$SDCA_{t-1}*R_t$	...	...	0.06	...	...
	...	...	(1.65)+	...	...
CA_t	...	...	...	0.63	...
	...	...	...	(3.66)**	...
CA_t*R_t	...	...	...	-0.47	...
	...	...	...	(1.86)+	...
CA_{t-1}	...	...	...	-0.78	...
	...	...	...	(3.63)**	...
$CA_{t-1}*R_t$	...	...	...	1.08	...
	...	...	...	(4.04)**	...
CK_t	...	...	...	...	0.011
	...	...	...	...	(4.68)**
CK_t*R_t	...	...	...	...	-0.010
	...	...	...	...	(2.25)*
CK_{t-1}	...	...	...	...	0.00
	...	...	...	...	(0.39)
$CK_{t-1}*R_t$	...	...	...	...	0.01
	...	...	...	...	(1.69)+
Observations	332	331	323	331	332
Number of firms	91	90	89	91	91
Sargan test[2/]	18.70	18.63	18.84	17.11	17.87
	(0.41)	(0.42)	(0.40)	(0.52)	(0.46)
Serial correlation[3/]	1.11	1.12	1.09	1.02	0.44
	(0.26)	(0.26)	(0.28)	(0.31)	(0.66)

Notes:
Robust z statistics in parentheses.+ significant at 10%; * significant at 5%; **significant at 1%.
1/ Real sector downturns are defined as periods of negative industrial production growth. Dependent variable is IK_{t-1}. All regressions include a constant and time dummies.

2/ Sargan test is the χ^2 statistics of a test of the null hypothesis that the overidentifying restrictions are valid. Statistics are based on two-step estimator. P-values are reported in parentheses.
3/ Serial correlation is the Z-statistic from a test of the null hypothesis of no second-order serial correlation in the residuals. P-values are reported in parentheses.

Table 8. Asymmetric Effects over Real Sector Downturns (Euler Equation Model) 1/

	(1)	(2)	(3)	(4)	(5)
IK_{t-1}	0.00	0.01	0.02	0.06	0.02
	(0.02)	(0.32)	(0.40)	(1.27)	(0.27)
SK_t	8.10	8.13	7.97	9.03	5.85
	(5.78)**	(5.78)**	(5.17)**	(5.01)**	(3.47)**
DA_{t-1}	-0.58	...	...	...	...
	(2.26)*	...	...	...	...
$DA_{t-1}* R_t$	0.23	...	...	...	...
	(1.24)	...	...	...	...
DE_{t-1}	...	-0.05	...	...	...
	...	(1.60)	...	...	...
$DE_{t-1}*R_t$	...	0.05	...	...	...
	...	(1.84)+	...	...	...
$SDCA_{t-1}$	...	...	-0.07	...	...
	...	...	(2.30)*	...	...
$SDCA_{t-1}*R_t$	...	...	0.03	...	...
	...	...	(0.76)	...	...
CA_t	...	...	...	-0.02	...
	...	...	...	(0.09)	...
CA_t*R_t	...	...	...	0.04	...
	...	...	...	(0.17)	...
CA_{t-1}	...	...	...	-0.95	...
	...	...	...	(2.16)*	...
$CA_{t-1}*R_t$	...	...	...	1.00	...
	...	...	...	(2.30)*	...
CK_t	...	...	...	...	0.01
	...	...	...	...	(2.43)*
CK_t*R_t	...	...	...	...	-0.01
	...	...	...	...	(1.13)
CK_{t-1}	...	...	...	...	0.00
	...	...	...	...	(0.28)
$CK_{t-1}*R_t$	...	...	...	...	0.004
	...	...	...	...	(2.05)*
Observations	272	271	270	269	273
Number of firms	86	85	85	85	87
Sargan test[2/]	20.91	19.72	22.84	21.12	22.35
	(0.28)	(0.35)	(0.20)	(0.27)	(0.22)
Serial correlation[3/]	0.69	0.53	0.76	0.46	0.60
	(0.49)	(0.60)	(0.45)	(0.65)	(0.55)

Notes:
Robust z statistics in parentheses.+ significant at 10%; * significant at 5%; **significant at 1%.
1/ Real sector downturns are defined as periods of negative industrial production growth. Dependent variable is IK_{t-1}. All regressions include a constant and time dummies.

2/ Sargan test is the χ^2 statistics of a test of the null hypothesis that the overidentifying restrictions are valid. Statistics are based on two-step estimator. P-values are reported in parentheses.
3/ Serial correlation is the Z-statistic from a test of the null hypothesis of no second-order serial correlation in the residuals. P-values are reported in parentheses.

Table 9. Asymmetric Effects over Equity Price Cycle (Error-correction Model) 1/

	(1)	(2)	(3)	(4)	(5)
IK_{t-1}	0.02	0.02	0.02	0.05	-0.01
	(0.46)	(0.49)	(0.40)	(1.24)	(0.12)
ΔS_t	18.59	18.38	18.43	16.53	14.81
	(2.97)**	(2.96)**	(2.97)**	(2.79)**	(2.71)**
$(k-y)_{t-1}$	-33.44	-33.43	-33.47	-33.31	-23.19
	(4.58)**	(4.57)**	(4.58)**	(4.42)**	(4.17)**
DA_{t-1}	-0.18	...	...	...	...
	(0.95)	...	...	...	...
$DA_{t-1}* R_t$	-0.01	...	...	...	...
	(0.11)	...	...	...	...
DE_{t-1}	...	-0.01	...	...	...
	...	(0.77)	...	...	...
$DE_{t-1}*R_t$	...	0.01	...	...	...
	...	(0.56)	...	...	...
$SDCA_{t-1}$	...	...	-0.03	...	...
	...	...	(1.48)	...	...
$SDCA_{t-1}*R_t$	...	...	0.01	...	...
	...	...	(0.33)	...	...
CA_t	...	...	...	0.51	...
	...	...	...	(2.88)**	...
CA_t*R_t	...	...	...	-0.62	...
	...	...	...	(2.76)**	...
CA_{t-1}	...	...	...	-0.69	...
	...	...	...	(2.88)**	...
$CA_{t-1}*R_t$	...	...	...	0.87	...
	...	...	...	(4.17)**	...
CK_t	...	...	...	...	0.01
	...	...	...	...	(4.69)**
CK_t*R_t	...	...	...	...	-0.01
	...	...	...	...	(1.34)
CK_{t-1}	...	...	...	...	0.00
	...	...	...	...	(0.62)
$CK_{t-1}*R_t$	...	...	...	...	0.01
	...	...	...	...	(1.49)
Observations	332	331	323	331	332
Number of firms	91	90	89	91	91
Sargan test[2/]	19.23	18.97	18.48	17.20	20.13
	(0.38)	(0.39)	(0.42)	(0.51)	(0.33)
Serial correlation[3/]	1.20	1.15	1.12	1.33	0.55
	(0.23)	(0.25)	(0.26)	(0.18)	(0.58)

Notes:
Robust z statistics in parentheses.+ significant at 10%; * significant at 5%; **significant at 1%.
1/ Dependent variable is IK_{t-1}. All regressions include a constant and time dummies.
2/ Sargan test is the χ^2 statistics of a test of the null hypothesis that the overidentifying restrictions are valid. Statistics are based on two-step estimator. P-values are reported in parentheses.
3/ Serial correlation is the Z-statistic from a test of the null hypothesis of no second-order serial correlation in the residuals. P-values are reported in parentheses.

Table 10. Asymmetric Effects over Equity Price Cycle (Euler Equation Model) 1/

	(1)	(2)	(3)	(4)	(5)
IK_{t-1}	0.00	0.02	0.02	0.06	0.01
	(0.08)	(0.43)	(0.45)	(1.33)	-0.16
SK_t	8.32	8.09	7.99	8.79	6.24
	(5.66)**	(5.41)**	(5.14)**	(4.73)**	(3.78)**
DA_{t-1}	-0.40	...	...	...	...
	(1.66)+	...	...	...	...
$DA_{t-1}* R_t$	-0.13	...	...	...	...
	(1.33)	...	...	...	...
DE_{t-1}	...	-0.01	...	...	...
	...	(0.39)	...	...	...
$DE_{t-1}*R_t$	...	-0.01	...	...	...
	...	(0.74)	...	...	...
$SDCA_{t-1}$	...	...	-0.05	...	...
	...	...	(1.99)*	...	...
$SDCA_{t-1}*R_t$	...	...	0.00	...	...
	...	...	(0.11)	...	...
CA_t	...	...	...	-0.03	...
	...	...	...	(0.14)	...
CA_t*R_t	...	...	...	-0.16	...
	...	...	...	(0.68)	...
CA_{t-1}	...	...	...	-0.73	...
	...	...	...	(1.70)+	...
$CA_{t-1}*R_t$	...	...	...	0.59	...
	...	...	...	(1.82)+	...
CK_t	...	...	...	...	0.01
	...	...	...	...	(2.27)*
CK_t*R_t	...	...	...	...	-0.01
	...	...	...	...	(0.80)
CK_{t-1}	...	...	...	...	0.00
	...	...	...	...	(0.27)
$CK_{t-1}*R_t$	...	...	...	...	0.01
	...	...	...	...	(1.66)
Observations	272	271	270	269	273
Number of firms	86	85	85	85	87
Sargan test[2/]	19.76	19.16	22.80	22.56	22.77
	(0.35)	(0.38)	(0.20)	(0.21)	(0.20)
Serial correlation[3/]	0.67	0.49	0.77	0.60	0.59
	(0.50)	(0.63)	(0.44)	(0.55)	(0.55)

Notes:
Robust z statistics in parentheses.+ significant at 10%; * significant at 5%; **significant at 1%.
1/ Dependent variable is IK_{t-1}. All regressions include a constant and time dummies.

2/ Sargan test is the χ^2 statistics of a test of the null hypothesis that the overidentifying restrictions are valid. Statistics are based on two-step estimator. P-values are reported in parentheses.

3/ Serial correlation is the Z-statistic from a test of the null hypothesis of no second-order serial correlation in the residuals. P-values are reported in parentheses.

Table 11. Threshold Effects (Error-correction Model) 1/

	(1)	(2)	(3)	(4)	(5)
IK_{t-1}	0.02	0.02	0.02	0.02	0.02
	(0.41)	(0.49)	(0.41)	(0.39)	(0.38)
ΔSt	18.56	18.01	18.39	12.99	14.363
	(3.10)**	(2.95)**	(2.98)**	(1.98)*	(2.65)**
$(k-y)_{t-1}$	-33.78	-33.26	-33.56	-29.31	-23.361
	(4.67)**	(4.57)**	(4.59)**	(3.55)**	(4.06)**
$DA_{t-1} * D^{DA}_{0-75}$	-0.19	...	...	...	...
	(0.74)	...	...	...	...
$DA_{t-1} * D^{DA}_{75-90}$	-0.36	...	...	...	...
	(1.92)+	...	...	...	...
$DA_{t-1} * D^{DA}_{90-100}$	-0.15	...	...	...	...
	(0.84)	...	...	...	...
$DE_{t-1} * D^{DE}_{0-75}$	...	-0.04	...	...	...
	...	(0.68)	...	...	...
$DE_{t-1} * D^{DE}_{75-90}$	...	0.00	...	...	...
	...	(0.05)	...	...	...
$DE_{t-1} * D^{DE}_{90-100}$	...	-0.01	...	...	...
	...	(0.80)	...	...	...
$SDCA_{t-1} * D^{SDCA}_{0-75}$	...	...	0.04	...	...
	...	...	(0.21)	...	...
$SDCA_{t-1} * D^{SDCA}_{75-90}$	...	...	-0.08	...	...
	...	...	(1.05)	...	...
$SDCA_{t-1} * D^{SDCA}_{90-100}$	...	...	-0.02	...	...
	...	...	(1.34)	...	...
$CA_t * D^{CA_t}_{0-75}$	...	...	...	0.49	...
	...	...	...	(1.50)	...
$CA_t * D^{CA_t}_{75-90}$	...	...	...	1.06	...
	...	...	...	(1.76)+	...
$CA_t * D^{CA_t}_{90-100}$	...	...	...	0.20	...
	...	...	...	(0.62)	...
$CA_{t-1} * D^{CA_{t-1}}_{0-75}$	...	...	...	0.02	...
	...	...	...	(0.10)	...
$CA_{t-1} * D^{CA_{t-1}}_{75-90}$	...	...	...	0.10	...
	...	...	...	(0.18)	...
$CA_{t-1} * D^{CA_{t-1}}_{90-100}$	...	...	...	-0.08	...
	...	...	...	(0.19)	...

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Table 11. Threshold Effects (Error-correction Model) 1/
(continued)

	(1)	(2)	(3)	(4)	(5)
$CK_t * D^{CK_t}_{0-75}$	...	...	...	...	-0.411
	...	...	...	...	(0.31)
$CK_t * D^{CK_t}_{75-90}$	...	...	...	...	0.085
	...	...	...	...	(0.32)
$CK_t * D^{CK_t}_{90-100}$	...	...	...	...	0.011
	...	...	...	...	(4.98)**
$CK_{t-1} * D^{CK_{t-1}}_{0-75}$	...	...	...	...	-2.55
	...	...	...	...	(1.44)
$CK_{t-1} * D^{CK_{t-1}}_{75-90}$	...	...	...	...	-0.31
	...	...	...	...	(1.27)
$CK_{t-1} * D^{CK_{t-1}}_{90-100}$	...	...	...	...	0
	...	...	...	...	(0.36)
Observations	332	331	323	331	332
Number of firms	91	90	89	91	91
Sargan test[2/]	18.97	19.17	18.48	17.17	19.20
	(0.39)	(0.38)	(0.42)	(0.51)	(0.38)
Serial correlation[3/]	1.04	1.07	1.09	1.22	0.58
	(0.30)	(0.29)	(0.28)	(0.22)	(0.56)

Notes:
Robust z statistics in parentheses.+ significant at 10%; * significant at 5%; **significant at 1%.
1/ Dependent variable is IK_{t-1}. All regressions include a constant and time dummies.

2/ Sargan test is the χ^2 statistics of a test of the null hypothesis that the overidentifying restrictions are valid. Statistics are based on two-step estimator. P-values are reported in parentheses.
3/ Serial correlation is the Z-statistic from a test of the null hypothesis of no second-order serial correlation in the residuals. P-values are reported in parentheses.

Table 12. Threshold Effects (Euler Equation Model) 1/

	(1)	(2)	(3)	(4)	(5)
IK_{t-1}	0.00	0.02	0.02	0.02	0.039
	(0.09)	(0.56)	(0.50)	(0.45)	(0.49)
SK_t	8.19	8.02	8.05	8.40	6.115
	(5.73)**	(5.37)**	(5.21)**	(4.74)**	(3.69)**
$DA_{t-1} * D^{DA}_{0-75}$	-0.35	...	...	...	...
	(1.32)	...	...	...	...
$DA_{t-1} * D^{DA}_{75-90}$	-0.50	...	...	...	...
	(2.34)*	...	...	...	...
$DA_{t-1} * D^{DA}_{90-100}$	-0.41	...	...	...	...
	(1.74)+	...	...	...	...
$DE_{t-1} * D^{DE}_{0-75}$	...	-0.06	...	...	...
	...	(0.70)	...	...	...
$DE_{t-1} * D^{DE}_{75-90}$	...	0.00	...	...	...
	...	(0.09)	...	...	...
$DE_{t-1} * D^{DE}_{90-100}$	...	-0.02	...	...	...
	...	(0.63)	...	...	...
$SDCA_{t-1} * D^{SDCA}_{0-75}$	...	...	0.17	...	...
	...	...	(0.76)	...	...
$SDCA_{t-1} * D^{SDCA}_{75-90}$	...	...	0.03	...	...
	...	...	(0.34)	...	...
$SDCA_{t-1} * D^{SDCA}_{90-100}$	...	...	-0.04	...	...
	...	...	(1.57)	...	...
$CA_t * D^{CA_t}_{0-75}$	...	...	...	0.40	...
	...	...	...	(2.02)*	...
$CA_t * D^{CA_t}_{75-90}$	...	...	...	1.36	...
	...	...	...	(2.46)*	...
$CA_t * D^{CA_t}_{90-100}$	...	...	...	-0.90	...
	...	...	...	(2.09)*	...
$CA_{t-1} * D^{CA_{t-1}}_{0-75}$	...	...	...	-0.08	...
	...	...	...	(0.42)	...
$CA_{t-1} * D^{CA_{t-1}}_{75-90}$	...	...	...	0.84	...
	...	...	...	(1.66)+	...
$CA_{t-1} * D^{CA_{t-1}}_{90-100}$	...	...	...	-0.46	...
	...	...	...	(0.76)	...

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Table 12. Threshold Effects (Euler Equation Model) 1/

(continued)

	(1)	(2)	(3)	(4)	(5)
$CK_t * D^{CK_t}_{0-75}$					0.468
					(0.31)
$CK_t * D^{CK_t}_{75-90}$					0.04
					(0.18)
$CK_t * D^{CK_t}_{90-100}$					0.007
					(2.16)*
$CK_{t-1} * D^{CK_{t-1}}_{0-75}$					-3.081
					(1.38)
$CK_{t-1} * D^{CK_{t-1}}_{75-90}$					-0.245
					(0.87)
$CK_{t-1} * D^{CK_{t-1}}_{90-100}$					-0.001
					(0.40)
Observations	272	271	270	269	273
Number of firms	86	85	85	85	87
Sargan test[2/]	20.91	19.42	22.40	26.56	21.23
	(0.28)	(0.37)	(0.21)	(0.09)	(0.27)
Serial correlation[3/]	0.62	0.49	0.63	0.76	0.50
	(0.54)	(0.63)	(0.53)	(0.45)	(0.62)

Notes:
Robust z statistics in parentheses.+ significant at 10%; * significant at 5%; **significant at 1%.
1/ Dependent variable is IK_{t-1}. All regressions include a constant and time dummies.

2/ Sargan test is the χ^2 statistics of a test of the null hypothesis that the overidentifying restrictions are valid. Statistics are based on two-step estimator. P-values are reported in parentheses.

3/ Serial correlation is the Z-statistic from a test of the null hypothesis of no second-order serial correlation in the residuals. P-values are reported in parentheses.

DATA SOURCES AND DEFINITIONS

The data set used in this paper was created in several steps:

1. Compile information for all Israeli firms included in the Thomsom Analytics (Worldscope) add in.

2. Excluded all financial companies, defined as having a 1-digit SIC code of 6.

3. Exclude outliers and unrealistic observations for the variables used to estimate the base specification. In particular, exclude individual observations where:

- Capital stock<0
- *IK*< 1st percentile or *IK*> 99th percentile
- Lag of Debt-to-equity<0

Variable definitions

IK: Investment-capital ratio. Ratio of investment-to-capital stock. Capital stock calculated at the start of the period (see definition below).

ΔS: Sales growth. S is the log of the real sales (sales deflated by the CPI).

SK: Sales-to-capital ratio.

k-y: Capital minus sales. K is the log of real capital stock (capital stock deflated by CPI). Y is the real sales.

DA: Debt-to-asset ratio.

DE: Debt-to-equity ratio.

SDCA: Short-term debt-to-current assets ratio.

CA: Cash flow-to-assets ratio.

CK: Cash-to-capital ratio.

Assets (total): Sum of total current assets, long term receivables, investment in unconsolidated subsidiaries, other investments, net property plant and equipment and other assets.

Capital Stock: Property, plant, and equipment (net of depreciation) at the end of the period, less investment, plus depreciation and amortization expenses.

Cash: Cash and equivalents, which is money available for use in the normal operations of the company.

Cash flow: Income before extraordinary items and preferred and common dividends, but after operating and non-operating income and expense, reserves, income taxes, minority interest and equity in earnings.

Current Assets: Cash and other assets that are reasonably expected to be realized in cash, sold or consumed within one year or one operating cycle.

Debt (total): All interest bearing and capitalized lease obligations. It is the sum of long and short term debt.

Equity: Common shareholders' investment in a company.

Investment (capital expenditure): Funds used to acquire fixed assets other than those associated with acquisitions.

Sales (net): Gross sales and other operating revenue less discounts, returns and allowances.

Short-term debt: Debt payable within one year including current portion of long term debt and sinking fund requirements of preferred stock or debentures.

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II. Fiscal Policy in Israel: Trends and Prospects[1]

Abstract

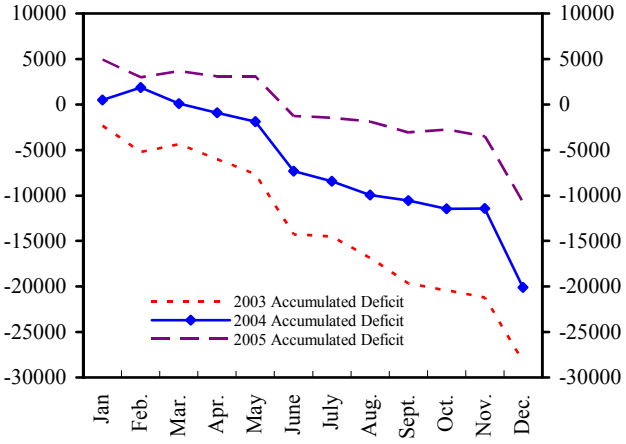
In recent years, Israel has taken important steps to strengthen fiscal discipline. However, despite a gradual decline in the size of the public sector since the mid-1980s, the authorities have failed to achieve long-lasting fiscal consolidation. Looking forward, deficits of 3 percent of GDP imply but a modest decline in the high public debt relative to GDP. Therefore, early and more ambitious fiscal retrenchment is desirable. This paper attempts to inform the public debate on the need for early fiscal adjustment by assessing the sustainability of public debt. The application of the Fund's Global Fiscal Model is also used to illustrate the trade-off between early and delayed fiscal consolidation.

A. Introduction

1. **Despite a gradual decline in the size of the public sector since the mid-1980s, Israel has failed to achieve long-lasting fiscal consolidation**. Following the stabilization program of 1985, public deficits declined sharply, and government debt was reduced by 40 percent over the next 10 years (Figure 1). Since the turn of the century, progress has slowed, and government debt has remained at around 100 percent of GDP (Figure 1).

2. **In recent years, however, the government has taken important steps to strengthen fiscal discipline.** Legislation in 2004 limiting the central government's fiscal deficit to no more than 3 percent of GDP and real expenditure growth to no more than 1 percent a year was key to the fiscal adjustment. While the implementation of this legislation is applied to the 2005-10 period only, the deficit of the central government reached 3.8 percent of GDP in 2004, which was considerably lower than the 4.6 percent of GDP average deficit in 2001-03. In 2005, the fiscal deficit target was raised from 3.0 to 3.4 percent of GDP to accommodate onetime costs associated with Gaza disengagement, but lower-than projected expenditure

Deficit/Surplus Progression, 2003-05
(In millions of NIS)



Source: Ministry of Finance

[1] Prepared by Selim Elekdag, Natan Epstein, and Marialuz Moreno-Badia.

and stronger-than expected revenue helped bring down the deficit to an estimated 1.9 percent of GDP.

3. **More can be done to achieve early fiscal consolidation.** Going forward, deficits of 3 percent of GDP imply but a modest decline in public debt relative to GDP and are accordingly insufficiently ambitious. Early fiscal consolidation is desirable for several reasons. First, a more pronounced and consistent decline in the public debt ratio would help lower future interest costs and thereby give greater scope to priority spending. Second, it would increase the economy's resilience to unfavorable shocks. Third, it would enhance credibility. Finally, it would help to cope with the associated long-run costs of aging.

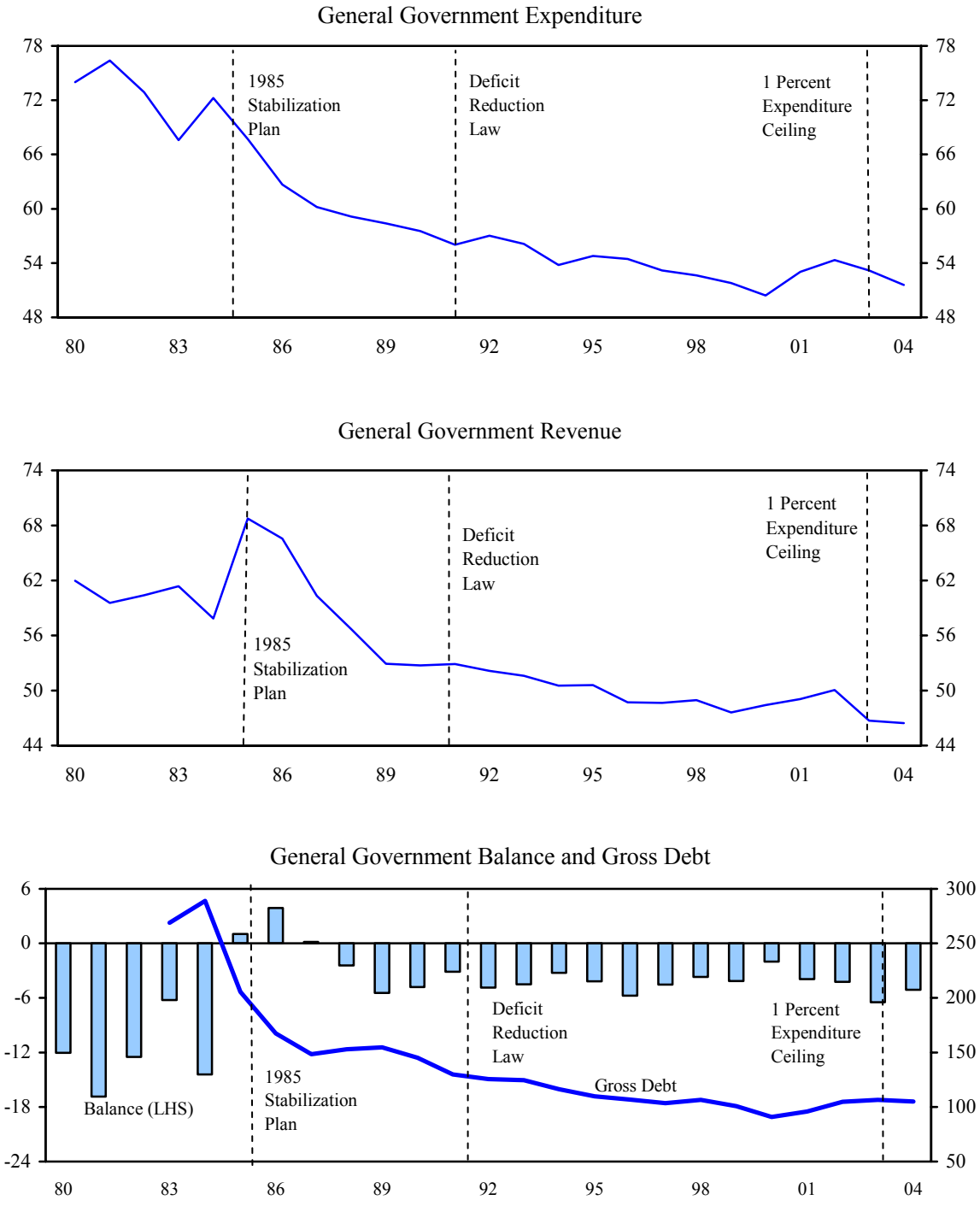
4. **This paper attempts to inform the public debate on the need for early fiscal adjustment.** It is organized as follows**.** Section B describes Israel's fiscal performance since the mid-1980s and compares Israel with other OECD countries. Section C assesses the sustainability of public debt going forward. Section D uses the Fund's Global Fiscal Model (GFM) to illustrate the trade-off between early and delayed fiscal consolidation. Section E examines the long-term benefits of reducing government debt by delaying tax cuts. Section F concludes.

B. Fiscal Performance Since 1985

5. **Israel has a history of attempting—with little success—to set up a mechanism to control fiscal outcomes on a multiyear basis.** Fiscal discipline increased substantially after the stabilization program of 1985, following a long period in which both budget deficits and public debt were very high. Since the mid-1980s, public expenditure has been reduced by more than 16 percent of GDP. This has enabled the general government deficit to be reduced from about 14 percent of GDP in 1984 to a still high 5 percent in 2004. The improvement in the deficit has also made possible a reduction in the tax burden of about 5 percent of GDP. However, the reduction of public deficits has proved insufficient to achieve durable fiscal consolidation, and public debt has remained high as result.

6. **The initial improvement in public finances was due to the Law of No-Printing of 1985 and the Budget Deficit Reduction Law (DRL) of 1991.** The first law passed in September 1985 as part of the stabilization program. It prohibited the Bank of Israel from lending money to the government to finance its deficit and put lower bounds on the government's accounts in the Bank. The 1991 enactment of the DRL called for the incorporation of medium-term fiscal targets, which were intended to compensate for the lack of a fiscal policy anchor. The targets were intended to bind future governments, thereby making fiscal policy more transparent and credible.

Figure 1. Israel: General Government Finances [1/ 2/]

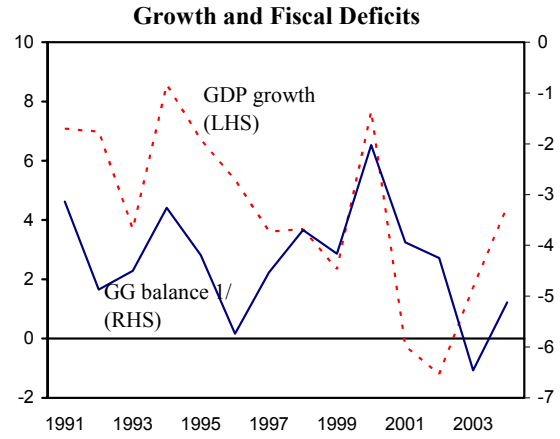


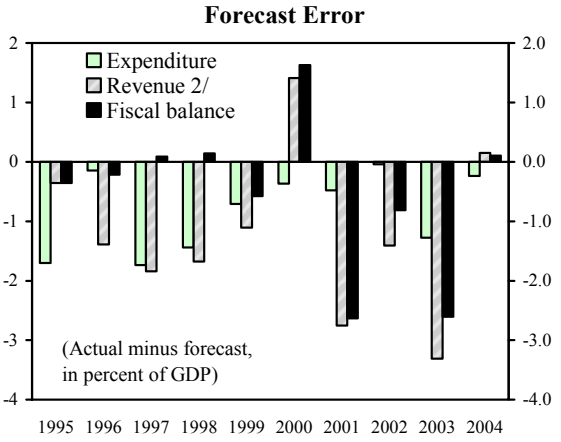
Source: Bank of Israel.

1/ In percent of GDP.

2/ The 1 percent expenditure ceiling was enacted at the end of 2003, but it applies only to the period

7. **Successive governments found it difficult to meet the deficit targets set by the DRL, particularly during periods of weak economic activity**. The DRL targets were not adjusted for the cycle, and, therefore, the law had to be amended continuously (Table 1). Notably, the budget overshot its deficit targets in the mid-1990s, over-performed in 2000, overshot the target again in 2001, 2003, and 2004, and over-performed in 2005. In addition, because the DRL prescribed the ex ante deficit path, it appears to have created a bias for overly optimistic revenue and growth projections at times of slow economic growth. In fact, an analysis of Israel's fiscal forecast errors shows that the under-performance on fiscal balance since the mid-1990s has been mainly driven by lower-than-expected revenue.[2] A significant part of the forecast error on the revenue side came from deviations in the projections of VAT and non-tax revenue. Optimistic revenue projections permitted the annual budget law's expenditure allocation to be higher than it realistically could be, given the deficit target. As a result the budget's effectiveness as an expenditure planning tool may have been lessened.





1/ In percent of GDP.
2/ Revenue excluding foreign

8. **A key reason for the failure to consistently implement the DRL is the lack of more formal, less ad hoc medium-term fiscal framework—one that incorporates multiyear budgets and binding expenditure ceilings in a detailed and transparent manner.** In 2004, the DRL was amended to include ceilings on expenditure growth between 2005 and 2010. Under this amendment, real expenditure would rise by no more than 1 percent each year, and the budget deficit would not exceed 3 percent of GDP.[3] While this amendment was seen as a first step toward making the DRL a more effective fiscal policy rule, the 2005 and 2006 budgets lacked clarity with regard to how exactly the government

[2] Forecast errors are defined as the difference between the reported actuals and budget projections. A negative (positive) value implies the outcome underperformed (exceeded) budget expectations.

[3] The 1 percent rule refers to growth in real expenditure from budget to budget.

intended to meet both the expenditure and deficit ceilings. The authorities' ability to adhere consistently to the amended fiscal rule is thus questionable. A more detailed presentation of multiyear budgets, which clearly delineates the path of fiscal consolidation, including when the path is adjusted to cyclical fluctuations, is needed.

Table 1. Israel : Central Government: DRL Ceiling Versus Actual Deficits

	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08
Deficit Targets by year announced																	
1991	6.2	3.2	2.2	0													
1994 1/			3	2.8	2.5												
1997						2.8	2.4	2	1.75	1.5							
2000 2/									2.5	1.75		1.5					
February, 2002											3	2	1.5	1			
June, 2002												3-3.5	2.5-3	2-2.5	1.5-2	1-1.5	
2004 3/ 4/													2.5-4	3.4	up to 3	up to 3	up to 3
Actual Deficits	3.8	2.4	2.3	4.1	3.7	2.6	2.3	2.4	0.7	4.4	3.8	5.6	3.8	1.9			

Sources: Ministry of Finance, and Bank of Israel.

1/ No specific deficit targets were given for the years 1995-97. The only requirement was that the deficit, as a percent of GDP, would decrease from its level in the previous year. Numbers underlined represent the deficit targets that the government decided on when it presented the budget for this year.
2/ No specific deficit targets were given for the years 2001-02. The only requirement was that the deficit, as percent of GDP, would decrease by 0.25 percentage points from the previous year, and that the deficit in 2003 would rise to 1.5 percent of GDP. Numbers underlined represent the deficit targets that the government decided on when it presented the budget for this year.
3/ The DRL was amended to include ceilings on expenditures growth between 2005 and 2010. Accordingly, budget expenditure, indexed to the CPI, would not increase by more than 1 percent each year and the budget deficit would not exceed 3 percent of GDP.
4/ The original target was 3 percent for 2005 but was later modified to account for the estimated cost of Gaza disengament of 0.4 percent of GDP.

Trends

9. **The remarkable improvement in the public finances from the mid-1980s through the 1990s has given way to a noticeable deterioration in more recent years**. To better understand the dynamics of fiscal policy in Israel, we identify three broad phases. During the first phase—1985−90—the general government balance improved by 11 percent of GDP on average, and the primary balance moved sharply into a surplus, reaching 4.5 percent of GDP by 1990 (Table 2). This improvement was achieved largely through cuts in public expenditure, principally defense and subsidies.[4] The pace of fiscal consolidation slowed markedly during the second phase—1991−2000—as the overall general government balance weakened by 2.7 percent of GDP and the primary balance declined by about 6 percentage points. It is important to note that during the 1990's Israel absorbed a very large number of immigrants (about 20 percent of its original population at the time), which resulted in higher government spending and contributed to the weakening of the fiscal balance. During this period, expenditure cuts in defense continued and Israel started enjoying the first fruits of its stabilization effort, as reflected in the substantial decline in interest payments. However, revenue fell as a result of tax cuts and a reduction of aid from the U.S.[5] The year 2001 marked the beginning of a third phase, during which a deterioration in the

[4] Subsidies to the business sector decreased significantly as part of the stabilization program.

[5] Because U.S. aid has remained at US$3 billion dollars since 1985, its real value has declined since then, and its size relative to GDP fell dramatically to about 2 percent in 2004. In recent years U.S. aid to Israel has been reduced annually. In 2006 it will amount roughly to US$2.5 billion.

public finances coincided with the economic recession. Over the period 2001−04, the overall budget deficit worsened from 2 percent of GDP in 2000 to 5.1 percent in 2004. The primary balance also declined by about 2 percentage points over the same period. In contrast to the previous phases, current expenditure increased (including transfers); combined with a further decline in revenue, this led to higher deficits and public debt.

Table 2. Israel: Trends in Public Finances
(Average during subperiods, in percent of GDP)

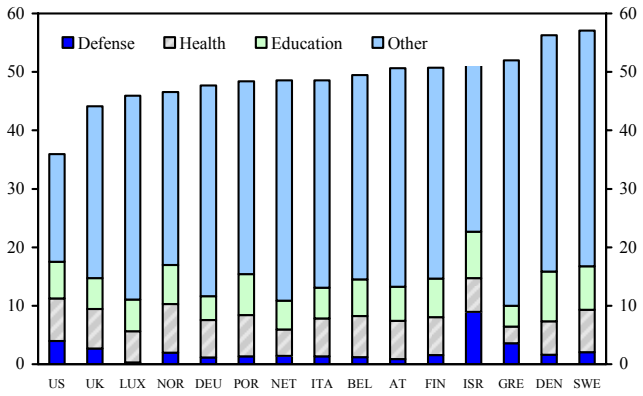
	1980-84	1985-90	1991-2000	2001-04
Revenues	60.2	59.7	50.0	48.1
Domestic receipts	48.5	47.5	44.3	43.7
Tax	40.4	41.6	38.1	38.2
External receipts	11.7	12.2	5.7	4.4
Intergovernmental transfer	8.0	9.7	3.9	2.8
Total expenditures	72.6	60.9	54.0	53.0
of which				
Current expenditures	66.6	56.3	48.1	48.9
Public consumption 1/	30.9	26.3	26.3	27.8
Defense 2/	6.7	4.8	2.1	1.9
Interest	11.4	10.8	6.7	5.8
Transfers and subsidies	17.6	14.5	13.0	13.3
Capital outlays	6.0	4.6	5.9	4.2
Gross fixed investment	2.4	2.4	3.1	2.6
Primary spending	61.2	50.2	47.3	47.2
Primary current spending	55.2	45.6	41.4	43.0
Overall balance	-12.4	-1.3	-4.0	-4.9
Primary balance	-1.0	9.5	2.7	0.9
Real GDP growth	2.7	4.1	5.6	1.2
Debt-GDP ratio (end-period)	289.1	145.1	90.8	104.9

Source: Bank of Israel.
1/ Excluding defense imports.
2/ Direct defense imports including advance payments, excluding taxes.

How does Israel Compare with OECD Countries?

10. **The fiscal consolidation from the mid-1980s through 1990s brought Israel more in line with OECD countries.** In 1985, the relative size of the Israeli public sector, at around 70 percent of GDP, was one of the highest in the world. Although the subsequent fiscal adjustment placed Israel closer to OECD countries, public spending, at about 52 percent of GDP in 2004, is still 11 percentage points higher than the OECD average (Figure 2). The main difference in spending levels comes from defense, which is 5 percentage points of GDP higher than in the U.S., the country with the highest defense spending among OECD countries. On the revenue side, the Israel tax yield as a share of GDP is slightly higher than the OECD average (Figure 3). The composition of tax revenue has changed over time in favor of indirect taxation. Overall, the fiscal deficit in Israel is the third largest among OECD countries, surpassed only by Japan and Greece. As a result, Israel has one of the highest debt-to-GDP ratios in the industrial world.

Breakdown of Government Expenditure, 2003
(in percent of GDP)



Taxes (in percent of GDP)

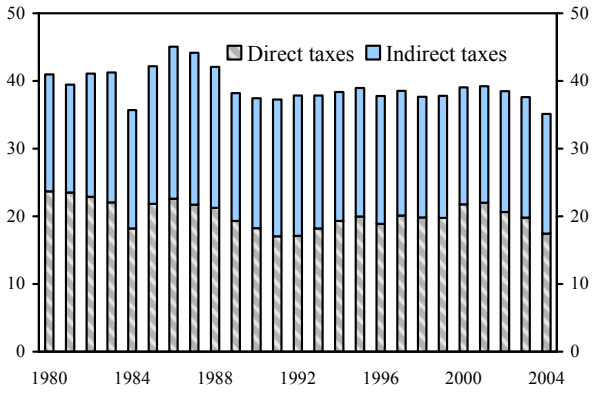
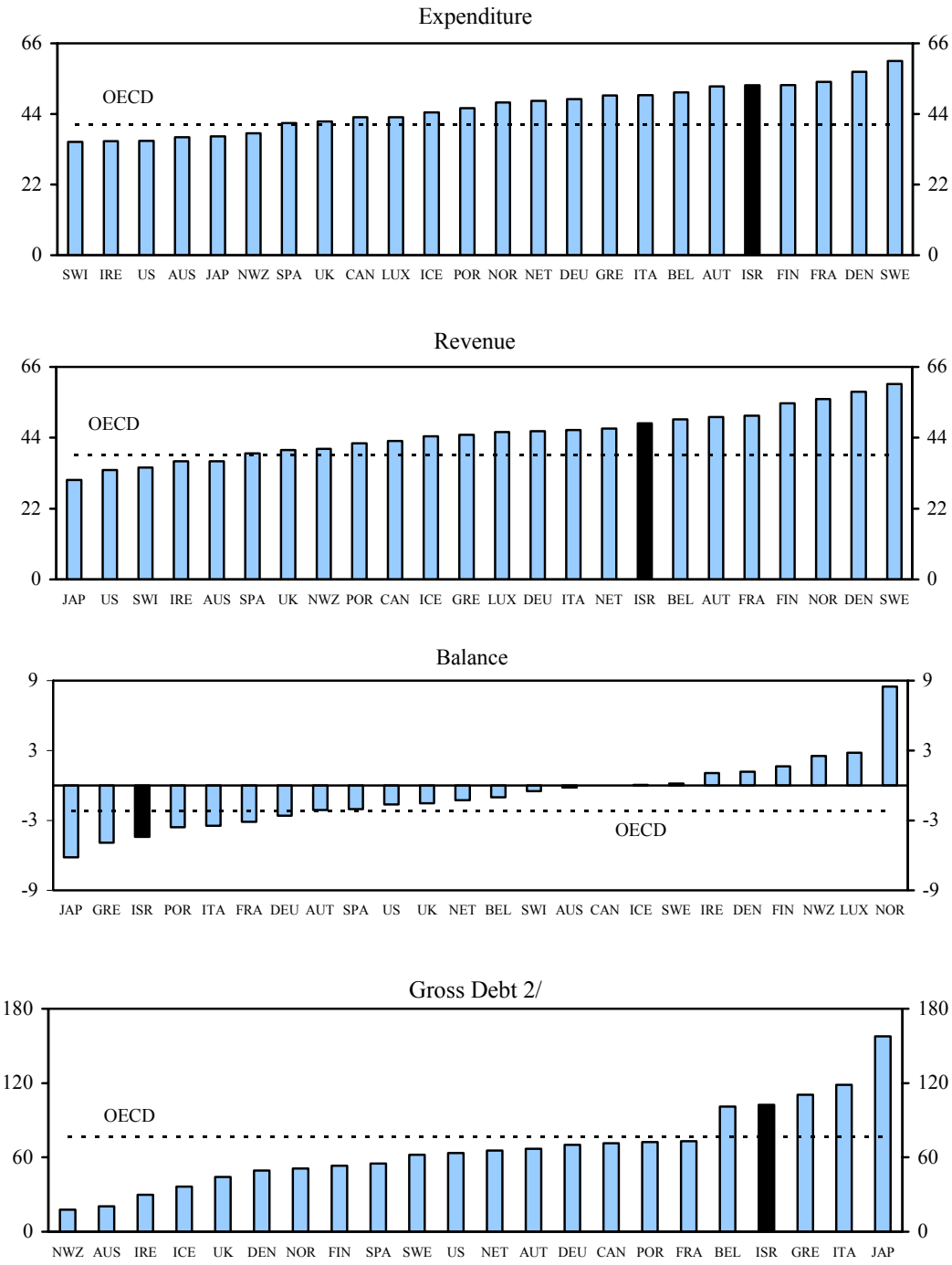
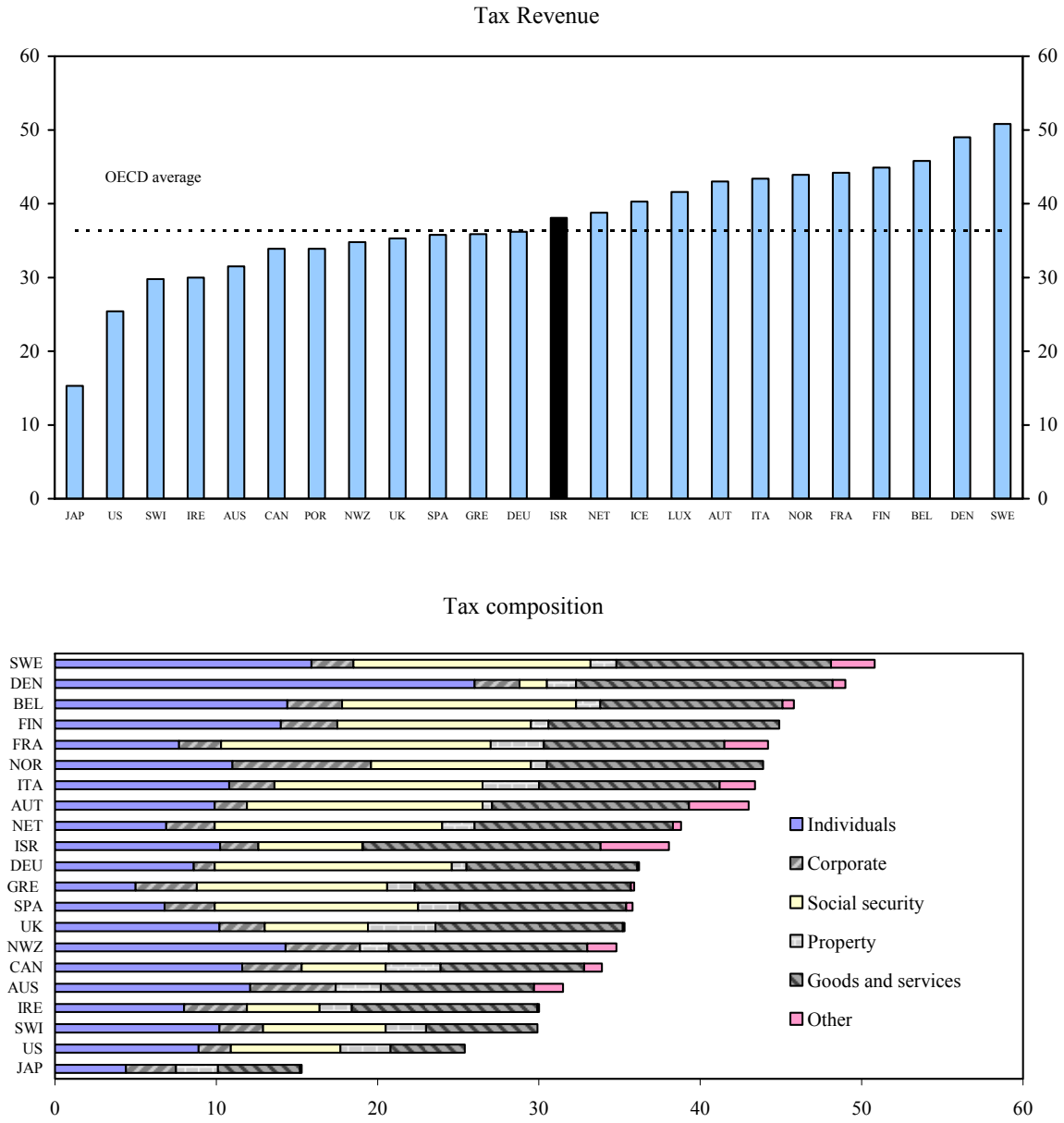


Figure 2. International Comparison: General Government Finances, 1995-2004 1/



Sources: Bank of Israel; and OECD, Economic Outlook.
1/ Average over the period, in percent of GDP.
2/ As of 2004.

Figure 3. Tax Revenues, 2003 1/
(In percent of GDP)

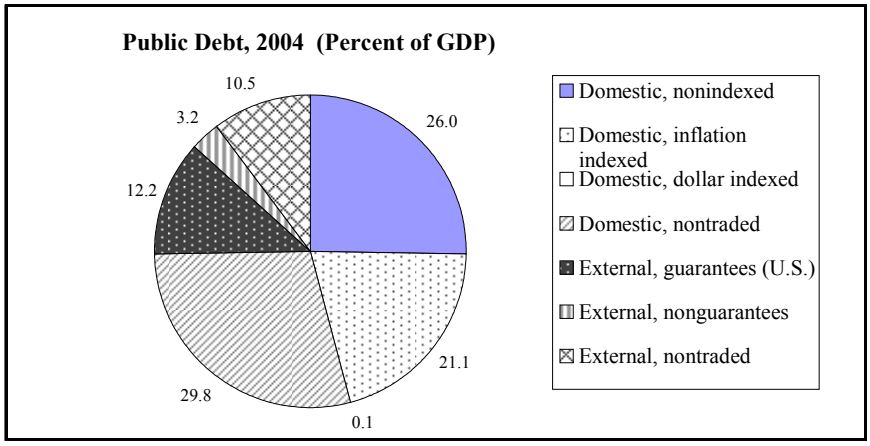


Sources: Bank of Israel; and OECD Revenue Statistics.
1/ Data for Australia, Portugal and Greece are as of 2002. Israel goods and services taxes include taxes on economic activity and net taxes on imports.

C. Assessing the Stance of Fiscal Policy

Medium Term

11. **Israel's high public debt, currently at just over 100 percent of GDP, presents important risks to the economy**. One of these risks includes the possibility that investors lose confidence in the ability of the government to service its debt in the face of adverse shocks resulting in sustained loss of output and revenue. This would likely increase the interest cost of servicing the debt, which would further hinder the prospects of economic recovery. Although much of the public debt (75 percent) is domestically held and half of the external debt portion is guaranteed by the U.S. government, the overall ratio is very high, and the economy stands to benefit from bringing the ratio down. In order to assess the sustainability of public debt, we look at the public debt dynamics over the next five years. We concentrate on two key paths: a baseline scenario that encompasses the trajectory of public debt under the current fiscal policy framework of 1 percent real expenditure growth and 3 percent of GDP fiscal deficit (applied to the central government), and a more ambitious alternative scenario that reflects the 1 percent expenditure rule and a declining path in the fiscal deficit.



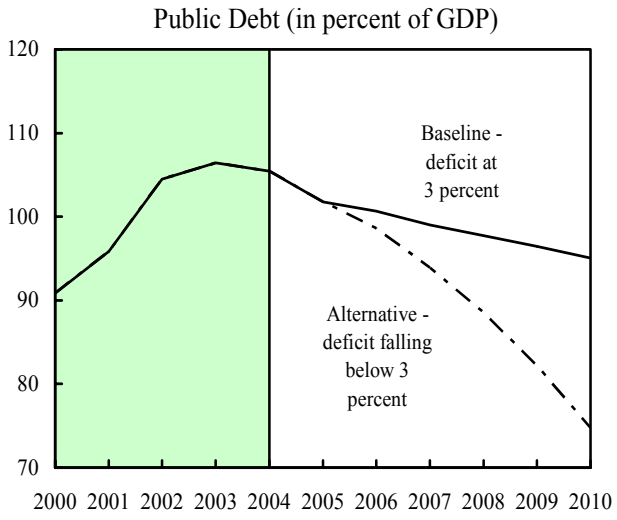
12. **Israel's vulnerability to large shocks points to the need for a more aggressive fiscal consolidation than currently envisaged.** Under the baseline scenario, average real GDP grows by 4.2 percent, the real interest rate is assumed at 4.5 percent, and the primary surplus is 2.4 percent of GDP. This is consistent with a general government deficit of 3.5 percent of GDP; that is, a central government deficit of 3.0 percent of GDP and local governments' deficit of 0.5 percent of GDP[6]. As can be seen in Figure 4, maintaining a deficit of 3.5 percent of GDP in the years ahead implies only a modest decline in public debt as a share of GDP. Indeed, under such a scenario, the public debt-to-GDP ratio would fall only slightly, to 95 percent of GDP, by 2010. The debt ratio is vulnerable to interest rate and growth shocks.[7] For example, if the real interest rate were to rise at a rate equivalent to one

[6] In this analysis, we assume that the subnational governments run a collective annual budget deficit of 0.5 percent of GDP, which is in line with the authorities' projections.

[7] For more details on these scenarios, see Appendix I.

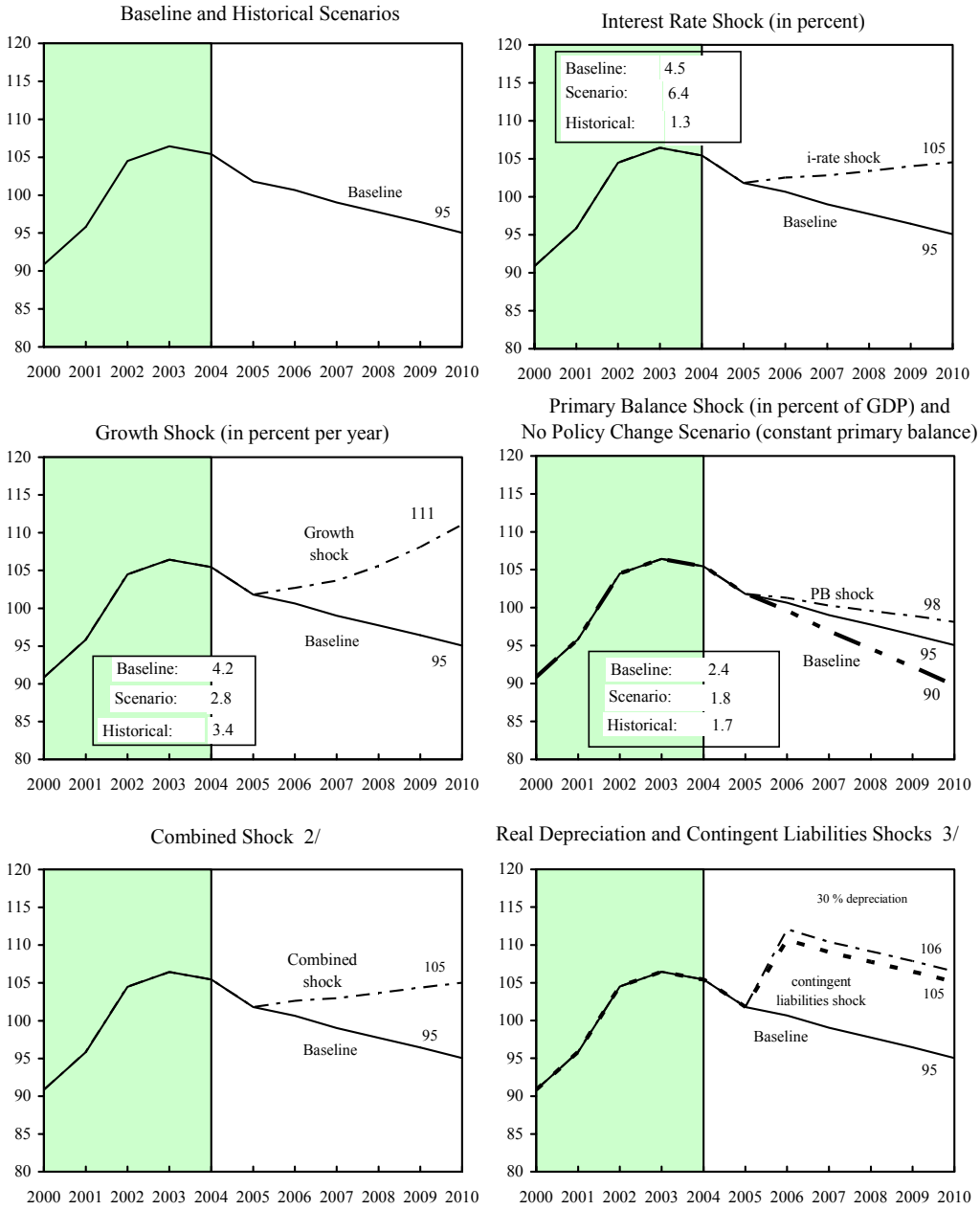
standard deviation above the baseline rate, the debt ratio would rise to 105 percent of GDP; whereas, if real GDP growth were to decelerate to an average of only 2.4 percent, the debt ratio would rise to 111 percent of GDP in five years.

13. **Adhering to the 1 percent real expenditure growth target and allowing the automatic stabilizers to operate fully would go a long way toward achieving fiscal consolidation.** The alternative scenario assumes that the authorities are able to gradually lower the fiscal deficit from 3.5 percent of GDP in 2005 to zero by 2008 and bring it to about a 2.5 percent surplus by 2010. If we apply the binding 1 percent expenditure rule, which translates to about a 1 percent of GDP annual decline in expenditure, and allow revenue as a share of GDP to remain constant (i.e. a revenue/GDP elasticity of one), the consolidation effort would amount to 6 percent of GDP over five years. Under this scenario, the public debt ratio would fall to 75 percent of GDP by 2010, or close to a 20 percentage point improvement over the baseline path.[8]



[8] In both scenarios, we assume that no new tax cuts will be introduced.

Figure 4. Israel: Public Debt Sustainability: Bound Tests 1/
(Public debt in percent of GDP)



Sources: International Monetary Fund, Country desk data, and staff estimates.

1/ Shaded areas represent actual data.Individual shocks are permanent one-half standard deviation shocks. Figures in the boxes represent average projections for the respective variables in the baseline and scenario being presented. Ten-year historical average for the variable is also shown.

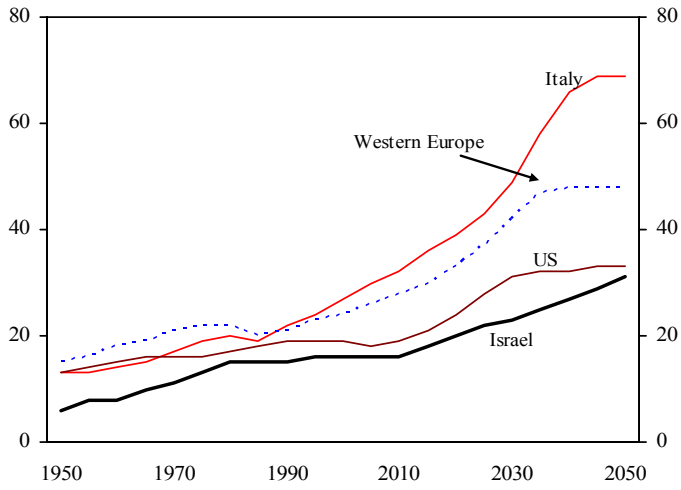
2/ Permanent 1/4 standard deviation shocks applied to real interest rate, growth rate, and primary balance.

3/ One-time real depreciation of 30 percent and 10 percent of GDP shock to contingent liabilities occur in 2006, with real depreciation defined as nominal depreciation (measured by percentage fall in dollar value of local currency) minus domestic inflation (based on GDP deflator).

Impact of Aging

14. **Israel is relatively well placed to deal with aging with its current medium-term fiscal framework, provided the authorities adhere to the 1 percent expenditure rule.** An international comparison of the old-age dependency ratio places Israel at the bottom of a group of industrialized (particularly European) countries. In addition, the pension system was recently reformed by raising the retirement age and lowering benefits.[9] Moreover, Broida (2003) analyzes the long-run effects of demographic trends on public spending in Israel and finds that pressures on related expenditure are not likely to increase through 2010. However, the demographic changes in 20-30 years suggest the need for increased future public expenditure to compensate for the higher old-age dependency ratio. Public spending on the old-age population was 2.8 percent of GDP in 1995, rose slightly to 2.9 percent in 2000 and 2005, and is expected to remain at that level in 2010. Nonetheless, by 2020, such spending is expected to rise to 3.7 percent of GDP. Most likely, public spending will rise substantially after that, given that Israel is set to experience a significant aging of its population after 2030. This underscores the importance of achieving early fiscal consolidation in order to cope with the increase in age-related spending.

Old-age Dependency ratio, 1950-2050



Source: United Nations Secretariat.

Negative Income Tax

15. **In their effort to reduce poverty incidence, the authorities are considering a broad range of measures, including the introduction of a negative income tax (NIT)**. In general, it is recognized that a NIT can be a useful mechanism in promoting employment and/or ensuring adequate income for low income earners. However, its effectiveness depends on a variety of factors (Appendix II).

[9] For details on the pension reform in Israel, see IMF (2004b).

D. Fiscal Consolidation: Now Versus Later

16. **To evaluate the long-term benefits of early fiscal consolidation, we use the IMF's Global Fiscal Model (GFM), calibrated to the Israeli economy and the rest of the world**.[10] The GFM is based on a micro-foundation model developed to examine fiscal issues. Several features of the model make it particularly suitable to analyze the impacts of fiscal consolidation, including its relaxing of the assumptions of Ricardian equivalence and perfect competition. Supply-side effects operate through changes in incentives, as taxes influence the desire to work and the rate of capital accumulation.[11] Demand is affected by the degree of agents' impatience and their planning horizons, the persistence of the consolidation effort, and the amount of public spending on domestically produced goods that would affect the real exchange rate and, thus, net exports.

17. **In the first scenario, we compare early and delayed fiscal consolidation achieved through expenditure cuts.** Fiscal consolidation is defined as reaching a debt-to-GDP ratio of 60 percent by 2020.[12] In July 2005, the Knesset approved a multiyear tax cut, which will be phased out in five years. Therefore, to make our simulations more realistic, we assume that fiscal adjustment occurs through expenditure cuts. Early fiscal consolidation implies adjusting the fiscal deficit by 1 percent of GDP every year until 2010 and gradually increasing the deficit thereafter. Delayed consolidation implies starting the fiscal adjustment only in 2015, necessitating a much sharper reduction in deficits in order to achieve the debt-to-GDP ratio of 60 percent by 2020.

18. **The simulations show that there are significant long-term benefits to early consolidation.** Early fiscal consolidation results in an initial fall in real GDP as the expenditure cuts dampen demand. This initial loss of output is larger than in the delayed scenario, since in that case, government expenditure does not change for the first five years (Figure 5). However, early consolidation leads to long term increases in output that are double those obtained if adjustment is delayed. This is because the reduction of the government's interest payments is larger, given the faster pace of debt reduction.

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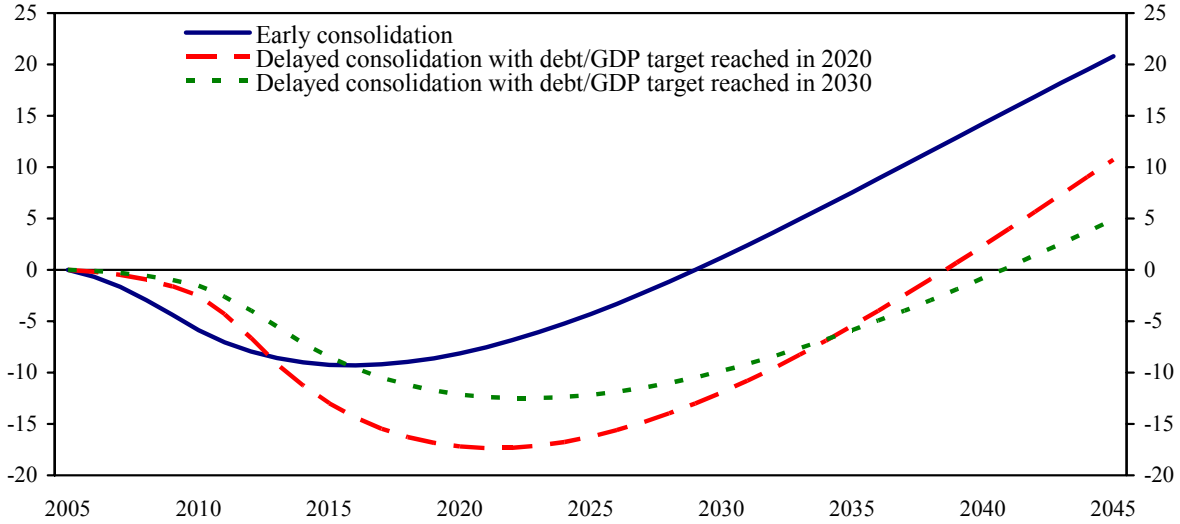
[10] For details on the model specification and calibration, see Elekdag, Laxton, and Rose (2005).

[11] The structure of this model, however, does not make it suitable to analyze short-term dynamics.

[12] According to Hercowitz and Strawczynski (2000): "The Maastricht guidelines of public-debt/output ratio of 60 percent is mentioned in the budget publications for the years 1997-2000 as important to achieve, and policymakers often refer to the Maastricht guideline as a model to imitate".

Figure 5. Israel: Effects of Fiscal Consolidation on Real GDP, 2005-45
(Percent deviation from baseline, cumulative)



19. **To further assess the benefits of early consolidation, we compare these results with an alternative form of delayed consolidation.** The alternative delayed consolidation involves starting the fiscal adjustment in 2015 but not reaching the debt-to-GDP ratio of 60 percent until 2030. The main difference between this delayed scenario and the one considered above is that, although this fiscal adjustment is less pronounced, it has to be maintained for a longer period. As expected, the initial loss of output is much smaller than in the early consolidation case. However, in the long term, early fiscal consolidation generates output increases that are four times higher.

E. Tax Cuts

20. **Recently introduced tax cuts have opened the question of the appropriate pace of debt reduction.** On July 25, 2005, the Knesset approved a tax plan that outlines Israel's tax policy for the next five years, including several tax cuts.[13] By cutting taxes, the authorities have slowed the pace of debt reduction. This section evaluates the long-term benefits from reducing government debt by delaying tax cuts, using the Fund's GFM. The simulations examine the consequences of postponing tax cuts in response to reductions in government spending so that public debt declines, allowing larger tax cuts in the future.

[13] The plan expands on some of the measures introduced in the 2003 tax reform. The key measures are (1) lowering the top marginal income tax rate from 49 percent to 44 percent by 2010; (2) cutting the corporate tax rate from 34 percent to 25 percent by 2010; (3) reducing the VAT rate from 17 percent to 16.5 percent; (4) establishing a uniform 20 percent capital gains tax rate; and (5) widening the tax base and strengthening enforcement through a proposal for taxing trusts.

21. **The impact of tax cuts on real activity depends on the responses of aggregate supply and demand.** The supply-side effects of the tax cut come from an increased incentive to work due to higher after-tax wages.[14] The increase in aggregate demand, in turn, depends on the extent to which individuals view a larger fiscal deficit as an increase in their permanent income, which also depends on the degree of agents' impatience and their planning horizons.

22. **This section compares the impact of matching a cut in transfers with an immediate tax cut versus a larger delayed tax cut.** The simulations assume that scope for tax cuts is provided by a permanent cut in lump-sum transfer payments of 1 percentage point of GDP.[15] The results compare the following two policy responses: (1) immediately implementing a permanent cut in tax rates so as to reduce tax revenues by the same amount as the cut in transfer payments (thus not affecting the fiscal balance); and (2) leaving tax rates unchanged for 10 years, followed by a larger permanent cut in tax rates made possible by the lower level of interest costs due to the intervening fall in the government debt ratio. In other words, delaying the tax cut for 10 years allows the government to run a fiscal surplus, which is then used to reduce public debt. The second scenario emphasizes an important trade-off: the government ends up with a permanently lower tax rate and level of government debt, but at the cost of not offsetting the negative short-term impact of the cut in transfers on output.[16]

23. **Simulation results suggest that there are significant long-term benefits to delaying a cut in taxes, but there are also some costs to not offsetting the fall in transfers in the short term.** Figure 6 shows that immediately replacing a 1 percentage point of GDP reduction in lump-sum transfers with a cut in wage taxes leads to a cumulative increase in real GDP of about 3.5 percent over the long run. Conversely, delaying the cut in wage taxes by 10 years results in a small fall in real GDP over the short term as the impact on aggregate demand of the reduction in transfer payments is not offset. However, the 10-year delay leads to an eventual tax reduction that is twice as large as in the case of immediate tax cuts. As Figure 6 highlights, once implemented, the larger tax cut promotes real GDP gains that are substantially larger. In fact, the cumulative long-run impact on real GDP is five times larger when tax cuts are delayed.

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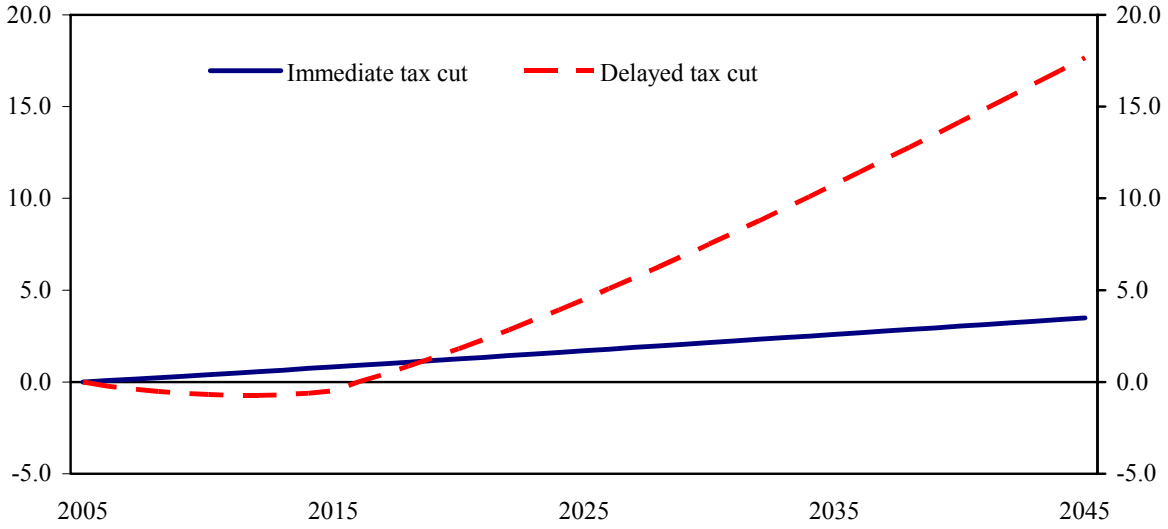
[14] These simulations consider only cuts in labor income taxes since cuts in corporate taxes yield similar results. See Bayoumi and Botman (2005) for a similar analysis of Canada.

[15] Lump-sum transfers have no impact on incentives and allow us to focus on tax rate-related distortions. It is also important to highlight that, since the GFM is a perfect foresight model, the government knows the exact amount it needs to decrease taxes to offset the decline in transfers in order to keep the fiscal balance unchanged—including any endogenous effects whereby a decline in tax rates may actually increase the revenue intake of the government.

[16] While such scenarios are clearly stylized, they help illustrate the effects of choosing to cut taxes or reduce debt in an intuitive manner. One reason to reduce government debt would be to prepare for the future pressures on government spending from an aging population.

Figure 6. Israel: Cumulative Effects on Real GDP of Reducing Transfers and Cutting Taxes, 2005-45
(Percent deviation from baseline)



F. Conclusion

24. **Israel has made progress in reducing the size of its public sector but has yet to achieve long-lasting fiscal consolidation.** The latest amendment to the Deficit Reduction Law, to limit the fiscal deficit to 3 percent of GDP, is a step in the right direction, but it must be seen as a ceiling, not a target, if the authorities are to realize sustained fiscal consolidation. The limit on real expenditure to no more than 1 percent should facilitate the gradual reduction in the fiscal deficit below the deficit ceiling and help achieve an earlier fiscal consolidation path. This would lead to a more pronounced and consistent decline in the public debt ratio, which will lower future interest costs, raise the economy's resilience to adverse shocks, and give greater scope to countercyclical fiscal policy, as well as help to deal with the long-run costs of aging.

25. **Israel's vulnerability to large shocks points to the need for early, more ambitious fiscal adjustment.** The current fiscal framework, while consistent with fiscal retrenchment, does not portend a significant improvement in the public debt profile over the medium-term, and thus will likely delay the benefits from a faster debt-reduction path. Simulations using GFM show that there are significant long-term benefits to early consolidation. While early fiscal consolidation could lower near-term output faster than otherwise, we find that early, more ambitious adjustment would double output growth in the long term, as reduced interest payments would free up government resources for other, more productive economic uses. Similarly, the cumulative long-run impact on real GDP is five times larger when tax cuts are delayed.

26. **A formal medium-term fiscal framework can help anchor fiscal policy, enhance its credibility, and make consolidation more durable.** Integrating multiyear budgets and binding expenditure ceilings in a clear and transparent manner is a necessary first step to adopting a medium-term fiscal framework. The authorities stand to benefit from such a framework, as it would raise the government's credibility and lessen political pressure to deviate from the key 1 percent expenditure rule. Indeed, a more detailed presentation of multiyear budgets, which clearly delineates the path of fiscal consolidation, including when the path is adjusted to cyclical fluctuations, will help anchor expectations, reinforce fiscal consolidation, minimize expenditure growth, and strengthen adjustment. To fully reap the benefits of multiyear budgets, it is important that the fiscal targets set in such a framework be maintained.

Public Sector Debt Sustainability Framework, 2000−10
(In percent of GDP, unless otherwise indicated)

	Actual							Projections						
	2000	2001	2002	2003	2004			2005	2006	2007	2008	2009	2010	
								I. Baseline Projections						Debt-stabilizing primary balance 10/
1 **Public sector debt 1/**	90.9	95.8	104.5	106.4	105.4			**101.8**	**100.7**	**99.0**	**97.7**	**96.4**	**95.1**	**0.8**
o/w foreign-currency denominated	27.9	26.5	27.0	26.6	25.5			25.0	25.0	25.0	25.0	25.0	25.0	
2 Change in public sector debt	-9.7	5.0	8.6	2.0	-1.0			-3.6	-1.1	-1.6	-1.3	-1.3	-1.4	
3 Identified debt-creating flows (4+7+12)	-7.9	5.3	6.3	3.0	0.0			-2.9	-1.3	-1.7	-1.5	-1.5	-1.6	
4 Primary deficit	-3.9	-1.9	-1.1	0.4	-1.0			-3.4	-2.4	-2.4	-2.4	-2.4	-2.4	
5 Revenue and grants	48.4	49.1	50.1	46.7	46.4			47.6	45.5	44.5	43.5	42.5	41.5	
6 Primary (noninterest) expenditure	44.5	47.2	48.9	47.1	45.5			44.2	43.2	42.2	41.2	40.2	39.2	
7 Automatic debt dynamics 2/	-3.3	7.0	4.4	2.2	1.3			0.0	0.6	0.0	0.2	0.2	0.1	
8 Contribution from interest rate/growth differential 3/	-2.6	4.3	2.4	4.3	1.7			0.0	0.6	0.0	0.2	0.2	0.1	
9 Of which contribution from real interest rate	4.4	4.1	1.3	6.1	6.3			5.1	4.7	3.9	3.9	4.0	4.0	
10 Of which contribution from real GDP growth	-7.1	0.2	1.1	-1.8	-4.5			-5.1	-4.1	-3.9	-3.8	-3.8	-3.9	
11 Contribution from exchange rate depreciation 4/	-0.7	2.7	1.9	-2.1	-0.4			0.0	0.0	0.0	0.0	0.0	0.0	
12 Other identified debt-creating flows	-0.7	0.1	3.0	0.4	-0.4			0.6	0.6	0.8	0.8	0.8	0.7	
13 Privatization receipts (negative)	-1.3	-0.5	-0.6	0.0	-0.1			-0.1	-0.5	-0.4	-0.4	-0.4	-0.4	
14 Recognition of implicit or contingent liabilities	0.0	0.0	0.0	0.0	0.0			0.0	0.2	0.2	0.2	0.1	0.1	
15 Other (specify, e.g. bank recapitalization)	0.6	0.6	3.6	0.4	-0.3			0.7	0.9	1.0	1.0	1.0	1.0	
16 Residual, including asset changes (2-3)	-1.8	-0.3	2.4	-1.0	-1.0			-0.8	0.1	0.0	0.2	0.2	0.2	
Public sector debt-to-revenue ratio 1/	187.7	195.2	208.7	227.8	227.0			213.9	221.0	222.3	224.5	226.7	228.8	
Gross financing need 5/	12.0	14.4	15.5	18.1	16.7			14.4	13.1	14.3	14.2	14.0	13.9	
in billions of U.S. dollars	13.9	16.3	16.2	20.0	19.5	10-Year Historical Average	10-Year Standard Deviation	17.8	17.1	19.9	20.9	22.0	23.1	Projected Average
Key Macroeconomic and Fiscal Assumptions														
Real GDP growth (in percent)	7.7	-0.3	-1.2	1.7	4.4	3.4	2.8	5.2	4.3	4.2	4.1	4.1	4.3	4.2
Average nominal interest rate on public debt (in percent) 6/	6.5	6.5	5.8	5.9	6.0	6.4	0.4	5.9	6.1	6.2	6.3	6.4	6.5	6.3
Average real interest rate (nominal rate minus change in GDP deflator, in percent)	4.9	4.6	1.4	5.9	6.1	1.3	3.9	5.2	4.9	4.2	4.3	4.4	4.5	4.5
Nominal appreciation (increase in US dollar value of local currency, in percent)	2.8	-8.5	-6.8	8.2	1.6	-3.3	6.7	-0.1	0.0	0.0	0.0	0.0	0.0	0.0
Inflation rate (GDP deflator, in percent)	1.5	1.9	4.4	0.0	-0.2	5.1	4.1	0.7	1.2	2.0	2.0	2.0	2.0	1.9
Growth of real primary spending (deflated by GDP deflator, in percent)	4.6	5.9	2.4	-2.1	0.8	3.1	3.2	2.2	1.9	1.8	1.6	1.6	1.7	1.7
Primary deficit	-3.9	-1.9	-1.1	0.4	-1.0	-1.7	1.2	-3.4	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4
								II. Stress Tests for Public Debt Ratio						Debt-stabilizing primary balance 10/
A. Alternative Scenarios														
A1. Key variables are at their historical averages in 2006-10 7/								**101.8**	**98.7**	**95.8**	**93.1**	**90.5**	**87.9**	**-1.1**
A2. No policy change (constant primary balance) in 2006-10								**101.8**	**99.6**	**96.9**	**94.6**	**92.2**	**89.7**	**0.8**
B. Bound Tests														
B1. Real interest rate is at baseline plus one standard deviations								**101.8**	**102.5**	**102.8**	**103.4**	**104.0**	**104.5**	**2.7**
B2. Real GDP growth is at baseline minus one-half standard deviation								**101.8**	**102.7**	**103.7**	**105.6**	**108.1**	**111.1**	**2.4**
B3. Primary balance is at baseline minus one-half standard deviation								**101.8**	**101.3**	**100.3**	**99.6**	**98.9**	**98.1**	**0.8**
B4. Combination of B1-B3 using one-quarter standard deviation shocks								**101.8**	**102.6**	**103.0**	**103.7**	**104.4**	**105.0**	**2.5**
B5. One time 30 percent real depreciation in 2006 9/								**101.8**	**112.1**	**110.4**	**109.2**	**107.9**	**106.5**	**0.8**
B6. 10 percent of GDP increase in other debt-creating flows in 2006								**101.8**	**110.7**	**109.0**	**107.8**	**106.5**	**105.1**	**0.8**

1/ Indicate coverage of public sector, e.g., general government or nonfinancial public sector. Also whether net or gross debt is used.
2/ Derived as $[(r - \pi(1+g) - g + \alpha\varepsilon(1+r)]/(1+g+\pi+g\pi))$ times previous period debt ratio, with r = interest rate; π = growth rate of GDP deflator; g = real GDP growth rate; α = share of foreign-currency denominated debt; and ε = nominal exchange rate depreciation (measured by increase in local currency value of U.S. dollar).
3/ The real interest rate contribution is derived from the denominator in footnote 2/ as $r - \pi(1+g)$ and the real growth contribution as -g.
4/ The exchange rate contribution is derived from the numerator in footnote 2/ as $\alpha\varepsilon(1+r)$.
5/ Defined as public sector deficit, plus amortization of medium and long-term public sector debt, plus short-term debt at end of previous period.
6/ Derived as nominal interest expenditure divided by previous period debt stock.
7/ The key variables include real GDP growth; real interest rate; and primary balance in percent of GDP.
8/ The implied change in other key variables under this scenario is discussed in the text.
9/ Real depreciation is defined as nominal depreciation (measured by percentage fall in dollar value of local currency) minus domestic inflation (based on GDP deflator).
10/ Assumes that key variables (real GDP growth, real interest rate, and other identified debt-creating flows) remain at the level of the last projection year.

Negative Income Tax [1]

There are a number of critical considerations to be considered in contemplating a NIT. In general, the effectiveness of a NIT depends on:

- ***Goals of the NIT***. The two usual goals are to ensure adequate income for low earners and promote employment. The primacy given to each of these goals will influence the design of the NIT.

- ***Interaction with social welfare, tax and labor market policies***. If other social welfare benefits are dependent on income, then incentives to work created by an NIT may be offset by reductions in other benefits caused by an increase in income. In this case, the NIT could have negligible beneficial effects. The overall level of taxation is also important. The higher are existing marginal tax rates, the more costly it is to impose high phase-out rates.[2] Labor market policies such as minimum wages must also be considered. High minimum wages mean that a greater proportion of workers are likely to be covered by the scheme resulting in a greater cost.

- ***Tax administration and compliance***. The cost of administering an NIT will depend on the level of filing and reporting, and system of assessment for the personal income tax.[3] A further concern is the potential for noncompliance, particularly in systems based on self-assessment.

There are also a number of difficult design issues that need to be considered, including who is eligible—single workers, families, families with children, self-employed; whether benefits should be more generous for larger families; whether to have a threshold for eligibility, and if so, whether to specify it in terms of earnings or hours worked; and the mechanism and timing of providing the credit. Those with low incomes will often move in and out of employment and their need for support will be highly volatile. It is necessary to match payments to these volatile levels of need without excessive administrative costs and without causing short term over or underpayments.

1/ Prepared by Peter Mullins (FAD).

2/ Personal tax rates in Israel are higher and more progressive than in other countries, which means that in setting phase-out rates, care should be taken to avoid high marginal effective tax rates.

3/ These costs could be substantial in the case of Israel given that about 50 percent of its workers do not file tax returns.

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III. A Simple Forecasting and Policy Analysis System for Israel Structure and Applications[1]

Abstract

Israel has a well-established inflation-targeting framework, but there is scope to improve the analytical structure used to formulate policy and to communicate with the public. In this paper, we develop a simple forecasting and policy analysis system for preparing baseline forecasts and risk assessments for the Israeli economy. The model has been designed to support policy analysis for an inflation-targeting regime and captures the essential small, open, flexible-exchange-rate economy linkages between the policy instrument and output, inflation and the exchange rate. The baseline forecast is largely judgmental in the short term, but uses the model to derive implications for the medium term. We conduct risk assessments on three key sources of uncertainty underlying the baseline forecast: the exchange rate, output gap, and oil prices. We also review briefly some of the issues and methods used in calibrating such a model and in evaluating its properties and performance.

A. Introduction

1. **In this paper, we describe a simple forecasting and policy analysis system (FPAS) for preparing baseline forecasts and risk assessments for the Israeli economy.** The model has been explicitly designed to support policy analysis for an inflation-targeting regime where the principal objectives are to provide anchors for inflation and inflation expectations.

2. **We sketch a simple model complete enough to play this role, a model that captures the essential small, open, flexible-exchange-rate economy linkages between the policy instrument (a short-term interest rate) and the nexus of output, inflation and the exchange rate.** The model is in "gap"—or deviation-from-equilibrium—form, and does not try to explain the underlying real equilibrium values. Thus, it cannot address many important issues, such as the dynamic implications of a permanent productivity shock or any stock issues, such as the role of debt. However, the model is capable of addressing many policy issues that arise routinely in making decisions about monetary policy actions and communicating the reasons to the public.

3. **To provide some motivation and background information, we follow this introduction with a brief review of economic developments in Israel, with a focus on the past five years, and some of the monetary policy issues that emerge.** We return to these themes later in the paper, as we illustrate the potential role of the model by using it to analyze

[1] Prepared by Natan Epstein, Philippe Karam, Douglas Laxton, and David Rose. The paper benefited from comments at the Bank of Israel.

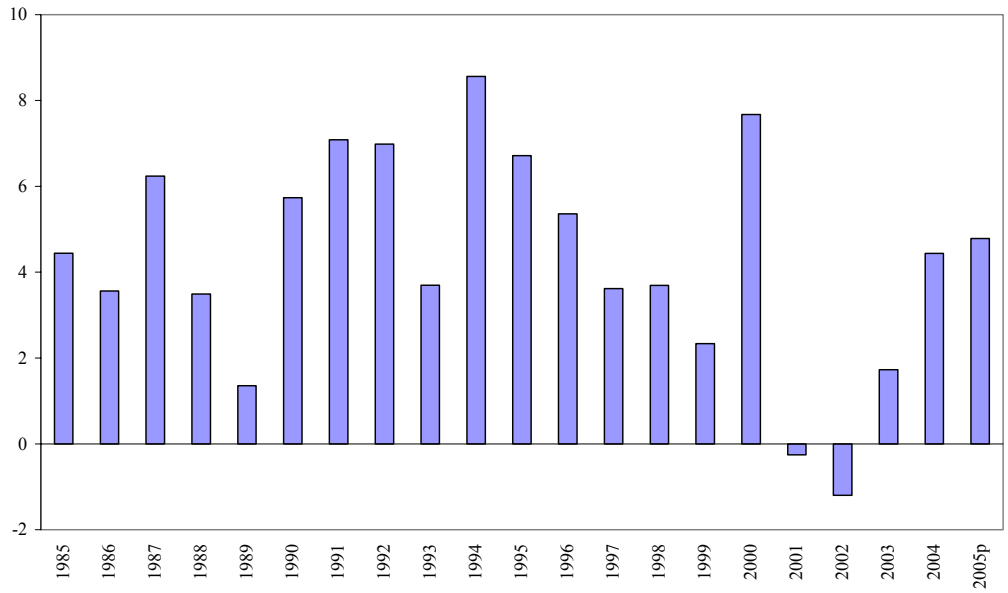
a number of issues that arise in considering the risks to a baseline forecast for the key macroeconomic variables in the Israeli economy.[2]

4. **The details of the results from simulations of any model depend on both its structure and its parameters.** The baseline forecast is largely judgmental in the short term, but uses the model to derive implications for the medium term. We also review briefly some of the issues and methods used in calibrating such a model and in evaluating its properties and performance.

B. Some Monetary History

5. **Israel's strong and sustained economic growth experienced since the mid-1980s came to a halt in 2001−02 as a result of the collapse of the high-tech boom, the deterioration in the security situation, and the global slowdown, particularly in U.S. business investment.** Israel's real GDP growth averaged 5.0 percent between 1985 and 2000, after which it contracted by 0.3 percent and 1.2 percent in 2001 and 2002. The economy has since recovered; real GDP grew by 4.4 percent in 2004, and is projected to grow by about 5 percent in 2005 (Figure 1).

Figure 1: Real GDP Growth, 1980-2005
(in percent)

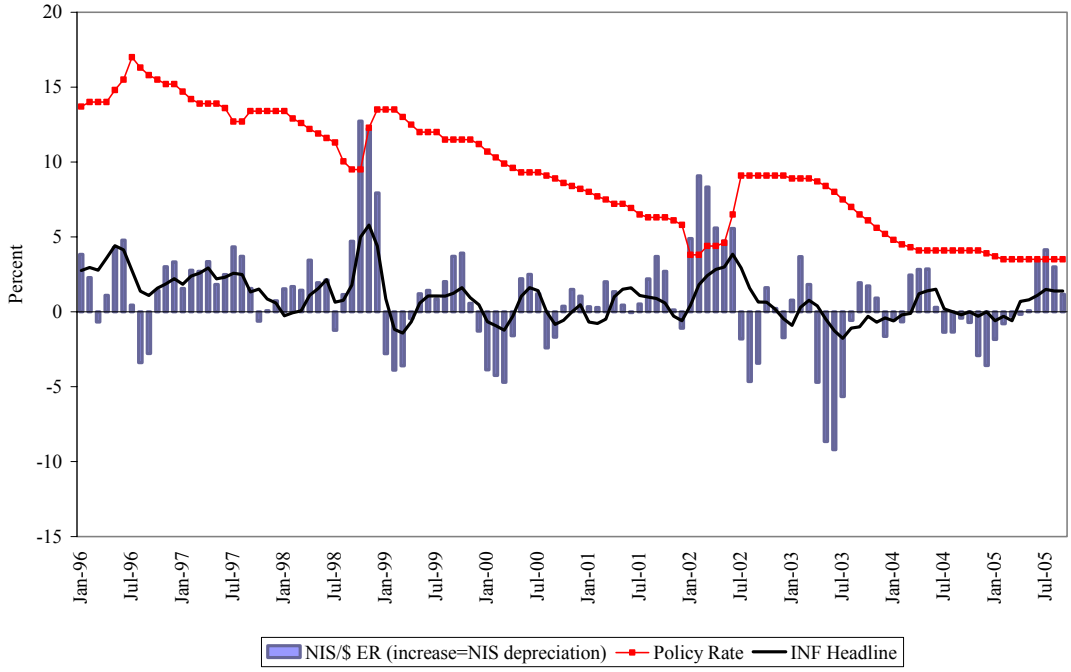


6. **During most of the pre-millennium period, interest rates were very high in Israel, reflecting the high country risk and a determination to keep inflation under control.** The importance of the exchange rate in this regard is clear (Figure 2). With a couple

[2] In this paper, the baseline is locked on December 10, 2005; that is, any subsequent new information is not reflected in that baseline scenario.

of exceptions, inflation remained low, and, for the most part, stable. The main exceptions were associated with major changes in the exchange rate, which in each case were closely associated with a change in policy stance. The pass-through of the effects of exchange rate changes to the CPI is very fast in Israel; roughly 25 percent of the CPI basket comprises contracts that are denominated in U.S. dollars.[3] One can see this effect clearly in the data for 1996, where a sharp increase in rates triggers a strong appreciation in the sheqel and a rapid decline in headline inflation. The experience in 1998−99 is even starker. In part in response to declining inflation, rates were gradually lowered through the early part of 1998. Then rates were cut more deeply, and the sheqel depreciated sharply, with an immediate effect on inflation.[4] As the rate of inflation pushed past 5 ercent on a 3-month rolling basis, the policy rate was increased dramatically, which created short-term appreciation and a significant reversal in inflation, with the headline rate dipping into negative territory (3-month rolling basis) in the first few months of 1999. Thereafter, rates began a long, slow decline and inflation remained low and periodically negative. With hindsight, one could argue that policy was perhaps overly cautious in the pace of moving rates towards world levels through this period.

Figure 2: NIS/$ Exchange Rate, Headline Inflation, and Bank of Israel's Policy Rate
1996-2005, 3-month rolling



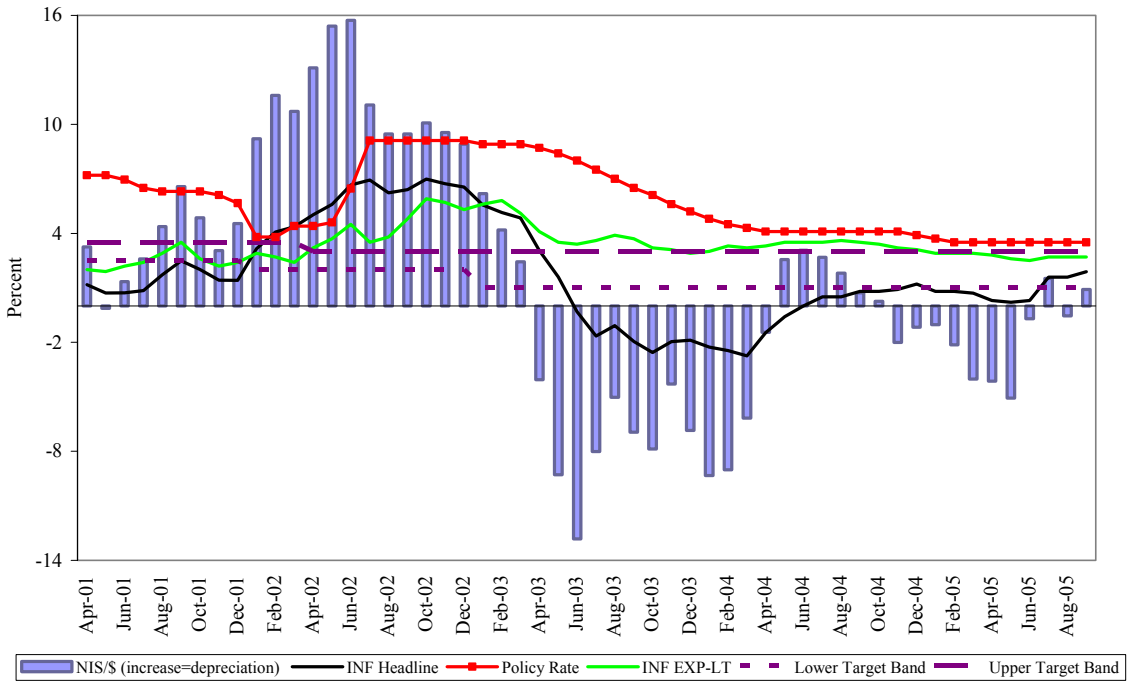
7. **We now review in more detail the period from 2001 to 2003, which echoes the 1998−99 episode.** The discussion refers throughout to material presented in Figure 3. In the

[3] Housing rentals are dollar denominated and alone account for about 20 percent of the CPI basket.

[4] The exchange rate depreciation throughout 1998 was partly in response to contagion effects emanating from the financial crises in Southeast Asia and Russia.

face of a weakening economy in 2001, the central bank dropped its rate precipitously—200 basis points— towards the end of the year. This exerted significant downward pressure on the sheqel exchange rate through the first half of 2002, which in turn put upward pressure on prices with headline inflation rising sharply through the first half of the year. The subsequent hikes in interest rates, only five months later and by 450 basis points in two steps, only raised questions about the policy intentions and exacerbated the exchange rate depreciation at a time when the weaker sheqel was already reflecting the deteriorating security and recessionary environment.[5] Inflation continued to rise, while long-run inflation expectations ratcheted up well above the 3 percent upper level of the target band. With year-on-year inflation reaching over 6 percent by the second half of 2002, and as the economy was struggling to get out of a long recession, the central bank put on the breaks and held its policy rate at around 9 percent until mid-2003. It subsequently lowered interest rates very gradually over the rest of the year. Keeping the policy rate at a high level resulted in a corresponding strong appreciation of the sheqel, which pushed inflation down sharply and into negative territory for a long period in the second half of 2003 and the first half of 2004.

Figure 3: NIS/$ Excgange Rate, Headline Inflation, LT Inflation Expectations, and Bank of Israel's Policy Rate
2001-2005 - monthly year-on-year



[5] Contrarian views about the relationship of interest rates and exchange rate allude to conditions where a weak state of the economy and misinterpretation of the intentions of a government by markets matter more than a structural interpretation of the link between interest rates and exchange rate.

8. **As reflected in expectations, the credibility of monetary policy was hurt by this episode.** Indeed, long-run inflation expectations have fallen to within Israel's inflation targeting band only in recent months, and then only just, after a long period of hovering above the band, despite the negative rates of inflation.

9. **Real GDP growth recovered strongly in 2004 and has accelerated somewhat in 2005.** Inflation remains benign, albeit ticking upward within the band, while the unemployment rate continues to fall, but from a high level. The economy remains vulnerable, however, to weakness abroad, especially in the United States and Europe, a sustained rise in oil prices, political volatility, and a deterioration in the security situation. Growth is expected to slow slightly in 2006, primarily owing to lower growth in exports.

10. **With renewed emphasis on fiscal consolidation, and inflation within the Bank of Israel's (BoI) target of 1–3 percent, monetary policy has been accommodative, notwithstanding recent increases in the policy rate.** Interest rates were lowered in 2004, as inflationary pressures eased amid sheqel appreciation against the U.S. dollar. For most of 2005, the Bank of Israel kept its policy rate unchanged at 3.5 percent, as inflation remained subdued, with the CPI registering a cumulative rise of 1.8 percent in the first nine months of the year. In September, and again in October, the BoI raised the rate by 25 basis points to 4 percent, and by a further 50 basis points in November, citing the anticipated effects of the cumulative rate of depreciation of the sheqel against the U.S. dollar, partly related to increased political uncertainty, stronger economic growth, and the persistent upward trend in inflation rates world-wide. The BoI increased the policy rate by another 25 basis points in January, 2006, but left it unchanged at 4.75 percent in February.

11. T**his cursory review of recent monetary history of Israel suggests that there has been excessive volatility in policy intervention with corresponding consequences for the economy and inflation.** The evidence from the expectations data suggests that there has been a price to pay on credibility. Better tools may help policy makers better understand the issues they must face and the consequences of their choices. We now turn to one possibility that has been used successfully in many central banks as a starting point—a very simple model of the nexus linking monetary policy, the exchange rate, output and inflation.

C. The Model

12. **The model has four core equations:** (i) an aggregate demand or IS curve that relates the level of real activity to expected and past real activity, the real interest rate, the real exchange rate and the level of foreign activity; (ii) a price-setting or Phillips curve that relates inflation to past and expected inflation, the output gap, the exchange rate and the relative price of oil[6]; (iii) an uncovered interest parity condition for the exchange rate, with some allowance for backward-looking expectations; and (iv) a rule for setting the policy

[6] Here we add a second Phillips equation, so as to analyze the implications of pass-through from oil price changes into the core measures of inflation (i.e. excluding energy components).

interest rate as a function of the output gap and expected inflation.[7] The model expresses each variable in terms of its deviation from equilibrium, in other words in 'gap' terms. The model itself does not attempt to explain movements in equilibrium real output, the real exchange rate, or the real interest rate, or in the inflation target. Rather, these are taken as given.

Output Gap Equation

13. **Domestic output depends on the real interest rate, the real exchange rate, and demand in the rest of the world, represented here by the United States.** Dynamics are added through past and future domestic output gaps.[8]

$$ygap_t \equiv \beta_{ld} ygap_{t+1} + \beta_{lag} ygap_{t-1} - \beta_{RRgap}(RR_{t-1} - RR^*_{t-1}) + \beta_{zgap}(z_{t-1} - z^*_{t-1}) + \beta_{yus} ygapus_t + \varepsilon^y_t \quad (1)$$

where *ygap* is the output gap, *RR* is the real interest rate in percentage points, z is the real exchange rate (measured so an increase is a depreciation, in percentage points), and a * denotes an equilibrium value of a variable. The output gap is measured as the deviation, in percentage points, of actual output from a measure of the trend or equilibrium level of GDP (a positive number indicates that output is above trend). Finally, $ygapus_t$ is the output gap in the U.S. economy, similarly measured.

14. **For most economies, there are lags in the transmission of monetary policy.** In terms of equation (1), this would lead us to expect that the sum of β_{RRgap} and β_{zgap} will be small relative to the parameter on the lagged gap in the equation. Berg, Karam and Laxton (BKL) suggest that that the sum of β_{RRgap} and β_{zgap} is between 0.10 and 0.20 for most economies.[9] For Israel, we begin with values at the upper end of this range, since it appears that monetary policy has a relatively rapid effect there.[10] BKL opine that the parameter on the lagged gap term, β_{lag}, would typically lie between 0.50 and 0.90. We begin with 0.6, towards the lower end of the range, for the same reason. For the weight on the lead of the output gap, β_{ld}, we have picked 0.1, which is in the middle of the range applied for other countries. Together, these settings provide a model economy with moderate inertia, which we would argue is an appropriate characterization of Israel.

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[7]For an introduction to the literature on such models, see Clarida, Gali and Gertler (1999). For a recent overview, see Woodford (2003a). See also Berg, Karam and Laxton (2006a, 2006b).

[8] The lead can be thought of as motivated by the structure one gets from an optimizing model with habit persistence. The dynamic equation has a forward- and a backward-looking component.

[9] See Berg, Karam, and Laxton (2006a).

[10] The parameter values proposed in this section are partly based on experience with this type of model in a number of countries and partly on econometric estimations using Israeli data. Many such models have been implemented at central banks and are unpublished; see, however, Coats, Laxton, and Rose (2003) for an application in the Czech Republic.

15. **Consider now the details of the effect of the price variables.** Coefficient β_{RRgap} determines the direct effect of the policy variable on the output gap (with a one quarter lag). Our starting point for this value for the Israel model is 0.15, which reflects our view that policy acts quickly and strongly in Israel. This is about three times the size of the parameter picked for a similar model in the Czech Republic, for example.[11] For industrial economies, we would expect that β_{zgap} would typically be smaller than β_{RRgap} and would depend on the degree of openness. We have calibrated the model with β_{zgap} at 0.05, one-third the value taken for β_{RRgap}.[12] The degree of openness would also influence the relative importance of the direct effect of world excess demand through $\beta_{yus;}$ normally this effect would be expected to be less than the direct effect of domestic demand conditions. We have set this parameter to 0.15, one-quarter of the domestic (lagged) gap coefficient.

Phillips Curve

16. **Inflation depends on expected and lagged inflation, the output gap, the exchange rate gap and movements in the real (relative) price of oil.[13]**

$$\pi_t = \alpha_{\pi ld}\pi 4_t^e + (1-\alpha_{\pi ld})\pi 4_{t-1} + \alpha_{ygap}[0.5ygap_t + 0.5ygap_{t-1}] \qquad (2)$$
$$+ \alpha_z\left[z_t - z_{t-1}\right] + \alpha_{rpo1}\pi rpo_t^e + \alpha_{rpo2}\pi rpo_{t-1}^e + \varepsilon_t^{\pi}$$

where $\pi 4_t^e$ is the expected rate of inflation over the next four quarters. We have a market measure of this expectation for Israel. To close the behavioral model we specify that this expectation is model-consistent:[14]

$$\pi 4_t^e = \pi 4_{t+4}.$$

17. **The Phillips curve embodies some key ideas about the role of monetary policy.** The fundamental role of monetary policy is to provide a nominal anchor for inflation and inflation expectations. In equation (2), the coefficients on expected and lagged inflation sum to one, implying that *any* constant level of inflation is consistent with the output gap and the real exchange rate gap being zero. The equation itself cannot determine a level of inflation. Rather, it is the actions of the monetary authority that pulls inflation towards the target. Monetary policy influences inflation through its effects on output and the exchange rate.

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[11] See Coats, Laxton, and Rose (2003).

[12] Note, however, that the relative size of this parameter does not determine alone the relative importance of the two channels of monetary policy. The exchange rate and the interest rate are linked, and the speed and strength of the response of the exchange rate will be very important.

[13] Inflation is measured as the annualized quarterly change, in percent, so $\pi_t = 400[\log(cpi_t) - \log(cpi_{t-1})]$. $\pi 4_t$ is the four-quarter change in the CPI.

[14] This explicit formulation of expectations has the advantage that we can use it to introduce shocks to expectations that move them temporarily away from model-consistent values.

Thus, the coefficients on these terms cannot all be zero or monetary policy would have no effect. The dynamic structure of equation (2) has not been formally derived here. However, we show one key idea explicitly. The dynamics of inflation depend on both expectations, per se, and on other sources of inertia. We show that here by having expectations fully model-consistent; yet there is a lagged term in the Phillips curve coming from other sources, such as indexation, regulation or other rigidities from contracts.[15]

18. **The behavior of the economy depends critically on the value of $\alpha_{\pi ld}$.** If there is a high weight on the forward component ($\alpha_{\pi ld}$ is 1), then inflation is equal to the sum of all *future* output and exchange rate gaps. A small but persistent increase in interest rates will have a large and immediate effect on current inflation. If on the other hand, there is a lot of inertia ($\alpha_{\pi ld}$ is close to 0), then current inflation is a function of lagged values of the gaps, and it may require lengthy periods of monetary pressure to move inflation toward some desired path. Where price setting is flexible and the monetary authorities are very credible, high values of $\alpha_{\pi ld}$ might be reasonable, but for most countries values of $\alpha_{\pi ld}$ significantly below 0.50 seem to produce results that are considered to be more consistent with data.[16] For Israel, we begin with $\alpha_{\pi ld}$ at 0.1, that is, with a relatively high degree of inertia in inflation.

19. **The value of α_{ygap} determines, conditional on the above discussion, the strength of the short-term responsiveness of inflation to excess demand.** Economies with more rigidity in price setting (regulation, contracts, etc.) would be expected to have lower values, all else equal.[17] We begin with α_{ygap} set to 0.3. This applies to a simple moving average of the current and lagged gaps. All else equal, an output gap of 1 percentage point will result in the inflation rate rising by 0.15 percentage points, with a further similar effect next quarter.

20. **The value of α_z determines the effects of exchange rate changes on inflation, and would typically be larger in economies that are very open.** Higher exchange rate pass-through is generally also observed in countries where monetary policy credibility is low and where the value-added of the distribution sector is low. There is evidence of pricing-to-market behavior in many economies, suggesting that α_z would be considerably smaller than the import (or traded goods) weight in the CPI basket. Our work suggests that Israel may be an exception in this regard. There are some key prices (rents, for example) that are denominated in U.S. dollars, which provides for fast and powerful pass-through of exchange rate changes into the CPI. Based on preliminary work on this issue, we have set α_z to 0.23.

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[15] We could, of course, add further inertia by making expectations partially forward- and partially backward-looking.

[16] The choice of parameters like this may change over time. For example, if the successful implementation and communication of a policy regime like inflation targeting results in gains in credibility, we would expect to see more weight to be placed on the forward component.

[17] It is important to understand, however, that the general issue of the nature and speed of response to excess demand is not primarily determined by this parameter. The policy response to excess demand and the influence of the response of the exchange rate, along with the degree of inertia in expectations, tend to be the crucial issues.

21. **The terms in the price of oil,** $\alpha_{rpo1}\pi rpo_t^e$ and $\alpha_{rpo2}\pi rpo_{t-1}^e$, **allow for the direct effect of oil prices on the CPI when the relative price of oil is changing.** In a steady state, where oil prices are rising in line with prices generally, these terms would have no effect. When relative oil prices are changing, however, we capture the pass-through effects using current and lagged rates of change. In the Israeli context, both parameters are set to 0.01, which reflects some empirical work to estimate the relevant elasticity.

22. **In 2005, and looking ahead to 2006, the effect of changing oil prices emerged as an important issue.** To allow for investigation of the implications of pass-through of oil price changes into the core measures of inflation, we add a second Phillips equation, which has similar form, but without the direct effect of relative oil prices included for the headline CPI inflation. Rather, we add a term that allows for a feedback from the difference between headline and core inflation to core inflation itself.

$$\pi c_t = \alpha_{\pi ld}\pi c4_{t+4} + (1-\alpha_{\pi ld})\pi c4_{t-1} + \alpha_{ygap}[0.5ygap_t + 0.5ygap_{t-1}]$$
$$+\alpha_z[z_t - z_{t-1}] + \alpha_{pt}(\pi 4_{t-1} - \pi c4_{t-1}) + \varepsilon_t^{\pi c}$$

Based on empirical work, α_{pt} is set to 0.05, so that if headline inflation rises one percentage point above core inflation, the latter responds with a one-quarter lag by 0.05 percentage points. The rest of the parameters are the same as in the equation for headline inflation.

Exchange Rate

23. **We adopt a version of uncovered interest parity (UIP):**

$$z_t = z_{t+1}^e - [RR_t - RR_t^{us} - \rho_t^*]/4 + \varepsilon_t^z \qquad (3)$$

where RR_t^{us} is the U.S. real interest rate and ρ_t^* is the equilibrium risk premium. As before, RR_t is the policy real interest rate and z_t is the real exchange rate.[18] Thus, any deviation of interest rates from equilibrium, either at home or abroad, would result in the exchange rate deviating from equilibrium, unless such rate deviations were identical. Any other movement in exchange rates is captured in the residual in the exchange rate equation, which can be thought of as a temporary shock to the risk premium.

24. **We assume a coefficient of 1 on the interest rate differential, as implied by UIP.** This result has been frequently challenged empirically. In defense of our assumption, the simultaneity involving interest rates and exchange rates makes any effort to estimate this

[18] The interest rate term is divided by 4 because the interest rates and the risk premium are measured at annual rates, where changes in z_t are inherently quarterly.

coefficient particularly difficult.[19] Fundamentally, however, we do not see this as an empirical issue; a macro model with irrational arbitrage is, to say the least, unappealing.

25. **We also allow—but do not impose—(model-consistent) rational expectations for the exchange rate:**

$$z^{e}_{t+1} = \delta_z z_{t+1} + (1 - \delta_z) z_{t-1}$$

If $\delta_z = 1$, we recover Dornbusch (1976) overshooting dynamics. In practice, overshooting often seems to take place in slower motion, and a value of δ_z somewhat less than 1 may provide more realistic dynamics. Unfortunately, there is little consensus across countries or observers on a reasonable value for δ_z.[20] For the Israel model, we begin with δ_z set to 0.25.

Monetary policy rule

26. **The monetary policy reaction function mirrors the specification in many similar models.** The policy instrument is a short-term nominal interest rate, and the central bank sets this instrument to anchor inflation to a target level, π^*, over time. The central bank may also temper its actions based on deviations of output from equilibrium.

$$RS_t = \gamma_{RSlag} RS_{t-1} + (1 - \gamma_{RSlag}) * (RR^*_t + \pi 4_t + \gamma_\pi [\pi 4_{t+4} - \pi^*_{t+4}] + \gamma_{ygap} ygap_t) + \varepsilon^{RS}_t \quad (4)$$

The structure and parameters of this equation have a variety of implications.[21] An important conclusion from assessments of monetary policy in the 1970s, and one embedded in the structure of this model, is that a stable inflation rate requires a positive γ_π.[22] Beyond this, our framework does not allow explicit discussion of optimality.[23] But it may be useful to note that how strongly the authorities should react depends on the other features of the economy.

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[19] See Chin and Meredith (1998), for example.

[20] The value of δ_z matters for forecasting and policy analysis. When $\delta_z = 1$, the real exchange rate will be a function of the future sum of real interest differentials (and risk premia) and will provide a direct and rapid channel through which monetary policy will operate. For policy, it may be imprudent to rely heavily on these forward-looking linkages in the face of uncertainty. Isard and Laxton (2000) suggest that policy could be made more robust in an uncertain world by assuming that δ_z is slightly below 0.5, because of larger and asymmetric costs that would result from assuming extreme values.

[21] For a brief introduction to the vast literature evaluating alternative monetary policy rules see Black, Macklem, and Rose (1997), Hunt and Orr (1999) and Taylor (1999).

[22] This restriction, which is necessary to provide an anchor for the system, has come to be known as the Taylor principle, after John Taylor who popularized the idea of using interest rate reaction functions to characterize monetary policy in macro models.

[23] The analyst could create a loss function, for example one that depends on the variance of output and inflation and possibly interest rates and then simulate the model to determine how, in the face of a given pattern of shocks, a particular rule performs.

If the economy is very forward-looking, for example, then mild but persistent reactions to expected inflation should be enough to keep inflation close to target. We begin with γ_π set at 2.5, which we would characterize as implying fairly aggressive response, but well below what has been used to characterize very aggressive central banks.[24] In a similar fashion, we have chosen 0.5 for γ_{ygap}, which we would characterize as an average weighting.

27. **We assume that the central bank smoothes interest rates, adjusting them gradually to the desired value based on deviations of inflation and output from equilibrium.** This feature is not easily rationalized, but it is widely observed. We have set this parameter, γ_{RSlag}, to 0.5, which is at the low end of the range reported by BKL.

The Supply Side

28. **This model has only a rudimentary supply side.** Output and the real interest rate appear in all the behavioral equations in gap terms, implying that only deviations from equilibrium levels for output, the real exchange rate and the real interest rate are modeled. The supply-side variables are assumed to follow simple stochastic processes. In applications of the model that are not explicitly stochastic, such as baseline forecasts and policy analysis of specific issues in a forecast, this means that the analyst must make assumptions about the equilibrium levels. Then, output itself will depend on the output gap from equation (1) and equilibrium output:

$$y_t \equiv ygap_t + y_t^*$$

29. **This reflects a choice for simplicity, and in particular recognition that only a much more complicated model would provide a useful supply side.** The implications of a positive permanent supply shock for the output gap and inflation, for example, are complex. The increase in capacity may reduce the output gap and prices. On the other hand, an investment boom will tend to result until the capital stock has achieved the higher level of productivity.[25] Each key supply-side variable is assumed to depend only on its own lagged values and shocks. This specification serves to provide a set of residuals that can be manipulated so the resulting response of the economy can be examined.

30. **Potential output is assumed to grow at some steady-state growth rate, with potentially serially correlated shocks to both the level and growth rate (thus permanent shocks to the level) of potential output.** For Israel, we are assuming steady-state annual growth in potential output of 4 percent. The equilibrium real interest rate and the equilibrium

[24] In the model for the Czech Republic, for example, this parameter was set to 5 (Coats, Laxton, and Rose, 2003).

[25] Many models have interesting treatments of the supply side and address these issues. For applications in Central Banks see, for example, Black and others (1994) and Coletti and others (1996) (Canada) and Hunt, Rose, and Scott (2000) (New Zealand). The IMF's GEM represents another approach.

real exchange rate are assumed to follow stationary processes, with temporary but possibly persistent shocks around some steady-state level. We assume that the equilibrium short-term real interest rate is 3.5 percent. The equilibrium risk premium is calculated as the value of the risk premium that keeps the real exchange rate on its equilibrium trajectory, given that interest rates are at their equilibrium values. Temporary shocks to the exchange rate are equivalent to and can be interpreted as temporary shocks to the risk premium.

31. **The inflation target is assumed to be equal to its lagged value.** For Israel, the target inflation rate is set at 2 percent per annum, the mid-point of the Bank of Israel's 1−3 percent target bands. In a forecasting and policy analysis exercise, the equilibrium values for the domestic real interest rate, the foreign (US) real interest rate, potential output, and the inflation target may come, as usual, from a variety of sources, including judgmental estimates of the authorities or econometric analyses.[26]

The Rest of the World (United States)

32. **Although there is no direct effect of economic conditions in Israel on economic performance in the United States, we include a parallel model of the U.S. economy to provide for sensible dynamics in experiments involving world (US) shocks.** The output gap dynamics are represented in a simplified version of equation (1). The structure is the same, but without the exchange rate and world gap terms.

$$yusgap_t \equiv \beta_{usld}\, yusgap_{t+1} + \beta_{uslag}\, yusgap_{t-1} - \beta_{RRgap}\,(RRus_{t-1} - RRus^{*}_{t-1}) + \varepsilon^{yus}_t$$

For the baseline analysis, we have assumed that U.S. potential output grows at 3.4 percent per annum over the forecast horizon, falling to 3 percent per annum in the longer term. The dynamic parameters are the same as in the domestic equation.

33. T**he U.S. Phillips curve has essentially the same structure as the Israeli version, but without the exchange rate effect.**

$$\pi us_t = \alpha_{\pi usld}\,\pi us4_{t+4} + (1-\alpha_{\pi usld})\,\pi us4_{t-1} + \alpha_{yusgap}\, yusgap_{t-1} + \alpha_{rwpo1}\,\pi rwpo^{e}_{t} + \alpha_{rwpo2}\,\pi rwpo^{e}_{t-1} + \varepsilon^{\pi us}_t$$

The U.S. target inflation rate is assumed to be 2.5 percent per annum. Note that this implies an ongoing nominal appreciation of the sheqel of 0.5 percent per annum, reflecting the difference in steady-state inflation rates. An important difference between the models comes in our choice for $\alpha_{\pi usld}$. We set this to 0.2, double the value in the Israeli equation. This makes the U.S. version much more forward-looking, reflecting a view that the Fed has built some credibility in its ability to control inflation. Finally, the parameters on the relative oil price terms are the same as in the domestic equation. There is also an equation for U.S. core inflation, with the same structure to allow for pass-through of oil price shocks into core

[26] In this, as in most similar exercises for other countries, we use a flexible filter that extracts long-run values from actual data as part of the historical analysis. Documentation of this methodology and programs to implement it are available.

inflation.

34. **Finally, there is a U.S. policy reaction function, which is very similar to the function specified for the Israeli economy, except that some explicit weight is given to the core inflation rate.** In the domestic economy, only headline inflation enters the reaction function. We do, however, set the smoothing parameter, γ_{ruslag}, to 0.75, higher than in the home reaction; the Fed does not, as yet, have a formal inflation target and is seen as less aggressive on this front, period-by-period, than most inflation-targeting central banks. Similarly, $\gamma_{\pi us}$, the weight on the key inflation term, is set to 2, a bit lower than in the domestic equation. The weight on the output gap is the same in the two equations.

$$RSus_t = \gamma_{ruslag} RSus_{t-1} + (1-\gamma_{ruslag})(RRus_t^* + \pi us4_t + \gamma_{\pi us}[0.5\pi 4_{t+4}^{us} + 0.5\pi c4_{t+4}^{us} - \pi tar_t^{us}]$$
$$+ \gamma_{yus} yusgap) + \varepsilon_t^{rsw}$$

D. Calibrating the Model and its Properties

35. **The answers a model gives depend crucially on the parameter values as well as its structure.** How does the analyst choose those values and the details of the structure?[27] We have taken and recommended an eclectic approach, following current modeling practice in many policymaking institutions. The basic idea is to choose coefficients that seem reasonable based on economic principles, available econometric evidence, and an understanding of the functioning of the economy, and then to look at how sensible the properties of the resulting model are. An iterative calibration process results in which the properties of the model are examined and changes made to the coefficient values, or the structure of the model, until the model behaves appropriately.

36. **Why not just estimate the model econometrically? The answer lies in same logic that leads us to begin with a very simple model, where we choose the *structure* of the model based on economic and not econometric considerations.** For similar reasons, useful parameter values will typically not come from a purely econometric approach. The data are inadequate, time series too short, and structural changes abound. Moreover, for the parameters we need for a simple high-level macro model, the problems of simultaneity in the limited historical data make the identification problem severe.

37. **A model should not to be judged primarily by how the parameters are chosen or how well the model fits the data.** Rather, the usefulness of a model for policy analysis will depend on how well it captures key aspects of the monetary policy transmission mechanism. For example, the model should provide reasonable estimates of how long it takes a shock to the exchange rate to feed into the price level. Some of this may come from an examination of history, where the analyst identifies a shock based on knowledge of the policy process and traces its effects. For example, a look at past disinflation episodes may shed some light on

[27] For an in-depth review of these issues, see Berg, Karam and Laxton (2006a, 2006b).

measures of the historical sacrifice ratio, which, in turn, can guide the calibration of the model. Another approach is to examine the properties of models that have been developed over time in central banks and other policy institutions. In cases where such models are used for day-to-day policy analysis, the results may correspond with the collective judgment of the policymakers and thus may represent a convenient insight into that judgment.[28] A comparison with well-established models from similar countries may also be helpful.

38. **The main disadvantage of calibration is that it does not lend itself easily to formal statistical inference, which has always been an important priority in both academic and policymaking circles.** The use of various system estimation techniques to parameterize Dynamic Stochastic General Equilibrium (DSGE) models and assess their performance is an active area of research.[29] Recent developments in the application of Bayesian estimation techniques represent a particularly promising way to bring data and statistical tests to bear in a way that is consistent with the practical approach we suggest.[30] These techniques provide answers to the question: to what extent are the data consistent with prior views about parameter values to permit the data to speak in a way that is consistent with the practical approach we suggest.[31] However, we do not see the Bayesian approach, or any econometric technique, as an alternative to properties-based calibration. Estimation can provide useful support for calibration, but the primary focus is sensible properties.

E. Using the Model for Forecasting and Policy Analysis

39. **Based on the successful experience of a number of central banks that started with a model of the sort we have described above, the model can be very helpful in the process of preparing forecasts and analyzing monetary policy.** Typically, the model itself does not make the short-term forecast. That comes from specialists using a variety of tools and information. A variety of techniques are available to enable the model solution to be tuned to a judgmental path for a certain period of time. The model can serve, however, to frame the discussion about the baseline forecast, by ensuring a coherent story. The model also contributes the medium- and long-term part of the baseline, where issues of the conjuncture are resolved in a process of convergence on an equilibrium path.

40. **The model comes into its own, however, in evaluating risks to the forecast, appropriate responses to a variety of shocks, and dependencies of the forecast and**

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[28] Schmidt-Hebbel and Tapia (2002) have compiled views about the monetary policy transmission mechanism and other features of the economy from twenty central banks.

[29] For a discussion of estimation issues of models designed for monetary policy analysis, see Coletti and others (1996), Hunt, Rose, and Scott (2000), Coats, Laxton and Rose (2003), Faust and Whiteman (1997), and Kapetanios, Pagan and Scott (2005).

[30] These Bayesian techniques can be thought of as a more formal version of the calibration/parameterization method described here.

[31] See Smets and Wouters (2004), and Juillard and others (2004) for some recent applications to DSGE macroeconomic models.

policy recommendations on various sorts of assumptions about the functioning of the economy. In most central banks that use this FPAS methodology, there will be a lot of sensitivity analysis of this type done before a formal baseline is chosen. Then, some of these experiments will be selected and documented as risks to the baseline scenario. We now illustrate these ideas using our simple model.

F. Baseline Analysis

External Conditions (Table 1)

Oil prices

41. **Our baseline assumptions on world oil prices come from the futures market on December 9, 2005.** Futures prices see the price of oil falling from 60US$ in 2005Q3 to 56.50 in 2005Q4 and then rising back to 60.10 in 2006Q4. Essentially, the scenario is built on the assumption that the large increase already seen in 2005 is permanent.

U.S. Economy

42. **Our U.S. baseline starts from the assumption that the output gap was negative in 2004, but has essentially closed following the strong growth in 2005.** Inflation pressure was rising from the output dynamics and is now sharply exacerbated by the oil price shock. Year-on-year headline CPI inflation jumped to 3.8 percent in 2005 Q3, with the quarter-on-quarter measure surpassing 5 percent at annual rates. However, core rates of inflation have remained low. In our baseline scenario, the Fed continues to push up short-term interest rates through 2006. Inflation rises a bit higher but then declines in the second half of 2006 as the effects of the abatement of pressures from the energy price shock and the effects of monetary tightening ease inflation expectations. Our baseline does not include a recession. Output growth slows as it converges on the potential rate, but the output gap remains close to zero. In short, the baseline scenario for the U.S. features quite a soft landing.

Baseline Scenario for Israel (Table 2)

43. **After a prolonged period of recession, the Israeli economy is strengthening. To date in 2005, real output growth, year-over-year, has been just over 5 percent.** We project growth to be robust in the fourth quarter (5.0 percent, quarterly at annual rates), leaving annual year-on-year growth for 2005 at 5 percent, above potential growth. However, the output gap remains negative, in our view, as recovery in levels still has some way to go before demand conditions become a concern in terms of inflation pressure. Moreover, real output growth is projected to ease slightly going forward, averaging 4.7 percent per for 2006 and 4.4 percent for 2007. We project the output gap to remain negative for the next few years, as the level of output approaches its potential from below.

44. **On average, prices fell in Israel in 2004, in large part owing to appreciation of the sheqel against the dollar, and for 2005 as a whole, headline inflation, projected at 1.25 percent, is below the longer-term target rate.** However, the sharp rise in oil prices

and depreciation in the exchange rate has had significant effects. From 2005 Q2, headline inflation has been well above the target level, with quarter-over-over quarter measure reaching 5.8 percent in Q3.

45. **To keep inflation from escalating, especially in the aftermath of the recent depreciation of the sheqel and the large oil price shock, the monetary authority must be vigilant.** The short-term rate will have to rise through the final quarter of 2005 and into 2006. Real rates have been below their equilibrium value through the prolonged period of excess supply, but will rise as output approaches its potential level.

G. Risk Analysis

46. **In this section, we describe the results for a number of shocks to the baseline assumptions.** We begin with a temporary increase in the world price of oil and then turn to demand shocks, considering both an increase in domestic demand and an increase in U.S. demand. Finally, we consider an exogenous depreciation of sheqel, in the form of an increase in the country risk premium.

A Temporary Increase in the Price of Oil (Table 3)

47. **Here we assume that the price of oil increases by 50 percent and then gradually returns to the control level over two years. Interest rates rise by 50 basis points on impact and then gradually decline over time.** The direct effect of a 50 percent oil price increase would raise headline Y-O-Y inflation by 0.5 percentage points, but the appreciation in the sheqel offsets this direct effect resulting in only a 0.29 percentage point increase in headline inflation on impact. Note that the exchange rate appreciates slowly over time in response to the higher interest rate differential rather than jumping instantaneously in response to the new future path of interest rate differentials.

48. **Growth is lower in 2006 by 0.6 percentage points partly because of a negative output gap (-0.2) and partly because of slower growth in potential output growth (-0.4).** However, as oil prices decline over time growth increases as both the output gap and the level of potential output return to their baseline line path. Note, that to keep headline inflation from rising significantly core inflation declines below baseline.

An Increase in Foreign Demand (Tables 4 and 5)

49. **We next consider a shock to foreign demand, via an add-on/temp shock on the residual in the U.S. output gap equation to 0.5 (i.e., the shock is 0.5 percent of potential) for 3 quarters, starting in the fourth quarter, 2005.** Of course, the endogenous response of policy and the rest of the macro variables influence the outcome for the gap over time.

50. **In the United States, output rises above control through 2006.** Quarterly output growth rises above control for the first three quarters, but then falls below control as the policy response begins to bite. The policy rate is increased relative to control by about 110

basis points on average in 2006, and slightly more in 2007, as inflation continues to rise relative to control through 2007, despite a lower output gap.

51. **In Israel, the extra foreign demand raises domestic output, but the effect is muted compared with the direct effects in the foreign economy; the output gap peaks at about 20 basis points above control in the third quarter of the shock.** The policy response in Israel is smaller than in the United States, peaking at about 80 basis points. In the very short run an appreciation of the sheqel initially offsets the effect of the shock on inflation, but then inflation rises modestly in response to higher demand.

An Increase in Domestic Demand (Table 6)

52. **We next consider a shock to domestic demand, via an add-on shock to the residual in the output gap equation of 0.5 (i.e., the shock is 0.5 percent of potential) for 3 quarters, starting in the fourth quarter, 2005.** There are no significant effects of a shock in Israel on the U.S. economy, and discussion is limited to the home country effects.

53. **The increase in domestic demand, relative to the baseline, has a negligible concurrent and lagged effect on inflation.** In anticipation of upward adjustment in inflationary expectations, monetary policy tightens, with the short rate peaking at about 50 basis points above control in the third quarter of the shock. The sheqel appreciates in response to the tightening, which in the short run more than offsets the direct effect of the additional demand. This illustrates a good example where the policy response to excess demand and the subsequent influence of the exchange rate, along with the degree of inertia in expectations, tend to be fundamental factors. The disinflation environment, associated here with the presence of a negative output gap also plays a key role in mitigating inflationary pressures. Output growth (YOY) reflects the cumulative shock, at about 1 percent, in the second quarter and remains at about the same level above control in the third quarter of the shock. After that, there is a period of decline in output, relative to control, as the policy tightening works to bring inflation and expectations back to the target level.

An Exogenous Depreciation of the Sheqel (Table 7)

54. **In this shock, we suppose that the risk premium rises and the sheqel depreciates.** The shock is on for just one quarter. The net effect in the first quarter is a depreciation of 1.4 percent. The exchange-rate effects persist for another year, before beginning to subside. Again, while there are some minor effects in the United States, our discussion focuses on Israel. This shock is particularly interesting, given the very recent developments in Israel.

55. **This shock puts upward pressure on prices in Israel; annual CPI inflation is up by almost 30 basis points in the first quarter (more than the direct pass-through effect).** The policy response is to raise interest rates (60 basis points at the peak) and to keep them higher for a year. The depreciation has little effect on aggregate demand, as the rapid policy response counters any stimulating effect. In the quarterly real growth numbers, we see that there is a very small positive effect in the second quarter, but thereafter the rate increase dominates as the inflationary effects are wrung out of the system.

H. Conclusions and Future Work

56. **In this paper we presented a small Forecasting and Policy Analysis System (FPAS) that has been designed to help prepare baseline forecasts and risk assessments for the Israeli economy.** The first version of the model was calibrated based on looking at single-equation estimation results, as well as examining the model's system properties in response to standard demand and supply shocks. Our initial experience using the model as an organizational device has been positive and we plan to use the model on an ongoing basis to provide forecast updates and risk assessments.

57. **The paper has benefited from very useful feedback and suggestions at the Bank of Israel and we plan to work with the BoI staff on the issues that were identified over the coming months.** First, we plan to estimate the parameters of the model with Bayesian methods and at the same time will attempt to develop a more consistent methodology for measuring key unobservable variables such as potential output and the output gap. Second, we intend to explore the implications of more forward looking behavior in the inflation equations and longer lags between real monetary conditions (combination of the real exchange rate and real interest rates) and the output gap. Finally, using a more structured 2-sector DSGE model as well as empirical work that has been done at the BoI, we plan to extend the baseline to allow for a trend real appreciation in the sheqel.

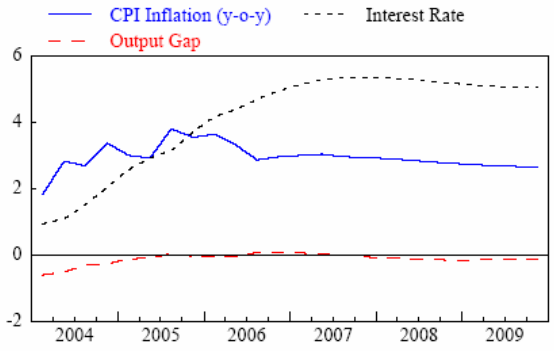
Table 1: United States Baseline Forecast on December 10, 2005

Deviations from the Latest Baseline

(percent deviation) or [percentage point deviation]

	Quarterly								Annual					
	2005				2006									
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	2004	2005	2006	2007	2008	2009
Short-term Interest Rate	2.6	2.9	3.2	3.7 [+0.1]	4.2 [+0.2]	4.4 [+0.3]	4.7 [+0.4]	5.0 [+0.6]	1.4	3.1 [+0.0]	4.6 [+0.3]	5.3 [+0.9]	5.3 [+0.9]	5.1 [+0.7]
Value of US$ (in IS. Sheqel)	4.38	4.37	4.56	4.63 (+1.6)	4.61 (+1.4)	4.59 (+1.1)	4.57 (+0.7)	4.54 (+0.3)	4.48	4.49 (+0.4)	4.58 (+0.9)	4.50 (-0.4)	4.47 (-0.6)	4.44 (-0.7)
Real GDP Growth														
% y-o-y	3.6	3.6	3.6	3.4 [+0.0]	3.3 [+0.0]	3.3 [+0.0]	3.3 [+0.1]	3.5 [+0.0]	4.2	3.6 [+0.0]	3.4 [+0.0]	3.3 [-0.3]	3.3 [-0.3]	3.4 [-0.0]
% q-o-q	3.8	3.3	3.8	2.9 [+0.0]	3.3 [+0.0]	3.4 [+0.0]	3.8 [+0.3]	3.4 [-0.2]						
CPI Inflation														
% y-o-y	3.00	2.93	3.80	3.55 [+0.02]	3.65 [+0.04]	3.32 [+0.07]	2.87 [+0.22]	2.97 [+0.32]	2.68	3.32 [+0.00]	3.20 [+0.16]	2.99 [+0.45]	2.84 [+0.34]	2.68 [+0.18]
% q-o-q	2.39	4.16	5.11	2.56 [+0.06]	2.80 [+0.10]	2.83 [+0.13]	3.31 [+0.61]	2.93 [+0.43]						
Core CPI Inflation														
% y-o-y	2.29	2.16	2.10	2.14 [-0.00]	2.17 [+0.00]	2.35 [+0.00]	2.60 [-0.05]	2.63 [-0.02]	1.76	2.17 [-0.00]	2.44 [-0.02]	2.64 [+0.10]	2.62 [+0.12]	2.54 [+0.04]
% q-o-q	2.58	2.02	1.47	2.50 [-0.00]	2.71 [+0.01]	2.72 [+0.02]	2.46 [-0.24]	2.65 [+0.15]						
Price of oil (US$)	46.1	50.8	60.0	56.5 (+0.0)	57.5 (+0.0)	58.8 (+0.1)	59.7 (+0.2)	60.1 (+0.3)	37.8	53.4 (+0.0)	59.0 (+0.2)	60.2 (+0.6)	60.1 (+0.9)	60.2 (+1.1)
Output Gap	-0.11	-0.09	0.05	-0.05 [+0.00]	-0.05 [+0.00]	-0.04 [+0.00]	0.08 [+0.08]	0.09 [+0.02]	-0.42	-0.05 [+0.00]	0.02 [+0.03]	0.01 [-0.26]	-0.13 [-0.59]	-0.14 [-0.64]
Potential Output Growth														
% y-o-y	3.1	3.2	3.2	3.2 [+0.0]	3.2 [+0.0]	3.3 [+0.0]	3.3 [+0.0]	3.3 [+0.0]	3.0	3.2 [+0.0]	3.3 [+0.0]	3.4 [+0.0]	3.4 [+0.0]	3.4 [+0.0]
% q-o-q	3.2	3.2	3.2	3.3 [+0.0]	3.3 [+0.0]	3.3 [+0.0]	3.3 [+0.0]	3.3 [+0.0]						

Inflation, Interest Rates and the Output Gap



Real GDP Growth

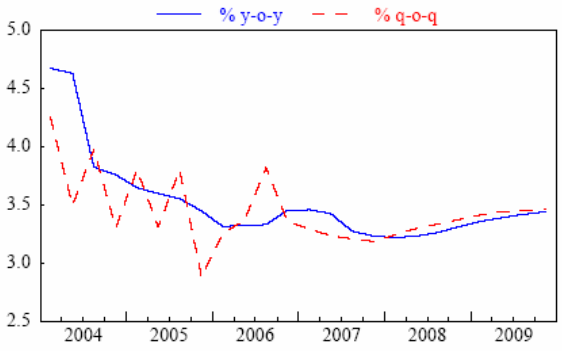


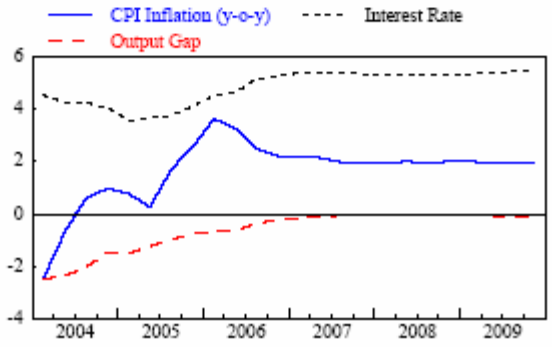
Table 2: Israel Baseline Forecast on December 10, 2005

Deviations from the Latest Baseline

(percent deviation) or [percentage point deviation]

	Quarterly								Annual					
	2005				2006									
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	2004	2005	2006	2007	2008	2009
Short-term Interest Rate	3.5	3.7	3.8	4.1 [+0.1]	4.5 [+0.5]	4.6 [+0.6]	5.1 [+1.1]	5.3 [+1.3]	4.3	3.8 [+0.0]	4.9 [+0.9]	5.4 [+1.4]	5.3 [+0.7]	5.4 [+0.4]
Value of US$ (in IS. Sheqel)	4.38	4.37	4.56	4.63 (+1.6)	4.61 (+1.4)	4.59 (+1.1)	4.57 (+0.7)	4.54 (+0.3)	4.48	4.49 (+0.4)	4.58 (+0.9)	4.50 (-0.4)	4.47 (-0.6)	4.44 (-0.7)
Real GDP Growth														
% y-o-y	5.1	5.2	5.1	4.7 [+0.0]	4.9 [+0.1]	4.6 [+0.1]	4.7 [+0.4]	4.5 [+0.5]	4.4	5.0 [+0.0]	4.7 [+0.3]	4.4 [+0.3]	4.0 [-0.2]	4.0 [-0.3]
% q-o-q	3.8	5.2	5.0	5.0 [+0.0]	4.3 [+0.3]	4.0 [-0.0]	5.3 [+1.3]	4.5 [+0.5]						
CPI Inflation														
% y-o-y	0.77	0.26	1.69	2.56 [+0.32]	3.62 [+0.35]	3.26 [+0.38]	2.48 [+0.53]	2.22 [+0.22]	-0.40	1.33 [+0.08]	2.89 [+0.37]	2.05 [+0.05]	1.97 [-0.03]	1.97 [-0.03]
% q-o-q	-1.97	3.51	5.80	3.07 [+1.27]	2.12 [+0.12]	2.11 [+0.11]	2.62 [+0.62]	2.02 [+0.02]						
Core CPI Inflation														
% y-o-y	0.22	-0.27	1.11	1.84 [+0.30]	2.40 [+0.33]	3.13 [+0.36]	2.43 [+0.48]	2.17 [+0.17]	-0.84	0.73 [+0.08]	2.53 [+0.33]	2.03 [+0.03]	2.01 [+0.01]	2.03 [+0.03]
% q-o-q	-0.07	-0.77	5.33	3.01 [+1.21]	2.11 [+0.11]	2.10 [+0.10]	2.50 [+0.50]	1.98 [-0.02]						
Price of oil (US$)	46.1	50.8	60.0	56.5 (+0.0)	57.5 (+0.0)	58.8 (+0.1)	59.7 (+0.2)	60.1 (+0.3)	37.8	53.4 (+0.0)	59.0 (+0.2)	60.2 (+0.6)	60.1 (+0.9)	60.2 (+1.1)
Output Gap	-1.51	-1.23	-0.99	-0.74 [+0.01]	-0.67 [+0.08]	-0.67 [+0.08]	-0.35 [+0.40]	-0.23 [+0.53]	-2.09	-1.12 [+0.00]	-0.48 [+0.27]	-0.10 [+0.57]	-0.06 [+0.36]	-0.09 [+0.07]
Potential Output Growth														
% y-o-y	4.0	4.0	4.0	4.0 [-0.0]	4.0 [-0.0]	4.0 [-0.0]	4.0 [-0.0]	4.0 [-0.0]	3.5	4.0 [-0.0]	4.0 [-0.0]	4.0 [+0.0]	4.0 [+0.0]	4.0 [-0.0]
% q-o-q	4.0	4.0	4.0	4.0 [-0.0]	4.0 [-0.0]	4.0 [-0.0]	4.0 [-0.0]	4.0 [-0.0]						

Inflation, Interest Rates and the Output Gap



Real GDP Growth

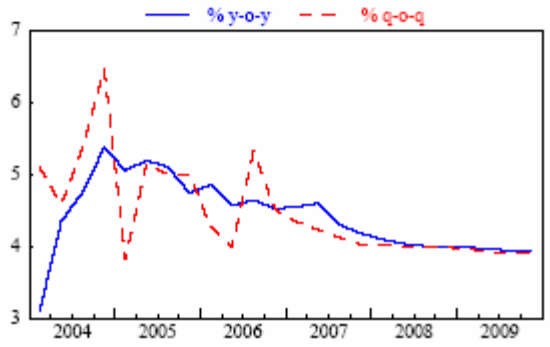


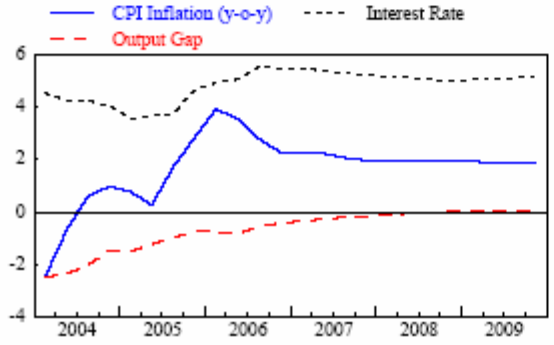
Table 3: Israel Temporary 50 Percent Increase in Oil Price

Deviations from the Latest Baseline

(percent deviation) or [percentage point deviation]

	Quarterly								Annual					
	2005				2006									
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	2004	2005	2006	2007	2008	2009
Short-term Interest Rate	3.5	3.7	3.8	4.6 [+0.5]	4.9 [+0.4]	5.0 [+0.4]	5.5 [+0.4]	5.5 [+0.2]	4.3	3.9 [+0.1]	5.2 [+0.4]	5.3 [-0.0]	5.1 [-0.2]	5.1 [-0.3]
Value of US$ (in IS. Sheqel)	4.38	4.37	4.56	4.60 (-0.5)	4.57 (-0.9)	4.55 (-1.0)	4.52 (-1.0)	4.50 (-0.9)	4.48	4.48 (-0.1)	4.54 (-0.9)	4.49 (-0.3)	4.48 (+0.3)	4.46 (+0.4)
Real GDP Growth														
% y-o-y	5.1	5.2	5.1	4.6 [-0.2]	4.4 [-0.4]	3.9 [-0.6]	3.9 [-0.8]	3.8 [-0.7]	4.4	5.0 [-0.0]	4.0 [-0.6]	4.5 [+0.1]	4.5 [+0.5]	4.2 [+0.2]
% q-o-q	3.8	5.2	5.0	4.3 [-0.7]	3.3 [-1.0]	3.2 [-0.8]	4.8 [-0.6]	4.1 [-0.4]						
CPI Inflation														
% y-o-y	0.77	0.26	1.69	2.85 [+0.29]	3.91 [+0.29]	3.54 [+0.28]	2.78 [+0.30]	2.28 [+0.06]	-0.40	1.40 [+0.07]	3.12 [+0.23]	2.12 [+0.07]	1.93 [-0.05]	1.87 [-0.10]
% q-o-q	-1.97	3.51	5.80	4.22 [+1.15]	2.13 [+0.01]	2.05 [-0.06]	2.73 [+0.11]	2.22 [+0.20]						
Core CPI Inflation														
% y-o-y	0.22	-0.27	1.11	1.71 [-0.13]	2.21 [-0.19]	2.89 [-0.24]	2.15 [-0.28]	1.99 [-0.18]	-0.84	0.70 [-0.03]	2.31 [-0.22]	1.99 [-0.03]	2.10 [+0.10]	2.07 [+0.04]
% q-o-q	-0.07	-0.77	5.33	2.49 [-0.53]	1.88 [-0.23]	1.91 [-0.19]	2.31 [-0.18]	1.85 [-0.14]						
Price of oil (US$)	46.1	50.8	60.0	84.9 (+50.4)	84.1 (+46.3)	80.1 (+36.3)	78.4 (+31.4)	76.0 (+26.5)	37.8	60.6 (+12.7)	79.6 (+35.0)	68.5 (+13.8)	60.3 (+0.4)	60.2 (+0.0)
Output Gap	-1.51	-1.23	-0.99	-0.75 [-0.01]	-0.78 [-0.10]	-0.84 [-0.17]	-0.55 [-0.20]	-0.43 [-0.21]	-2.09	-1.12 [-0.00]	-0.65 [-0.17]	-0.25 [-0.15]	-0.05 [+0.01]	0.06 [+0.15]
Potential Output Growth														
% y-o-y	4.0	4.0	4.0	3.8 [-0.2]	3.7 [-0.3]	3.5 [-0.4]	3.4 [-0.5]	3.5 [-0.5]	3.5	4.0 [-0.0]	3.5 [-0.4]	4.1 [+0.1]	4.3 [+0.3]	4.1 [+0.1]
% q-o-q	4.0	4.0	4.0	3.3 [-0.7]	3.4 [-0.6]	3.5 [-0.5]	3.6 [-0.4]	3.6 [-0.4]						

Inflation, Interest Rates and the Output Gap



Real GDP Growth

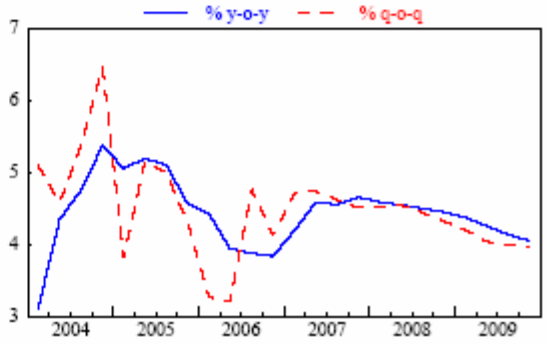


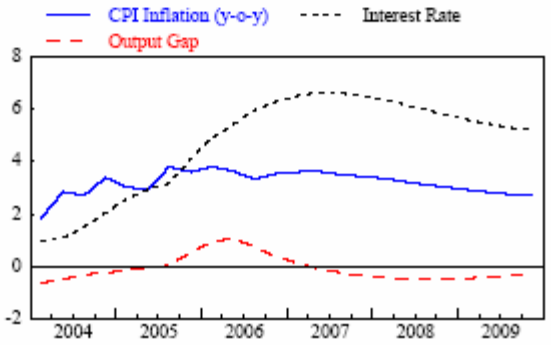
Table 4: United States Results for Positive United States Demand Shock

Deviations from the Latest Baseline

(percent deviation) or [percentage point deviation]

	Quarterly								Annual					
	2005				2006									
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	2004	2005	2006	2007	2008	2009
Short-term Interest Rate	2.6	2.9	3.2	4.1 [+0.4]	4.9 [+0.7]	5.4 [+1.0]	5.9 [+1.2]	6.3 [+1.3]	1.4	3.2 [+0.1]	5.6 [+1.1]	6.5 [+1.3]	6.1 [+0.8]	5.4 [+0.3]
Value of US$ (in IS. Sheqel)	4.38	4.37	4.56	4.61 (-0.3)	4.59 (-0.4)	4.57 (-0.5)	4.55 (-0.5)	4.52 (-0.4)	4.48	4.48 (-0.1)	4.56 (-0.5)	4.49 (-0.2)	4.47 (+0.1)	4.46 (+0.3)
Real GDP Growth														
% y-o-y	3.6	3.6	3.6	4.1 [+0.6]	4.3 [+1.0]	4.5 [+1.2]	4.0 [+0.7]	3.1 [-0.3]	4.2	3.7 [+0.2]	4.0 [+0.6]	2.4 [-0.9]	3.1 [-0.2]	3.5 [+0.1]
% q-o-q	3.8	3.3	3.8	5.4 [+2.5]	4.8 [+1.6]	4.0 [+0.6]	1.8 [-2.0]	1.9 [-1.4]						
CPI Inflation														
% y-o-y	3.00	2.93	3.80	3.60 [+0.05]	3.80 [+0.15]	3.61 [+0.29]	3.32 [+0.45]	3.51 [+0.55]	2.68	3.34 [+0.01]	3.56 [+0.36]	3.54 [+0.55]	3.17 [+0.34]	2.79 [+0.11]
% q-o-q	2.39	4.16	5.11	2.76 [+0.20]	3.20 [+0.40]	3.39 [+0.56]	3.93 [+0.62]	3.53 [+0.60]						
Core CPI Inflation														
% y-o-y	2.29	2.16	2.10	2.19 [+0.05]	2.32 [+0.15]	2.64 [+0.29]	3.04 [+0.44]	3.18 [+0.54]	1.76	2.18 [+0.01]	2.80 [+0.36]	3.19 [+0.55]	2.96 [+0.34]	2.65 [+0.11]
% q-o-q	2.58	2.02	1.47	2.70 [+0.20]	3.11 [+0.40]	3.28 [+0.56]	3.08 [+0.61]	3.25 [+0.60]						
Price of oil (US$)	46.1	50.8	60.0	56.5 (+0.0)	57.6 (+0.1)	59.0 (+0.3)	59.9 (+0.4)	60.5 (+0.6)	37.8	53.4 (+0.0)	59.2 (+0.4)	60.8 (+0.9)	60.8 (+1.2)	61.0 (+1.3)
Output Gap	-0.11	-0.09	0.05	0.55 [+0.60]	0.93 [+0.98]	1.09 [+1.13]	0.72 [+0.64]	0.38 [+0.29]	-0.42	0.10 [+0.15]	0.78 [+0.76]	-0.14 [-0.15]	-0.46 [-0.33]	-0.37 [-0.23]
Potential Output Growth														
% y-o-y	3.1	3.2	3.2	3.2 [+0.0]	3.2 [+0.0]	3.3 [+0.0]	3.3 [+0.0]	3.3 [+0.0]	3.0	3.2 [+0.0]	3.3 [+0.0]	3.4 [+0.0]	3.4 [+0.0]	3.4 [+0.0]
% q-o-q	3.2	3.2	3.2	3.3 [+0.0]	3.3 [+0.0]	3.3 [+0.0]	3.3 [+0.0]	3.3 [+0.0]						

Inflation, Interest Rates and the Output Gap



Real GDP Growth

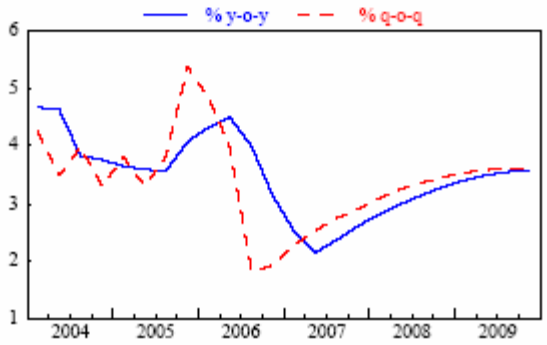


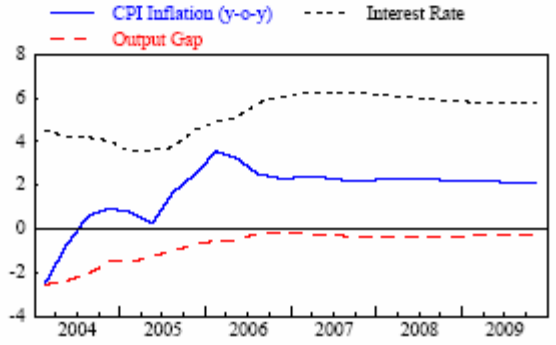
Table 5: Israel Results for Positive US Demand Shock

Deviations from the Latest Baseline

(percent deviation) or [percentage point deviation]

	Quarterly								Annual					
	2005				2006									
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	2004	2005	2006	2007	2008	2009
Short-term Interest Rate	3.5	3.7	3.8	4.6 [+0.5]	4.9 [+0.4]	5.2 [+0.5]	5.8 [+0.7]	6.0 [+0.8]	4.3	3.9 [+0.1]	5.5 [+0.6]	6.2 [+0.9]	6.0 [+0.7]	5.8 [+0.4]
Value of US$ (in IS. Sheqel)	4.38	4.37	4.56	4.61 (-0.3)	4.59 (-0.4)	4.57 (-0.5)	4.55 (-0.5)	4.52 (-0.4)	4.48	4.48 (-0.1)	4.56 (-0.5)	4.49 (-0.2)	4.47 (+0.1)	4.46 (+0.3)
Real GDP Growth														
% y-o-y	5.1	5.2	5.1	4.9 [+0.1]	5.0 [+0.2]	4.8 [+0.2]	4.8 [+0.2]	4.5 [-0.0]	4.4	5.1 [+0.0]	4.8 [+0.1]	4.1 [-0.3]	3.9 [-0.1]	4.1 [+0.1]
% q-o-q	3.8	5.2	5.0	5.5 [+0.4]	4.5 [+0.2]	4.3 [+0.3]	5.1 [-0.2]	4.1 [-0.4]						
CPI Inflation														
% y-o-y	0.77	0.26	1.69	2.52 [-0.04]	3.57 [-0.04]	3.24 [-0.02]	2.50 [+0.02]	2.33 [+0.11]	-0.40	1.32 [-0.01]	2.91 [+0.02]	2.31 [+0.25]	2.27 [+0.30]	2.16 [+0.20]
% q-o-q	-1.97	3.51	5.80	2.91 [-0.16]	2.10 [-0.02]	2.20 [+0.09]	2.79 [+0.17]	2.23 [+0.21]						
Core CPI Inflation														
% y-o-y	0.22	-0.27	1.11	1.81 [-0.04]	2.36 [-0.04]	3.11 [-0.02]	2.45 [+0.02]	2.28 [+0.11]	-0.84	0.72 [-0.01]	2.55 [+0.02]	2.27 [+0.25]	2.29 [+0.28]	2.21 [+0.18]
% q-o-q	-0.07	-0.77	5.33	2.86 [-0.15]	2.10 [-0.01]	2.19 [+0.09]	2.66 [+0.17]	2.19 [+0.21]						
Price of oil (US$)	46.1	50.8	60.0	56.5 (+0.0)	57.6 (+0.1)	59.0 (+0.3)	59.9 (+0.4)	60.5 (+0.6)	37.8	53.4 (+0.0)	59.2 (+0.4)	60.8 (+0.9)	60.8 (+1.2)	61.0 (+1.3)
Output Gap	-1.51	-1.23	-0.99	-0.64 [+0.10]	-0.52 [+0.15]	-0.46 [+0.21]	-0.19 [+0.16]	-0.16 [+0.07]	-2.09	-1.09 [+0.03]	-0.33 [+0.15]	-0.26 [-0.16]	-0.35 [-0.29]	-0.28 [-0.19]
Potential Output Growth														
% y-o-y	4.0	4.0	4.0	4.0 [+0.0]	4.0 [+0.0]	4.0 [+0.0]	4.0 [+0.0]	4.0 [+0.0]	3.5	4.0 [+0.0]	4.0 [+0.0]	4.0 [-0.0]	4.0 [-0.0]	4.0 [-0.0]
% q-o-q	4.0	4.0	4.0	4.0 [+0.0]	4.0 [+0.0]	4.0 [+0.0]	4.0 [+0.0]	4.0 [-0.0]						

Inflation, Interest Rates and the Output Gap



Real GDP Growth

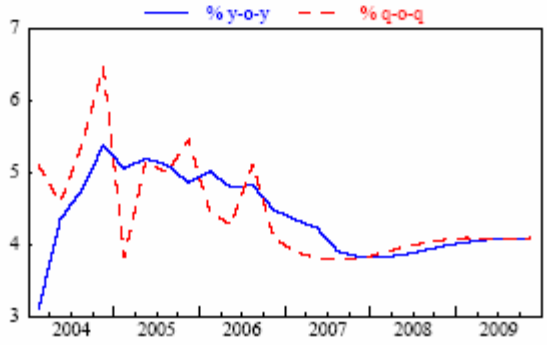


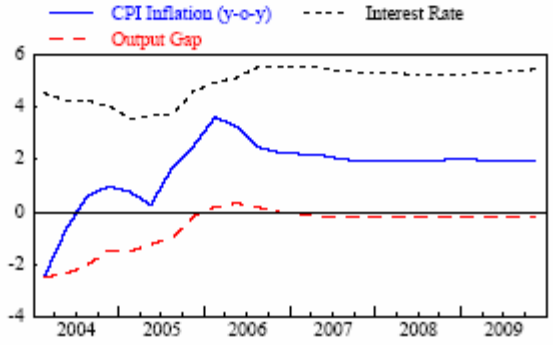
Table 6: Israel Results for Positive Demand Shock

Deviations from the Latest Baseline

(percent deviation) or [percentage point deviation]

	Quarterly								Annual					
	2005				2006									
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	2004	2005	2006	2007	2008	2009
Short-term Interest Rate	3.5	3.7	3.8	4.6 [+0.5]	4.9 [+0.4]	5.1 [+0.5]	5.5 [+0.4]	5.5 [+0.3]	4.3	3.9 [+0.1]	5.3 [+0.4]	5.4 [+0.1]	5.2 [-0.1]	5.3 [-0.1]
Value of US$ (in IS. Sheqel)	4.38	4.37	4.56	4.61 (-0.3)	4.59 (-0.4)	4.57 (-0.6)	4.53 (-0.8)	4.50 (-0.9)	4.48	4.48 (-0.1)	4.55 (-0.7)	4.46 (-0.9)	4.43 (-0.9)	4.41 (-0.7)
Real GDP Growth														
% y-o-y	5.1	5.2	5.1	5.4 [+0.6]	5.8 [+0.9]	5.6 [+1.1]	5.2 [+0.6]	4.2 [-0.4]	4.4	5.2 [+0.2]	5.2 [+0.5]	3.7 [-0.7]	4.0 [-0.1]	4.0 [+0.0]
% q-o-q	3.8	5.2	5.0	7.5 [+2.5]	5.5 [+1.2]	4.5 [+0.5]	3.4 [-2.0]	3.3 [-1.2]						
CPI Inflation														
% y-o-y	0.77	0.26	1.69	2.53 [-0.03]	3.59 [-0.03]	3.25 [-0.01]	2.48 [+0.00]	2.26 [+0.04]	-0.40	1.32 [-0.01]	2.89 [+0.00]	2.07 [+0.02]	1.97 [-0.01]	1.96 [-0.01]
% q-o-q	-1.97	3.51	5.80	2.94 [-0.13]	2.13 [+0.01]	2.17 [+0.07]	2.69 [+0.06]	2.03 [+0.01]						
Core CPI Inflation														
% y-o-y	0.22	-0.27	1.11	1.82 [-0.03]	2.37 [-0.02]	3.13 [-0.00]	2.45 [+0.02]	2.23 [+0.05]	-0.84	0.72 [-0.01]	2.54 [+0.01]	2.06 [+0.04]	2.02 [+0.01]	2.03 [+0.00]
% q-o-q	-0.07	-0.77	5.33	2.89 [-0.12]	2.13 [+0.02]	2.18 [+0.08]	2.58 [+0.08]	2.01 [+0.03]						
Price of oil (US$)	46.1	50.8	60.0	56.5 (+0.0)	57.5 (-0.0)	58.8 (-0.0)	59.7 (+0.0)	60.1 (-0.0)	37.8	53.4 (+0.0)	59.0 (-0.0)	60.2 (-0.0)	60.1 (+0.0)	60.2 (-0.0)
Output Gap	-1.51	-1.23	-0.99	-0.16 [+0.59]	0.19 [+0.87]	0.33 [+1.00]	0.17 [+0.52]	-0.00 [+0.22]	-2.09	-0.97 [+0.15]	0.17 [+0.65]	-0.16 [-0.06]	-0.19 [-0.13]	-0.19 [-0.10]
Potential Output Growth														
% y-o-y	4.0	4.0	4.0	4.0 [+0.0]	4.0 [+0.0]	4.0 [+0.0]	4.0 [+0.0]	4.0 [+0.0]	3.5	4.0 [+0.0]	4.0 [+0.0]	4.0 [+0.0]	4.0 [+0.0]	4.0 [-0.0]
% q-o-q	4.0	4.0	4.0	4.0 [+0.0]	4.0 [+0.0]	4.0 [+0.0]	4.0 [+0.0]	4.0 [+0.0]						

Inflation, Interest Rates and the Output Gap



Real GDP Growth

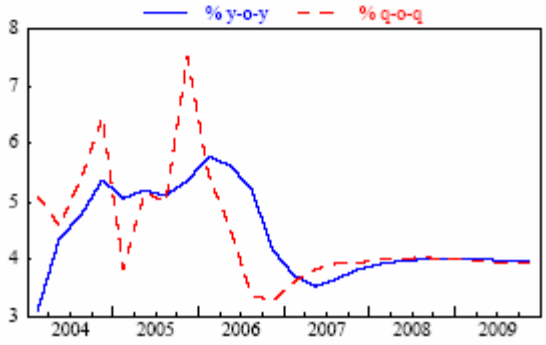


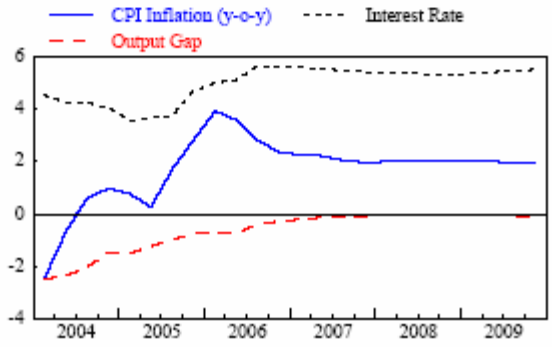
Table 7: Israel Results for Sheqel Depreciation Shock

Deviations from the Latest Baseline

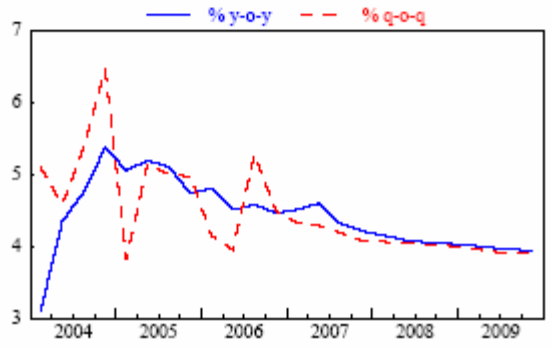
(percent deviation) or [percentage point deviation]

	Quarterly								Annual					
	2005				2006									
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	2004	2005	2006	2007	2008	2009
Short-term Interest Rate	3.5	3.7	3.8	4.7 [+0.6]	5.0 [+0.5]	5.1 [+0.5]	5.6 [+0.5]	5.6 [+0.3]	4.3	3.9 [+0.1]	5.3 [+0.4]	5.5 [+0.1]	5.3 [+0.0]	5.4 [+0.0]
Value of US$ (in IS. Sheqel)	4.38	4.37	4.56	4.69 (+1.4)	4.67 (+1.2)	4.64 (+1.0)	4.61 (+0.9)	4.58 (+0.8)	4.48	4.50 (+0.3)	4.63 (+1.0)	4.53 (+0.7)	4.50 (+0.6)	4.47 (+0.6)
Real GDP Growth														
% y-o-y	5.1	5.2	5.1	4.7 [-0.0]	4.8 [-0.0]	4.5 [-0.1]	4.6 [-0.1]	4.5 [-0.1]	4.4	5.0 [-0.0]	4.6 [-0.1]	4.4 [+0.0]	4.1 [+0.1]	4.0 [+0.0]
% q-o-q	3.8	5.2	5.0	5.0 [-0.0]	4.1 [-0.1]	4.0 [-0.0]	5.3 [-0.0]	4.5 [-0.0]						
CPI Inflation														
% y-o-y	0.77	0.26	1.69	2.83 [+0.27]	3.91 [+0.29]	3.58 [+0.31]	2.82 [+0.34]	2.33 [+0.11]	-0.40	1.40 [+0.07]	3.15 [+0.26]	2.12 [+0.07]	1.98 [+0.01]	1.97 [+0.00]
% q-o-q	-1.97	3.51	5.80	4.17 [+1.10]	2.18 [+0.06]	2.20 [+0.09]	2.76 [+0.13]	2.19 [+0.17]						
Core CPI Inflation														
% y-o-y	0.22	-0.27	1.11	2.10 [+0.26]	2.67 [+0.28]	3.43 [+0.30]	2.76 [+0.33]	2.28 [+0.11]	-0.84	0.79 [+0.07]	2.78 [+0.25]	2.09 [+0.06]	2.02 [+0.01]	2.03 [+0.00]
% q-o-q	-0.07	-0.77	5.33	4.06 [+1.05]	2.17 [+0.06]	2.19 [+0.09]	2.62 [+0.13]	2.15 [+0.17]						
Price of oil (US$)	46.1	50.8	60.0	56.5 (+0.0)	57.5 (-0.0)	58.8 (-0.0)	59.7 (+0.0)	60.1 (-0.0)	37.8	53.4 (+0.0)	59.0 (-0.0)	60.2 (-0.0)	60.1 (+0.0)	60.2 (-0.0)
Output Gap	-1.51	-1.23	-0.99	-0.75 [-0.00]	-0.70 [-0.03]	-0.71 [-0.04]	-0.40 [-0.05]	-0.27 [-0.05]	-2.09	-1.12 [-0.00]	-0.52 [-0.04]	-0.13 [-0.04]	-0.05 [+0.01]	-0.07 [+0.02]
Potential Output Growth														
% y-o-y	4.0	4.0	4.0	4.0 [-0.0]	4.0 [-0.0]	4.0 [-0.0]	4.0 [-0.0]	4.0 [-0.0]	3.5	4.0 [-0.0]	4.0 [-0.0]	4.0 [+0.0]	4.0 [+0.0]	4.0 [+0.0]
% q-o-q	4.0	4.0	4.0	4.0 [-0.0]	4.0 [-0.0]	4.0 [-0.0]	4.0 [-0.0]	4.0 [-0.0]						

Inflation, Interest Rates and the Output Gap



Real GDP Growth



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IV. THE REFORM OF THE CAPITAL MARKETS IN ISRAEL[1]

Abstract

The commercial banks have been dominant in the capital markets in Israel for some years, although this dominance has begun to decline as capital markets have developed and allowed non-bank institutions to provide credit to the business and household sector. Being concerned that the banks' dominance was frustrating the development of capital markets and that the financial markets more generally remained subject to excessive concentration, inadequate competition, and conflicts of interest, the authorities have forced banks to divest their holdings in mutual and provident funds. Despite arguing for a long transition period in which to sell the funds, the banks have in fact successfully sold most of their interests in these funds within a few weeks of the legislation implementing the reform being enacted in 2005. The authorities have also implemented (or propose to implement) a number of other tax, legislative and regulatory changes to remove the barriers to the development of the capital markets. The government's decision, in the 1990s, to stop requiring institutions to invest in non-tradable risk-free government bonds is having an increasingly positive effect on capital market development as institutions look for a more diverse range of instruments for risk management purposes. The result is that the recent economic recovery has been accompanied by a rapid increase in market capitalization and daily turnover in the stock market, an increase in the corporate bond market, and increased cross border investment flows. These highly desirable developments in the capital markets, together with the divestiture of banks' interests in funds, carry risks which demand a regulatory response. The regulatory authorities are aware of this and have implemented a number of valuable reforms. The regulatory authorities should be given more resources and greater independence in order to continue the process of assessing risks, strengthening regulations and enforcing their rules.

A. The Capital Markets in Israel

1. **The capital markets in Israel have been highly concentrated.** The financial sector is composed of about 200 institutions. However, until 2005, most of its activity was conducted by five banking groups (made up of banking institutions and provident funds), five insurance groups and pension funds (that were owned by the Histadrut[2] until pension reform)[3].

2. **Three banks have for many years dominated the financial markets**. In 2003, the three largest banks had 78 percent of bank deposits. In 2004[4], the same three banks also managed 80 percent of mutual fund assets and 73 percent of provident funds assets. The banks are

[1] Prepared by Richard Pratt

[2] A labor union.

[3] Bank of Israel: Financial Stability Report 2003.

[4] Prior to the enactment of legislation in 2005.

also the main distributors of mutual and provident funds to the public. In addition, the banks are dominant in the underwriting of new equity issues, underwriting 99 percent of all new issues. The banks are therefore in a dominant position in that most savers and most borrowers would probably have tended to look first to one of the three main banks. Put another way, the three largest banks provided 95 percent of all financing to the private sector, whether in the form of credit or investments through mutual funds, or the underwriting of corporate financing[5].

3. **The supervisor has been encouraging the closure or merger of smaller banks in an attempt to improve competition**. The supervisor considers that smaller banks will not have the resources to improve their systems and controls in line with strengthening legislation and the implementation of an approach consistent with the new Basel agreement on capital standards (Basel 2). Smaller banks that choose to merge have been prevented from joining either of the two largest banks, in order to avoid deepening the concentration in the banking market. Instead, they have merged with other smaller banks or medium sized groups. The supervisor hopes and expects that the process will result in a total of five reasonable sized banking groups[6]. The Government has, in the past, owned a substantial proportion of the banking system but, in 2004 and 2005 was able to sell the remaining holdings in Bank Leumi and Discount Bank.

4. **Apart from the banks, the main institutions in the financial markets are the insurance companies and the agents that sell their products**. Three insurance companies dominate the market for life and general insurance and for pension funds. In addition, there are a small number of mutual and provident funds managed by independents. The following table demonstrates the concentration of the market that existed until 2004.

Table 1: Market Share of Leading Entities According to Activity Area (December 2003)[7]
(In percent)

Banking	Mutual funds	Provident funds	Underwriting	Insurance	Pension (new funds)
Public's deposits	Managed assets	Managed assets	No. of issues*	Total assets	Total assets
Poalim: 30	Poalim: 36	Poalim: 41	Poalim: 27	Migdal:28	Mivtahim: 50
Leumi:30	Leumi: 31	Leumi: 19	Leumi: 24	Clal: 21	Makefet: 15
IDB: 18	IDB: 13	IDB: 13	Clal: 14	Phoenix:14	Meitivit: 9
78	80	73	65	63	74

*Out of total issues (private and public) in the period between January 2002 and August 2003.

5. **The dominance of the banks has been decreasing in recent years and the insurance companies have been increasing in importance.** The banks' share of total

[5] Inter Ministerial Committee Report on Structural Reform in the capital market headed by Dr. Yosef Bachar, Director General of the Ministry of Finance, published November 2004 (Inter Ministerial Committee Report).

[6] Discussion with the Bank Supervisor December 2005

[7] Inter Ministerial Committee Report.

credit and financial sector assets has been steadily decreasing for several years. This has been manifested in a decline in the proportion of business sector credit coming from banks and an increase in the proportion coming from other sources. Since the banks owned most of the provident funds[8] until 2005, the rate of decline in credit from banks became even sharper when they sold the funds. The non-bank sector has been able to extend credit both in the form of loans (extended by insurance companies and provident funds to the business and household sectors) and in the form of corporate bonds.

Table 2: Share of Banks in Supply of Credit[9]

	2000	2001	2002	2003	2004	09-2005
Total assets of (NIS billion, sep05 prices)						
Banks	758	808	796	796	789	810
Banks and provident funds owned by them	893	946	921	938	940	969
Share of banks in (%)						
Total credit to business sector	79	78	76	74	69	64
Total assets of private sector	43	42	40	38	35	33
Total assets of finance sector	64	65	64	62	60	58
Share of banks and provident fund owned by them in (%)						
Total credit to business sector	83	82	80	78	74	71
Total assets of private sector	56	54	51	49	47	44
Total assets of finance sector	76	76	75	73	71	69
Change in Credit to the business sector (%, annual terms)						
From banks	13.7	11.3	-0.1	-2.5	-4.1	-2.0
From other sources	3.5	15.5	12.7	12.4	21.3	40.1

6. **The insurance companies' position has been strengthened by their purchases of pension funds, provident funds and mutual funds.** The purchase of new pension schemes took place in 2004. Although small at present, these funds will grow substantially in future. The purchase of provident funds and mutual funds was as a result of legislation enacted in 2005 requiring the banks to sell these funds. That legislation is discussed in more detail in the next section.

B. Concern About the Dominance of Banks in the Financial System

7. **The authorities argued that the dominance of the banks was highly undesirable.** The authorities took the view that the capital markets were underdeveloped because the banks acted to frustrate that development in order to preserve their market power. An Inter Ministerial Committee Report on Structural Reform in the capital market was formed, headed by Ministry of Finance Director General Bachar. Its report was published November 2004 (Inter Ministerial Committee Report). The analysis in the report is described in the following paragraphs.

8. **The Inter Ministerial Committee Report (the Report) raised concerns that the dominant position of the banks created a series of actual or potential conflicts of interest** including the following:

[8] A provident fund is a long term investment, not unlike a mutual fund but which benefits from tax incentives designed to encourage long term savings for contingencies such as hospitalization, redundancy and retirement. Currently tax advantages are only available to those who maintain their savings in the provident fund until retirement.

[9] Bank of Israel Financial Stability Report 2004

- A bank could directly or implicitly encourage the investment managers for the mutual and provident funds it controls to invest in equity issues for which the bank was the underwriter, so as to reduce the underwriting risks;

- Banks, despite being under a duty to offer objective advice to investors in funds, in practice persuaded the majority of customers to buy the mutual and provident funds that were managed by their own subsidiaries;

- Banks might have been inclined to encourage additional, perhaps excessive, credit to their customers for the purpose of investment in their own funds;

- The managers of mutual and provident funds might have been inclined to channel their investments to institutions and companies that were owned by or related to the banks;

- The managers of mutual and provident funds might not have insisted on the lowest fees or commissions for services conducted by their parent bank;

- Where it was concerned about the ability of a corporate customer to repay a loan, a bank might have been tempted to encourage the company to issue debt or equity as a means of raising funds to repay the loan, thus transferring the risk of default by the company from the bank to the investors in its funds;

- If the bank's own managed funds were to subscribe to the issue then this would compound the conflict of interest.

9. **While the Report emphasized that some of these conflicts were potential, it argued that, in many cases, there was evidence of improper behavior by the banks.** One example was the failed share support operation of the 1980s where the Bejski Report[10], following the collapse of the banks, indicated that banks may have used their funds to support the operation, sometimes encouraging customers to extend their credit to invest further in funds. The authorities took the view that the lack of competition in Israel exacerbated the conflicts of interest that would exist in any economy where there is universal banking.[11]

10. **The Report considered that the concentration inhibited innovation**. The absence of money market funds, offered with checkbooks, and the absence of term loans or credit cards were cited by the authorities as examples of the lack of innovation in the financial markets. The authorities considered that the widespread use of overdrafts and the extensive network of payment, investment and other services effectively tied customers into the banks. It was not easy to switch banks if there was an overdraft that was financing investments or other interests—especially if, as was the case in Israel, there was limited credit information available to allow banks to judge the creditworthiness of new customers. The authorities aspired to a different model of an advanced capital

[10] Inquiry Commission's Report on Bank Share Regulation (1986).

[11] Inter Ministerial Committee Report.

market, where nonbank intermediaries play a larger part in the capital markets than do banks.[12]

11. **The Report further considered that the banks acted to frustrate the development of capital markets.** For example, the authorities noted that they had observed predatory pricing behavior by the banks in respect of corporate finance. Specifically, the authorities said that, when companies contemplated raising finance from the capital markets, the banks offered credit on particularly attractive terms, thus frustrating the development of corporate debt and equity markets. It was for this reason, according to the authorities, that total corporate debt in 2004 was only 8 percent of GDP (whereas it is 70 percent in the United States and 28 percent in the United Kingdom).

12. **The Report argued that regulation and supervision had failed to solve the problem in the past and that structural reform was necessary.** The Committee recommended the enforced divestiture of the banks' interests in mutual and provident funds—a proposition that had been mooted several times over the previous twenty years by various committees but which had never been implemented. According to the Committee, the failure to implement this reform had been due to heavy pressure from the banks.

13. **The Committee's proposals included the following three main elements**:

- Banks would be prohibited from managing mutual and provident funds and would be obliged to sell their interests in such funds over a four year period. There would remain limits on the maximum share of the market that any purchaser could acquire at the time of purchase.

- Banks would be permitted to sell, to the investing public, mutual funds, provident funds, long term insurance products and pension funds managed by others but could receive no commission or other remuneration from the managers of those funds. All income for offering advice on funds, or commission for executing instructions to buy, would have to be paid by the customer in the form of a fee.

- Banks would not be permitted to act as pricing underwriters for public offers of securities where the issuer (or entities it controlled) owed the banks (or related parties) more than NIS 5 million or a sum equivalent to 10 percent of its total financial liabilities.[13]

14. **In addition to these proposals, the Committee recommended supplementary measures.** The largest banks would be required to sell their holdings in smaller banks. There should be a strengthening of regulation including the introduction of a law to regulate provident funds and a review of the regulatory supervisory structure to ensure consistency, better coordination and greater effectiveness. There should be a working party on the development of new capital market instruments. Other measures were also proposed.

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[12] Presentation to the mission by the Ministry of Finance 8 December 2004

[13] Inter Ministerial Committee Report

C. The Enactment of the Inter Ministerial Committee Recommendations

15. **In 2005, legislation forcing the divestiture of the banks' holdings in mutual and provident funds was enacted and implemented.** Banks were required to sell their interests in mutual and provident funds within a defined timescale. Although the banks sought an extension of the timescale within which they could sell mutual and provident funds, in fact, they sold most of the funds within three months of the legislation being enacted. Two thirds of the funds were sold to domestic insurance companies. The remainder either remain with the banks for the time being or have been sold to foreign interests. Some of the regulators and banks believe that the price received by the banks was substantially higher (perhaps up to 50 percent higher) than might have been expected on the basis of the current fee income received by the banks[14].

16. **The proposal to ban the payment of commissions was dropped.** Instead, those who sell or advise on investment products must choose to engage either in "investment advising" or "investment marketing":

- Investment advisers must be independent and are required to give objective and unbiased investment advice on investment products that are suitable for their customers, given their full circumstances and risk appetite;

- Investment marketing agents are also required to recommend suitable products for their customers but are allowed to promote products issued by companies with which they are associated and face increased disclosure obligations pertaining to their ties and biases;

- Banking corporations can only engage in investment advising.

17. **Restrictions on the banks' underwriting capacity were enacted.** Banks will still be able to act as underwriters but the legislation will prevent them from operating as costing underwriters in those cases where a potential conflict of interest arises in the course of providing the credit.

D. The Removal of Barriers to the Development of the Capital Markets.

18. **While the proposals of the Inter Ministerial Group have been the subject of much debate and controversy, other important reforms have also been implemented over a number of years and further reforms are under way.** The Chairman of the Israel Securities Authority (ISA) appointed a Committee to identify barriers to the development of the capital markets and has set in train a reform program designed to remove them. The following measures have been taken or proposed:

[14] Discussion with representatives of the banks and with Israel Securities Authority, the Bank of Israel and the Insurance Commissioner

- Tax changes implemented in January 2005 reduced the disincentive to invest in overseas capital markets, thus increasing the competition for Israeli savings;

- The Government has proposed legislative and regulatory changes to encourage asset-backed securities, municipal bonds, corporate bonds, short term commercial paper, real estate investment trusts, funds of funds, exchange traded funds, repos, World Bank bonds, swaps and other instruments;

- Regulations governing the issuance of prospectuses for new public offerings have been introduced, simplifying the process of raising funds through the primary market;

- Legislation has been proposed which would facilitate the public offering in Israel of foreign mutual funds from well regulated jurisdictions;

- Legislation has been enacted to safeguard the solvency of the clearing house in the event of the default of one of its members;

- The removal of foreign exchange restrictions over the past decade has enhanced the ability of companies to raise capital overseas;

- The Government is putting in place measures designed to encourage customers to switch more readily between banks;

- The commission structure for insurance was reformed in a way that introduces an incentive for insurance companies and their agents to sell mutual and provident funds and some of them are doing so;

- The authorities are moving towards the introduction of International Financial Reporting Standards, seeking voluntary compliance by the spring of 2006.

In many cases, where legislation is proposed, it is still under consideration either within the Government or in the Knesset.

19. **In addition to the removal of barriers to capital market development, changes in the practice of the government in debt issuance have also promoted capital market development.** In the past, the government directed a high proportion of the assets of the pension funds, provident funds and insurance companies into special index-linked bonds. These bonds had guaranteed returns and were held by the financial institutions until maturity. They were, essentially, risk-free (leaving aside the possibility of government default). These bonds are no longer issued but a substantial proportion of them remain in the assets of the financial institutions (see table below). Moreover, given the continuing high level of government debt, relative to GDP, the Government also has absorbed a large proportion of non-directed savings. Overall, 83 percent of non-bank financial sector assets were held in the form of government debt. In the past, the proportion has been much higher. These institutions might be expected to be active in the capital markets and to have the greatest demand for additional capital market instruments. However, in practice, the high degree of direction in the savings market meant that there was limited demand from financial institutions for new instruments and this is the most

likely explanation for any lack of development in the capital markets in the past. However, the change, over a number of years in the debt issuance practice of the government is beginning to bear fruit in the increased demand by institutional investors for other financial instruments and the corresponding growth in the corporate debt market..

Table 3: Estimated Distribution of Financial Sector Assets 2004[15]

(NIS billion end of 2004 prices)**

	Banking System	Provident Funds	Pension Funds	Insurance	Total
Private sector	498	39	8	20	566
Public sector*	90	88	129	64	372
Of which: nontradable	41	8	116	31	197

* Includes deposits with Bank of Israel and holdings of Treasury Bills.
** Mutual funds are not included in this table since the Bank of Israel treats them as equivalent to portfolios of private sector holdings in debt and equity.

20. **The introduction of Real Time Gross Settlement (RTGS) has also prompted development of the financial markets.** RTGS is an important development that will improve the stability of financial risk by reducing settlement risk. As the Bank of Israel has moved towards the introduction of RTGS, the preliminary measures have prompted an interbank money market. It will also be necessary to develop a fully functioning repo market and the authorities have proposed legislation designed to facilitate this. This legislation is currently under consideration within the government.

E. The Recent Growth of the Capital Markets

21. **Even though much of the legislation necessary to remove the barriers to development has yet to be enacted, the capital markets have begun to grow rapidly.**

- The market capitalization of the equity market grew in 2005 to $110 billion as compared with $78 billion in 2004. The fixed income market capitalization was $95 billion in 2005 compared with $57 billion in 2004.

- Daily turnover in the equity market was $204 million compared with $140 million in 2005. For the fixed income market the equivalent figures were $456 million and $207 million.

- In 2004, government bonds accounted for 98 percent of the fixed income market but this had fallen to 77 percent in 2005.

- There was a substantial increase in total capital raised on the Tel Aviv stock market—from NIS 12.4 billion in 2002 to NIS 63.3 billion in 2005. [16]

[15] Bank of Israel Financial Stability Report 2004.

[16] Israel Securities Authority; as of October, 2005.

- Increased interest in the primary market was demonstrated by the growth in the number of prospectuses submitted for ISA approval.

- The Israeli corporate debt market has been growing rapidly—up from NIS 2.5 billion of new issuance in 2000 to an estimated NIS 21 billion in 2005.

F. The Risks Created by Capital Market Development

22. **Capital market development is positive for the economy and, for the most part, the measures taken are to be supported.** In particular, the care taken by the authorities to identify tax, infrastructure and legal barriers to the development of new instruments and investment opportunities has been a painstaking but worthwhile task. Regulatory simplification in certain areas, coupled with enhanced supervisory powers—to be used in a proportionate way—provides a sound basis for the future and should enable the capital markets to support continued economic growth in the future.

23. **Following the divestiture of banks' interest in mutual and provident funds and their capital market developments, it is necessary to reassess the risks in the financial markets.** As a result of all the developments (not merely the forced divestiture of banks' funds interests), participants in the capital markets are having to adapt to new roles; new instruments are becoming available; existing investment products have new risk profiles, investment advisers are operating according to different rules; and investors will need to adapt to markets with different investment opportunities.

24. **Insurance companies must adapt to new roles.** Israeli insurance companies have bought most of the mutual and provident funds sold by banks (see Table 4). The insurance companies are developing into general managers of money and will need to adapt their corporate governance, their policies, and controls to ensure that they understand and manage the risks that are associated with the ownership of funds. Staff will have to learn new skills. While the funds' assets will be held separately from those of its parent insurance company and much of the investment risk will normally be borne largely by the investor, the insurance companies will still be subject to a range of operational, legal and reputational risks from their fund management activity. The insurance companies would also be at risk if the income from mutual and provident funds turned out to be less than they assumed when accepting high prices. At the same time, and quite separately from their purchase of funds, insurance companies are expected by the Insurance Supervisor[17] to engage in more direct lending to businesses and households. At present this occurs only to a very small degree. However, if the practice grows, the insurance companies will have to ensure that they have the necessary credit assessment and management skills. Insurance companies are also believed by the authorities to be likely to want to offer products with a guaranteed return. Such products would be very similar to bank deposits and, if such a development proceeds, the insurance companies would be behaving like banks. The authorities will have to be prepared either to prevent this from happening, or to ensure that the supervisory arrangements are as effective as those for banks. The companies themselves would need to have the same risk management skills as banks if they are to be successful. Insurance companies may also

[17] Discussion with the Insurance Commissioner

increase their overseas interests from 10 percent of assets at present to around 20 percent in the future (a figure the Insurance Commissioner considered appropriate). The companies will also have to learn the skills, and implement proper policies and controls, to manage the associated risks.

Table 4: Distribution of Israeli Public Assets[18]

Institution	Share of assets prior to sale of funds	Share of assets as of 2/2006
Bank Poalim	27%	23%
Bank Leumi	24%	19%
Other banks	16%	11%
Insurance companies	13%	20%
Foreign investment managers	0	7%
Others	20%	20%
Total	100%	100%

25. **Insurance companies must take care in their selling practices.** It is claimed by some that the insurance companies have paid a much higher price than could be justified by the present value of the fee income stream currently received by the banks. Moreover, the upward movement in interest rates since the purchase of the mutual and provident funds may increase the financing costs of money borrowed to finance the purchase of the mutual and provident funds. If so, they may be tempted to engage in aggressive selling practices in order to secure a return on their investment. The agents selling insurance products will tend to be marketing agents, who have a responsibility to provide objective advice but are allowed to favor the products of the company with which they are associated. This will be a difficult balance to strike and there is a danger that such agents may be tempted to engage in aggressive selling practices which will result in investors not being fully informed of the risks they are facing when buying their products. This in turn could lead to legal challenges to the insurance companies.

26. **Banks need to compensate for the loss of their fee income and the declining quality of their borrowers.** The fee income received by banks for the management of funds was not, according to the banks, as cyclical as the returns from their traditional intermediation business. The loss of this income makes the banks more dependent on their traditional business and thus increases their exposure to the risks associated with normal business cycles. At the same time (and in common with banks world-wide), the banks find that the highest quality borrowers are those best able to secure funds from the capital markets. As more credit is available from the capital markets, the best rated companies will turn to them for funds and the overall quality of remaining bank borrowers may therefore decline. The banks need to compensate for this increased risk by diversifying their business including the use of investments outside Israel. This requires particular diligence and care in ensuring that foreign investments are appropriately managed as many banks have found, to their cost, in the past.

27. **Insurance companies, provident funds, pension funds and mutual funds will have additional investment opportunities which will require new management skills.** As already noted, insurance companies, provident funds and pension funds have, in the

[18] Insurance Commissioner

past, held most of their assets in the form of government bonds, often guaranteed. In the future, they will be using a larger number of financial instruments to manage their risks. They will be competing for customers and may well be looking for investment opportunities with higher yield and risk. They have already moved substantially into corporate bonds. Provident funds have placed 28.5 percent of their assets in corporate bonds, of which 15.4 percent are untradable. The figures for insurance companies were 12.6 percent and 7.7 percent in June 2005[19]. Corporations issuing these bonds have been surprised at the fine rates they have been able to achieve in the corporate bond market[20]. Insurance companies do not have the same experience as banks in evaluating credit risk of corporations and they must be careful that they do not under-price that risk. Insurance companies and provident funds make loans and provide mortgages. At present this activity is very limited, representing less than 1 percent of the assets of provident funds and 4 percent of insurance company assets. However, the intention of the authorities in liberalizing the capital markets is that these alternative sources of credit should grow and these percentages may become larger in future. If so, insurance companies will need to develop the appropriate risk management skills and controls.

28. **Investors will need to understand that provident funds and insurance companies' products may be more risky than hitherto.** Provident and insurance companies used to invest almost exclusively in government bonds and thus presented a very low risk to investors. Although there were disclosure rules requiring managers to disclose their investment policies and risks, in practice these were not all followed by the banks as fund managers. Investors chose between products largely on the basis of comparative yield. This will no longer be appropriate as provident funds and insurance companies invest in a wider range of instruments and attempt to gain or retain investors by offering different levels of risk and potential yield. Given that the generic names of the provident funds and insurance products may not change, there is a danger that investors may not appreciate the different risks to which they are subject. New instruments (and particularly direct loans to businesses and households) will create new risks and it is essential that investors are informed of this change to products which have long been familiar to them as risk free investments.

29. **Investment advisers will be operating in a new regime with different rules.** Banks will continue to be the main distributors of funds. They will be independent investment advisers offering objective advice on all the products in the market. This will be a quite different from the previous regime when banks' advisers sold exclusively their own products. Banks may have some links with particular funds – for example where they may have lent money to an insurance company to buy mutual and provident funds, or have entered into an agreement to sell funds and provide other services as part of the original agreement to sell the funds. Moreover, it will be straightforward for the banks to develop deposit-based products that perform in a similar manner to certain kinds of funds. Banks will still be able to offer individual portfolio management services and for higher net worth customers these services will compete directly with mutual funds for customers' savings. Banks will be able to take a position in individual equities and it is conceivable that this could create a self interest for the bank in recommending those equities to

[19] Data supplied by the Insurance Commissioner

[20] Discussion with the National Manufactures Association

customers when giving investment advice. Notwithstanding the banks' own interests, the banks' advisers will not be able to favor their own banks' products and must give fully objective advice. Strictly speaking, this was also true under the previous regime and yet the regulators were unable to enforce the requirement. It will be essential for the credibility of the new regime that the regulators should enforce the rules vigorously in future.

G. The Response by the Regulatory Authorities

30. **The regulatory authorities are well aware of the need to understand and regulate the markets in a way that protects stability and the interests of investors while avoiding stifling innovation**. The Insurance Commissioner, for example, expressed the view that the international best practice in some aspects of the supervision of insurance substantially lagged behind that for banks and that this was equally true in Israel[21]. The regulatory authorities are taking action on this but more needs to be done.

31. **The bank supervisory authority has additional powers.** Bank supervisors now have further powers to assess the good standing of owners, controllers, and managers of banks. This enables the supervisors not only to check the good standing of such persons prior to their appointment (which power they held previously) but also to seek the removal of these key persons if they subsequently believe and can show that they can no longer be regarded as being of good standing. The bank supervisors' ability to share information with other domestic regulators and foreign supervisors has now been enhanced.

32. **There is a new insurance regulatory law which gives new powers and sanctions to the Insurance Commissioner**. The Commissioner has used the new law to issue new regulations requiring new capital requirements, new risk management procedures, and new corporate governance practices for insurance companies. The new law provides additional powers to assess the suitability of owners, controllers, and managers of insurance companies and this power will be used to ensure that all key personnel in insurance companies have the necessary qualifications (although existing staff will have "grandfathered" rights to retain their present positions). All assets must be valued at a fair value. The regulation ensures that insurance companies follow adequate credit management practices when granting loans. The credit management rules are also based on those for banks. The Commissioner has taken new initiatives to regulate the activities of the boards of the regulated institutions and their sub-committees; to regulate the activities of the external and internal auditors; and has imposed on insurance companies a requirement to appoint an actuary and risk manager. The Commissioner has decided that he must consider insurance companies as financial conglomerates, given their expanded role in the capital markets and has, for example, implemented regulations that will require insurance companies to allocate additional capital to cover the goodwill that was included in the price paid for the mutual and provident funds.

33. **The ISA also has additional powers and has enhanced its regulatory approach.** The ISA is, as a result of new legislation, in a better position to assess the suitability and good standing of shareholders holding more than 30 percent control in

[21] Discussion with the Insurance Commissioner

mutual fund management firms. The ISA has been authorized to issue directives and instructions to ensure the implementation of the regulations. (This is a particularly important development as it was the absence of an unambiguous power of this kind that led to the banks challenging previous attempts to take action to enforce the rules on conflicts of interest.) The enforcement of the rules governing investment advisers' behavior will be further enhanced by new legislation bringing the managers of investment advisers within the ISA's regulatory reach, so that the ISA can ensure that advisers are not placed under improper pressure to depart from the code of conduct in order to increase sales. The ISA will be able to issue rules of conduct (with the prior approval of the Knesset Finance Committee) and will have additional sanctions at its disposal, including civil fines. The new law also enhances the ability of the ISA to cooperate with foreign regulatory authorities, although it is not able to sign IOSCO's multilateral memorandum of understanding mainly because of the retention of a dual criminality requirement in its provisions. The ISA has proposed changes to rectify this. Notwithstanding the new legislation, the ISA does not have an unambiguous power to enter the premises of regulated businesses without cause or notice in order to carry out an inspection. This has never caused a problem in the past but it should be rectified when the opportunity arises.

34. **The ISA has decided to broaden the supervision of mutual fund managers now that they are no longer under the control of banks[22].** The supervision will extend to the independent trustees who are responsible for the safe custody of mutual fund assets. There will be further on-site inspections of mutual funds and trustees to enforce the regulations, although it is intended to use external accountancy and other professional firms to carry out this work. There are enhanced disclosure requirements for mutual funds.

35. **New legislation provides a proper basis for regulating provident funds.** The new legislation governing the regulation of provident funds puts that regulation on a sound statutory footing (having previously been reliant on tax legislation). The regulation of the provident funds is the responsibility of the Insurance Commissioner, who is a member of the staff of the Ministry of Finance. He has instituted a review of the accounting disclosure and reporting requirements for provident funds and imposed new requirements including internet-based reporting.

H. Further Measures to Be Considered

36. **In practice, at least some of the regulators are likely to need substantially more resources in order to carry out their responsibilities in the new and changing environment.** The Insurance Commissioner, for example, has 50 professional staff of whom just 15 are devoted to on-site supervision. He has responsibility for 100 institutional investors (insurance companies, provident funds and pension funds). He has decided to implement a new more proactive supervisory approach, involving more on-site visits. He is seeking and should be granted new staff, not only for on-site inspections but also to carry out research, design reporting systems for the regulated bodies, collate, and analyze reports, assess the risks of different bodies, and take action to mitigate risks and enforce rules. The ISA is faced with the need to assess applications for approval from a large

[22] Discussion with the ISA

number of investment advisers as well as owners, controllers, and managers of regulated bodies. It has only 11 professional staff devoted to the regulation of 40 mutual fund managers. The ISA considers that it has sufficient resources because it is intending to outsource the on-site inspection process to accounting and other professional firms. While it is perfectly reasonable to deploy such firms as part of an inspection process, it would be preferable to have a substantial in-house team with on-going experience of inspections. This would enable the ISA to set the parameters for the work of outside bodies, check that they are performing the task properly, and maintain a valuable knowledge base about the behavior of regulated bodies. Equally, the ISA needs to ensure that its staff numbers are expanding sufficiently to enforce the regulations it has been developing and to respond to enquiries that are coming from market participants about the simplified prospectus requirements, the role of advisers, the new rules for foreign mutual funds, and other developments. The need for additional resources will become more acute as the legislative and other changes are made to allow an increasing number of new instruments.

37. **The division of responsibilities between supervisory authorities should be reviewed.** At present, the Bank of Israel is the bank supervisor, the Insurance Commissioner is the insurance supervisor and the ISA is the securities regulator. This split of responsibilities is not uncommon. However, the arrangement carries some disadvantages and risks in the Israeli context. Increasingly, the products and services developed by different financial institutions do not fit neatly into separate boxes. The responsibility for the regulation of Investment products such as bank deposits, mutual funds, provident funds, pension funds and insurance companies is split between the three regulatory authorities. The way certain kinds of deposit, mutual funds, provident funds, and insurance products behave and the risk they pose to the investor are not always very different from each other and yet the division of responsibilities could result in inconsistencies and anomalies. The Insurance Commissioner, for example, noted that accounting rules for provident funds, pension funds, and insurance companies were not consistent with each other or with those for financial institutions regulated by other bodies. The Insurance Commissioner and the bank supervisor are developing regulations for insurance companies that follow those for the banks where they are behaving in a similar fashion. All regulators should review their rules to ensure consistency. In the short to medium term there may be a case for reallocating responsibility for some products (provident funds are discussed further below). In the longer term, it would be sensible to review the structure of regulation. However, structural changes can be very disruptive and it is essential that, at this time, when there is an urgent need to upgrade the standard of regulation to respond to new and developing risks in the capital markets, that the regulatory authorities are not distracted from their prime regulatory task.

38. **All regulators will have some responsibility for enforcing the new regime for investment advisers and it is essential that the rules and enforcement are consistent.** Banks will employ most investment advisers and the Bank of Israel will be the supervisor. Investment advisers and marketing agents will sell provident funds (which are within the responsibility of the Insurance Commissioner) and mutual funds (regulated by the ISA). The requirement to give objective advice was present but not effectively enforced under the previous regime. The regulators now have new powers and it is important that the regulations and their enforcement are consistent. These new powers should be deployed vigorously to create and maintain credibility in the integrity

of investment advice. The regulatory authorities have taken some steps to achieve this. The ISA and the Insurance Commissioner have, sensibly, cooperated in the drafting of ethics rules for investment advisers.

39. **Particular attention should be paid to the responsibility for provident funds regulation.** Although classified as a long term investment and therefore regulated by the Insurance Commissioner along with insurance companies and pension funds, the provident fund is, in almost every respect, a collective investment scheme and carries similar risks to other such schemes such as mutual funds. The international standard-setting body for such schemes is the International Organization of Securities Commissions (IOSCO) and the ISA follows IOSCO standards. Because he is primarily concerned with insurance, the Insurance Commissioner does not follow IOSCO standards in respect of provident funds. Thus, for example, requirements for disclosure by provident funds are being developed by the Insurance Commissioner but are not to be based on existing requirements developed by the ISA for mutual funds. So long as the regulation of provident funds rests with the Insurance Commissioner, it should follow the IOSCO principles. However, the structural review should also consider whether provident funds should be regulated separately from mutual funds.

40. **Each provident fund should be required to appoint an independent custodian to safeguard its assets.** IOSCO principles require that the assets of a collective investment scheme should be held by an independent custodian. This provides important safeguards, since the custodian ensures that the title to the assets is held securely, that transactions are properly completed and that investments made are within the fund's investment policy and the law. The ISA requires an independent trustee to perform this function for mutual funds. The same should apply to provident funds.

41. **The independence of the ISA and the Insurance Commissioner should also be strengthened by giving them rule-making powers that do not require the endorsement of a separate authority.** Detailed and technical rules are essential to provide certainty to regulated entities and to provide a transparent basis for regulation. The Israeli regulatory authorities can and do issue regulations. Unlike the Bank of Israel, however, which has the authority to issue regulations on its own authority, the rules of the Insurance Commissioner and the ISA are subject to the approval of the Minister of Finance and the Knesset Finance Committee. This arrangement creates the danger that agreement on new rules could be delayed or could be subject to political bargaining involving unconnected matters. The Israeli capital markets are developing very quickly and it is important that the regulatory authorities should be able to issue rules in a timely fashion. There should certainly be proper consultation and accountability but it should not be necessary to receive the approval of Ministers or Knesset committees before new rules can be issued.

42. **The budgets of the regulatory authorities are subject to oversight by political committees and this could also compromise independence.** Each jurisdiction needs to make arrangements consistent with its own legal and constitutional traditions. Some jurisdictions give regulatory authorities their own stable source of income (often in the form of license fees from regulated institutions) which is subject to value for money reviews and accountability arrangements but not necessarily prior approval by political bodies. Other jurisdictions provide multi-year budgets to ensure stability of income and

hence a degree of budgetary independence. In Israel, the annual budgets of the regulatory authorities are subject to political approval by the Knesset Finance Committee and it is difficult to reconcile this with the requirement for a stable source of income as is required by international standard setting bodies. If it is not possible for the regulatory authorities to be given total budgetary independence (subject to reviews of efficiency and transparent annual reports and accounts) it would be preferable to provide for three to five year budgets, so that there could be no danger that regulatory independence might be compromised because of concerns about budget approvals by the Minister or the Knesset Finance Committee.

I. Summary and Conclusions

43. **The authorities' actions have led to the growth of the capital markets.** The growth of the corporate bond market is a positive development for Israel. It provides further opportunities for business to obtain credit and an expansion of choice for institutional and individual investors. Together with the forced divestiture of banks' holdings of mutual and provident funds, actions that the authorities have taken, or plan to take, to remove the legal, tax, and regulatory barriers to the further development of capital markets, are already leading to growth and innovation in the creation of new instruments for investment and risk management. This action is to be commended.

44. **The authorities have also recognized the risks posed by capital market development and are taking action to address them.** The changes in the capital markets are having the result that there are new participants, selling new products to investors under new rules, with advisers operating under a new regime. There is a particular risk that arises because of the radically changed risk profile of provident funds which is the result of a shift in their asset portfolio away from risk-free government bonds to newer capital market instruments. Investors may not be aware of the changed risk profile and need to be properly advised and protected. The authorities should be applauded for recognizing these risks. The introduction of new laws and regulations and the development of new proactive approaches to enforcement are welcome.

45. **However, more needs to be done**. The legislation proposed by the authorities has yet to be enacted in many cases. Most importantly the regulatory infrastructure, although strengthened by recent legislation, needs further attention, particularly in the form of greater independence and more resources. The roles and responsibilities of the regulatory authorities could usefully be reviewed but not at the expense of creating a serious distraction to the management of the authorities at a time when their attention must remain focused on assessing and managing the risks created by the favorable development of the capital markets.

V. BANKING SECTOR DEVELOPMENTS AND ISSUES[1]

Abstract

The banking industry is an essential component of the Israeli financial sector. The system holds over half of all financial assets and is highly concentrated in five banking groups. Over the past several years, the profitability and capital position of the banking system has improved, albeit from a low base following the 2001-2002 recession. In light of the past earnings volatility of Israeli banks and the concentration of credit risk in the Israeli economy, it is important that the banking system be encouraged to continue to build its capital base and strengthen its profitability in an effort to bring it more in line with international peers in other small economies.

The supervisors in the Bank of Israel (BoI) have a very important responsibility to provide a supervisory regime that is conducive to well-capitalized and profitable banks. Under such a regime, each bank would clearly understand supervisory expectations regarding capital levels and risk management systems. At the same time, healthy banks, which are meeting supervisory expectations, would be given the authority and flexibility to innovate and respond to market developments without intensive rules-based regulation.

A. Structure and Performance of the Israeli Banking System

1. **Israel has a large and concentrated banking system.** As of end-September, 2005, the system had assets of NIS875 billion or about US$193 billion. (Table 1 provides information on the banking system.) The system is highly concentrated, with the five largest banking groups accounting for about 95 percent of system assets. Among the five largest banking groups, Leumi and Hapoalim each controls about 30 percent of system assets. Two foreign banks, Citigroup and HSBC, have a branch each, but do not have a material asset base.

[1] Prepared by Jonathan L. Fiechter, Michael Moore, John Palmer, and William Ryback. This chapter provides an update on developments and issues affecting the banking system in Israel and its supervision function by the Bank of Israel.

Table 1. Israel: Banking System
(financial information in NIS, consolidated banking group at September 30, 2005)

	Assets	Percent of total	Credit to the public	Percent of total	Deposits from the public	Percent of total
Bank Leumi	264.7	30.2	175.1	30.4	215.6	30.7
Bank Hapoalim	260.4	29.8	180.2	31.2	202.8	28.8
Israel Discount	153.0	17.5	83.2	14.4	127.4	18.1
Mizrahi	85.0	9.7	64.9	11.2	69.4	9.9
First International	70.8	8.1	43.1	7.5	60.1	8.5
Five largest banks	834.0	95.3	546.4	94.7	675.4	96.0
Total Banking System	875.3	100.0	576.8	100.0	703.2	100.0

Source: Bank of Israel

2. **The condition of the banking system is improving, albeit from a low base following the 2001-2002 recession.** The banking system has high levels of problem loans, low profitability, and relatively low capital levels compared to its international peers. Problem loans in the system, a large share of which is in the real estate and construction sector, average about 10 percent (for the five largest banks, problem loans range from 6 percent to 13 percent of total loans).[2] Through end September, the banking system reported net income of NIS5.3 billion or 0.8 percent annualized return on assets compared to a 0.6 percent ratio for 2004. Capital levels are low, with risk-based capital ratios for the five largest banks ranging from 9.7 to 12.2 percent (the regulatory minimum is 9 percent). The banking system enjoys ample liquidity provided primarily through deposit funding.

3. **Banks will shortly realize gains from the divestiture of their provident and mutual funds management businesses**, which will provide a one-time boost to income. The mandated divestiture followed August 2005 reforms designed to reduce the market power of the major banking groups and increase participation by non-banking companies. While intended to achieve greater competition in financial services for the economy, the divestiture by banks of the funds management business eliminates a potential source of income and income diversification for banks.

4. **The financial sector, both in Israel and internationally, is becoming increasingly competitive and more complex.** There is a need to ensure that well managed and healthy

[2] Problem loans are loans that are under special supervision, rescheduled, overdue or otherwise non-performing, or considered doubtful either in part or in total, and problem off-balance sheet exposure. The BOI does not deduct collateral from problem debts.

Israeli banks have the operational flexibility to adapt quickly to changing market conditions. Israeli banks, particularly those with international ambitions, need to be profitable and efficient to remain competitive in international markets. They need to be able to adapt to new regulatory regimes such as the Basel II capital adequacy framework and the International Financial Reporting Standard (IFRS), to meet changing customer needs, and to take full advantage of modern capital markets instruments such as derivatives and asset securitization.

5. **Despite the level of concentration in the banking system, the BoI has been encouraging greater consolidation of smaller banks, which has resulted in the sale or liquidation of more than 10 banks since 2001**. The consolidation reflects a supervisory concern that smaller banks have neither sufficient size to support the higher regulatory costs arising from initiatives such as Basel II, anti-money laundering rules, and accounting requirements nor the economies of scale to compete with the larger banks. At the same time, the Government has been reducing its ownership of the banking system, which in the past had been substantial.

6. **The banking groups have a large number of overseas offices**. At the end of 2004, there were 122 overseas offices including subsidiaries, branches, and representative offices. Assets and deposits in foreign branches and subsidiaries of Israeli banks comprise over 15 percent of system levels. On the other hand, the presence of foreign-owned banks in the Israeli market remains small despite the openness of the authorities to foreign institutions. Two foreign banks, Citigroup and HSBC, have branch operations that are limited to wholesale activities and private banking.

B. Supervision and Regulation

7. **The 2001 Financial System Stability Assessment (FSSA) concluded that the Bank of Israel largely complied with the Basel Core Principles (BCP) for Effective Banking Supervision**. While the mission did not conduct a reassessment of the BCP, the earlier conclusions reached during the FSSA remained consistent with the findings of the mission. The caliber of BoI supervisors is generally strong with considerable depth of quality in the department. The BoI provides continuous oversight over the systemically relevant institutions largely in line with best supervisory practices. Nonetheless, supervisory effectiveness could be strengthened further. The following areas merit further attention.

Supervisory Priorities

8. **The five banking groups that dominate the banking system are each systemically relevant**. The failure of a bank in any one of these groups could have serious consequences for the economy and for the payment and settlement system. In response, a supervisory philosophy of limiting the risk-taking of the banks has developed. The BoI designs prescriptive rules for a broad range of banking activities with examiners then emphasizing compliance with these rules. This approach is aimed at preventing banks from suffering financial loss, promoting transparency, and protecting the public from unpopular fees and

unfair treatment. Such a prescriptive approach, however, may impose additional costs (direct and indirect) on the banking system and, ultimately, on the public.

9. **To strengthen supervisory effectiveness, the BoI needs to move towards a more risk-based supervision process based on supervisory principles**. The objectives of the BoI are properly aligned toward supervising the five largest institutions, consistent with the critical role of these institutions in the economy. Very important prudential issues, however, such as the high level of problem loans, the level of provisioning, the relatively low capital levels, and low earnings may receive less attention. A risk-based approach focuses supervision on reviewing bank performance against sound risk management practices rather than relying on the resource-intensive review of compliance with prescriptive rules. Such an approach would allow for greater allocation of BoI resources according to risk. Such a risk-based resource allocation would have several elements. It could include the analysis of systemic risks and focusing supervisory efforts on those activities in systemically important institutions that are perceived to be riskiest and where risk controls are weak.

10. **An important element of a principles-based approach is ensuring that supervisory resources are sufficient and appropriately allocated** to understand and mitigate vulnerabilities. It will be important that BoI have staff with the necessary skills to deal with the supervision of emerging areas of risk in the banking system such as foreign exchange risk, securitization, and other money market activity. Optimally, the number of staff in the Supervision Department will be increased. Banks are already engaging modestly in some of these activities and are intending to enhance their infrastructure and technology platforms to expand further in these business lines. Banks are anxious to expand their revenue drivers as growth in traditional business lines becomes constrained by competition and forced divestiture. It is important for the BoI supervisors to support these new activities, but within the parameters of safety and soundness. In line with developing a more principles-based approach, there will need to be a high level of consultation with the banking sector to ensure common understanding of risk management practices.

11. **As an example, an area of vulnerability is the lower capital levels and high levels of problem loans in some banks**. In line with a more principles-based approach, the BoI would set out a broad objective that banks be required to attain target capital ratios more in line with international peers within a specified timeframe. Similarly, agreement would be reached to reduce the level of problem loans and/or increase provisions in individual banks to specified targets.[3] The bank management and boards of directors would then need to adopt their own strategy and develop their own plans for reaching these targeted levels over a mutually agreeable time frame. The current economic conditions and the realization of one-

[3] High levels of problem loans create a vulnerability for banks in the event of an economic downturn and distract management attention from properly serving their customer base. Problem borrowers should be encouraged by their banks to improve their credit worthiness and enhance the collateral against their outstanding credit.

time gains from the divestiture of the funds management businesses by the banks could facilitate the achievement of such broader objectives.

Anti-Money Laundering (AML)

12. **A vulnerability for the Israeli banking system is the risk of money laundering**, particularly in foreign offices of Israeli banks. It is important that bank policies and oversight of AML requirements cover the group-wide operations, not just compliance by the domestic operations of Israeli banks. In this regard, host-country regulators (and law enforcement agencies) have identified the foreign operations of several of the larger banks as not yet complying with local laws and regulations. Some of the actions taken in response have been severe and demonstrate the need to strengthen risk-management practices over AML in foreign offices.

13. **Two recommendations for the AML area** would be that: (i) BoI carry out a review of the adequacy of the group-wide AML policies and the internal control processes in Israeli banks; and (ii) the authorities undertake a self-assessment of the AML regime against the revised FATF Recommendations and the revised assessment methodology. The review of bank practices by the BoI should determine whether oversight by bank management and boards of directors is sufficiently robust to ensure compliance with local legal requirements and that observed deficiencies are not more widespread. For the self-assessment of Israel's regime, there should be a determination of the adequacy of legislative and regulatory requirements and their implementation against the Financial Action Task Force (FATF) Recommendations, which have undergone substantial revision.

Introduction of the Basel II Capital Adequacy Framework

14. **The BoI is in the early stages of gearing up to implement Basel II.** In 2004, the BoI issued a paper to the banking industry that set out a timetable for the adoption of the Basel II capital framework beginning in 2008. International experience suggests that preparing banks and supervisory systems for Basel II implementation is a massive undertaking and that it is important for sufficient guidance to be provided to the banking industry to meet the timetable. There are over 80 areas of national discretion that will need to be reconciled with the unique characteristics of Israeli banking practice and mapped to the supervisory process. Given the ambitious timeline for the announced implementation of Basel II, the BoI should consider: (i) a significant increase in BoI staffing resources to develop the implementation strategy and prepare regulatory guidance; and/or (ii) extending the timeline for implementation.

Introduction of E**xplicit Deposit** I**nsurance**

15. **The authorities are considering introduction of an explicit deposit insurance regime.** Because of some of the problems with implicit deposit insurance schemes, the 2001 FSSA had recommended that the government adopt explicit deposit insurance. Explicit deposit insurance would replace the current scheme that provides the BoI Governor with the

authorization and discretion to guarantee deposits and other bank claims. In line with the adoption of the Basel II framework, the BoI could eventually consider a risk-based deposit insurance scheme, with insurance premiums assessed based on risk. The risk-based premiums would be a natural complement to Basel II that would reward well-managed banks and encourage weaker banks to strengthen their risk-management practices.

Accounting and Financial Reporting

16. **The BoI is responsible for setting the accounting, financial reporting, and disclosure requirements for the banking system.** The BoI has carried out this role in an outstanding fashion and requires banks to follow U.S. generally accepted accounting principles (US-GAAP). Reporting and disclosure requirements are in line with internationally accepted practices and the quality of that reporting is high.

17. **With the adoption of International Financial Reporting Standards by the Israel Securities Authority (ISA) for all other public companies, however, there is the potential for unnecessary confusion.** Absent convergence between US GAAP and IFRS, it is possible that beginning in 2008, Israeli banks will be applying US GAAP while all other public companies in Israel apply IFRS. This will make cross-sectoral comparisons of financial statements difficult. The BoI should consider developing a transition strategy for the banks to introduce IFRS by 2008 (or a more manageable timetable if that date would impose onerous system conversion problems for the banks.) The BoI may also wish to consider devolving some aspects of its accounting standard responsibilities to Israel's Institute of CPAs, as part of the Institute's normal standard-setting role.

Consumer Protection

18. **By law, the BoI is responsible for consumer protection. This function has been delegated to the BoI's supervision department, which has created a *Bank-Customer Relations Area***. The BoI has been very successful in carrying out its consumer protection mandate. This success, however, has come at the cost of drawing resources away from the BoI's duties of ensuring the safe and sound operation of the banking system. Bank customers may file complaints directly with the BoI even before they have sought relief directly from their bank. It would be more efficient to require that customers first attempt to resolve problems directly with their banks and turn to the BoI only as a last resort when dissatisfied with their bank's response. The advocacy role of the *Bank-Customer Relations Area* appears to go well beyond most consumer affairs/complaint-handling units in other central banks and supervisory agencies. This level of advocacy is often the role of independent bank ombudsmen and consumer protection agencies in other countries. While protecting consumers is an admirable goal, making it part of banking supervision has come at the price of reduced resources devoted to prudential supervision.

C. Conclusion

19. **Israel has a large and highly concentrated banking system that has grown stronger in recent years following the 2001-2002 recession.** Nonetheless, the level of problem loans in the banking system has remained stubbornly high, contributing to a low level of profitability. The caliber of the BoI supervisors is strong and they are highly qualified. Because of the systemic importance of the major banking groups to the Israeli economy, it is important that the supervisory function be made more efficient and that it continue to focus on ensuring a financially sound and competitive banking system.