Israel: Selected Issues

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ISRAEL

Selected Issues

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Approved by European Department

January 22, 2008

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This Selected Issues paper offers further analysis of the key topics covered in the accompanying Staff Report. These include Israel's equilibrium exchange rate, financial sector stability, and prudential policy challenges. The final chapter serves as an input into the ongoing policy debate on reforming fiscal rules.

The main findings are:

- Israel's real exchange rate is moderately undervalued (by about 5–10 percent), while gains in external competitiveness appear to have been eroded somewhat in recent years. For this and other reasons the undervaluation could be lower than the econometric estimates suggest.

- Financial stability has been improving. Compared with the accounting ratios (capital/assets, ROE etc), market-based indicators paint a less improved picture of recent financial stability developments in Israel, possibly reflecting markets' assessment of challenges and risks for banks associated with the recent financial sector reforms and concerns over the wider impact of global credit market events. Stress tests for banks, based on publicly available data, suggest that the banks have become more resilient to shocks over time. Credit risk remains the key source of risk.

- Financial sector reforms are spurring rapid mostly positive change and much work to adapt the prudential framework and financial infrastructure is ongoing. For example, banks are expanding abroad, taking on new risks. However, data disclosed by the major banks suggest that exposures to US mortgage-related assets, though causing significant loss to one bank, do not present systemic risks. Insurance companies are developing into diversified groups. Regulators now need to (i) build the expertise necessary to support a more complex regulatory system; (ii) ensure consistency between the pace of regulatory change and high-quality implementation, ideally moving to a more principles-based approach; and (iii) strengthen their capacity to manage and resolve financial stress.

- Israel's performance against its fiscal rules over the past two decades has been mixed but improving noticeably as of late. A new fiscal rule should be anchored on the objective of lowering the public debt to 60 percent of GDP by 2015, with a view to rapidly diminishing the economy's vulnerability to shocks.

I. ISRAEL'S EXTERNAL COMPETITIVENESS: ASSESSING THE REAL EXCHANGE RATE[1]

A. Introduction

1.   **Israel's real effective exchange rate (REER) has trended lower since 1998, while the current account moved from deficit into surplus.**[2] The REER depreciation ought to have made Israeli exports more competitive in world markets, and the improvement in the current account position in part reflects this. However, the recent transition to appreciable current account surpluses appears to have been driven more by factors associated with capital market developments rather than durable competitiveness gains in exports of goods and services.

Current Account and Real Exchange Rate
(Distance from 1987-2006 average; percent)

RER (deviation from period average) 1/
+1 standard dev. of RER
-1 standard dev. of RER
Current account (percent of GDP, right scale) 2/
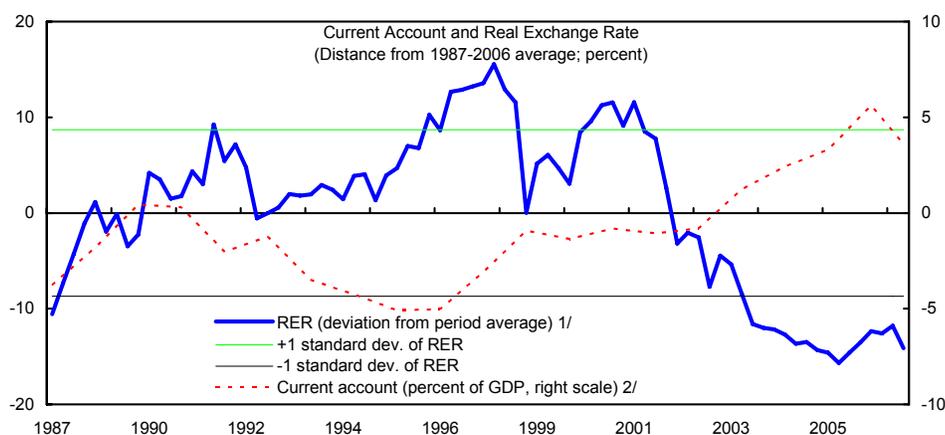
Sources: Bank of Israel; IMF, Information Notice System; and IMF staff calculations.
1/ Data for 2007 as of September.
2/ Projection for 2007.

2.   **This paper adopts an eclectic approach to assessing Israel's external competitiveness**.[3] Particular attention is paid to measures of equilibrium real exchange rates. The paper is structured as follows: Section B reviews recent trends in the current account; Section C examines various measures of the real exchange rate; Section D analyzes Israel's export performance; Section E concludes.

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[1] Prepared by Natan Epstein, with research assistance from Jonathan Manning.

[2] Israel's exchange rate is floating; the Bank of Israel last intervened in the foreign exchange market in 1997.

[3] See Drummond (2006, 2007), Epstein (2007), Gagales (2007), Gutierrez (2006), and McGrew (2007) for similar approach taken in recent assessments of Portugal, Italy, Latvia, Greece, Macedonia, and Turkey, respectively.

B. Current Account Trends

3.   **The current account balance has trended higher since the mid 1990's.** In order to assess the underlying factors behind this improvement, it is helpful to decompose the current account into its key sub-components over two broad periods.[4]

- The late-1980's-mid 1990's featured high investment/low savings, and the current account position deteriorated from about balance in 1989 to a deficit of around 5 percent of GDP in 1994–96. This was primarily due to a substantial wave of immigration (equivalent to about 20 percent of Israel's original population at the time), appreciable increases in government spending and deficits, and a reduction in current transfers. Transfers mainly comprise US government aid, compensation from Germany, and private transfers. All three sources are trending lower (as a share of GDP) and are expected to continue to do so.

- However, starting in the second half of the 1990s the current account began to improve, in large part because of the unwinding absorption effects of the large immigration pool, gains in price competitiveness—helped by the downward trend in the real exchange rate, but also due to structural changes that increased savings.[5] While public saving rose, private savings were supported by cutbacks in the welfare state.

Current Account Balance and Components
(Percent of GDP)
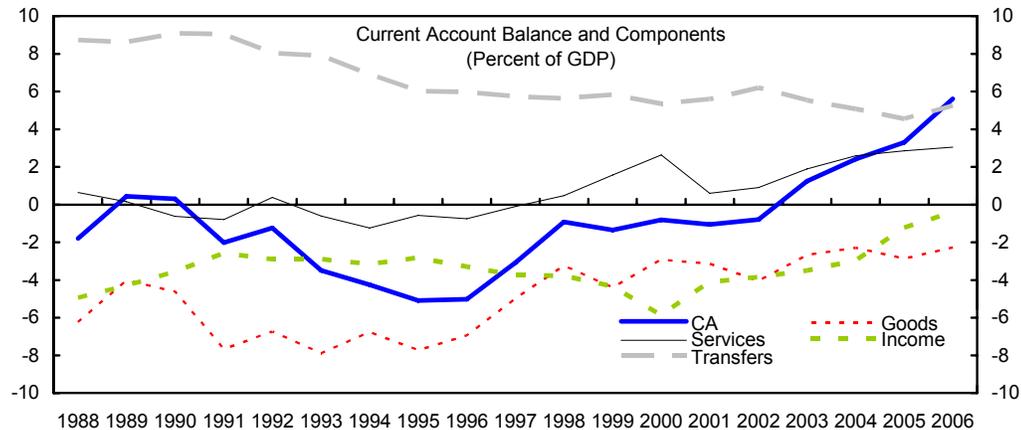
Sources: Bank of Israel; and IMF staff estimates.

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[4] The analysis in this paper is confined to developments after the 1985 economic stabilization program for reasons of relevance and ease of analysis.

[5] See Chapter 7 of the BoI Annual Report for 2006.

4.   **Since 2003, the improvement in the current account mainly reflects an appreciable increase in the income balance.** The current account rose from a surplus of 1 percent of GDP in 2003 to 5.6 percent in 2006. Over 70 percent of the gain is attributed to the income balance, which rose steadily from a deficit of 3.5 percent of GDP in 2003 to about zero percent in 2006. The rise in the income balance stems mainly from a steady increase in the holdings of foreign assets by Israeli residents, who have sought to diversify their investment portfolios. Over the same period, the goods balance was trend-less, hovering around a deficit of 2–3 percent of GDP, while the services balance rose gradually to a surplus of about 3 percent of GDP. The surplus in net transfers slowly declined to around 4 percent of GDP. These recent developments suggest a possible disconnect between the improvement in the current account and the extent to which it has reflected sustained gains in external competitiveness.

Change in Current Account Balance Components, 2003 to 2006 (Percent of GDP)

Sources: BoI; and IMF staff calculations.
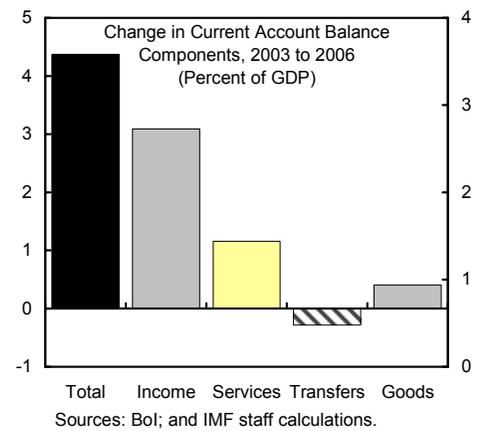
C. Measures of Real Exchange Rate Valuations

5.   **In comparison with long-run historical averages, Israel's real exchange rate appears undervalued, albeit moderately.** A secular uptrend in the CPI-based real effective exchange rate (REER) during the previous two decades reversed course in 1998 when the REER began to trend lower, and depreciated further as a result of the 2001–02 recession. At 2007Q2, the REER was more than 20 percent below its peak, but only 12 percent below its average level over the preceding 20-year period and 6 percent below the average level since 2001. On the basis of unit-labor-cost (ULC), the real exchange rate shows a similar trend.

REER (2000=100) 1/

CPI-based 1/

ULC-based 2/
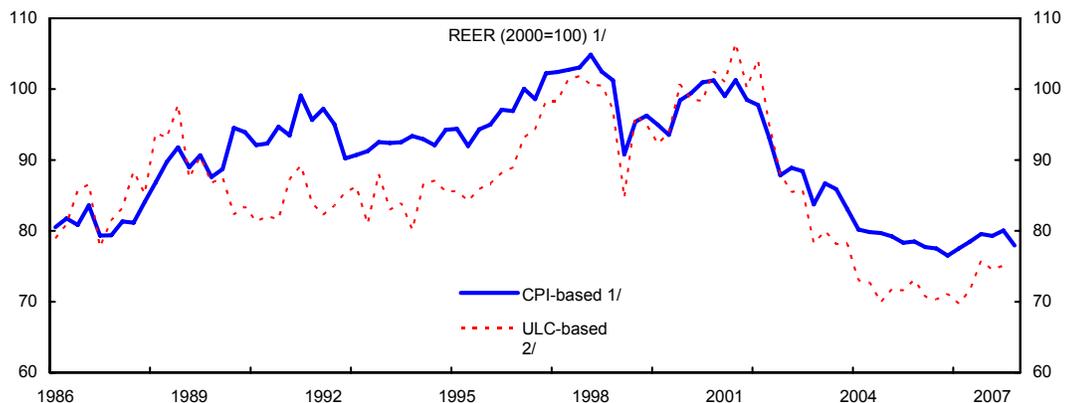
Sources: Bank of Israel; IMF, internal database; and IMF staff calculations.
1/ Data for 2007 as of September.
2/ Data for 2007 as of June.

6.   **More refined approaches to assessing real exchange rates rely on estimates of an equilibrium rate derived from underlying macroeconomic fundamentals.** The premise here is that the real exchange rate is not stationary (confirmed by unit root tests) but rather changes slowly over time in response to fundamentals. The methodology developed by the IMF's Consultative Group on the Exchange Rate (CGER) adopts three key approaches: Equilibrium Real Exchange Rate (ERER), Macro Balance (MB), and External Sustainability (ES).[6]

7.   **The ERER estimates the equilibrium relationship between the real exchange rate and a set of fundamentals.** These are: *net foreign assets (NFA)*, *labor productivity*, *commodity terms of trade*, *government consumption*, *trade restrictiveness*, and *price controls*, with an intercept for each country (equal to the average real exchange rate over the sample period).[7] The equilibrium rate is assessed at "trend" values of the right-hand-side variables, and thus is calculated as a function of the projected medium-run (2012) values of these fundamentals. On this basis, Israel's real exchange rate was found to be 9.5 percent below its estimated equilibrium level.[8] However, a key assumption of the ERER methodology is that average misalignment over the sample period is zero. This may lead to an overestimation of Israel's equilibrium real exchange rate at the end point of the sample period (2006), for the following reasons:

Sources: IMF staff estimates.

Sources: IMF staff estimates.

- Current transfers receipts have been falling as a share of GDP.

- Immigration, much of which occurred during 1989–95, may have temporarily boosted the real exchange rate, beyond what is captured by productivity and government consumption.

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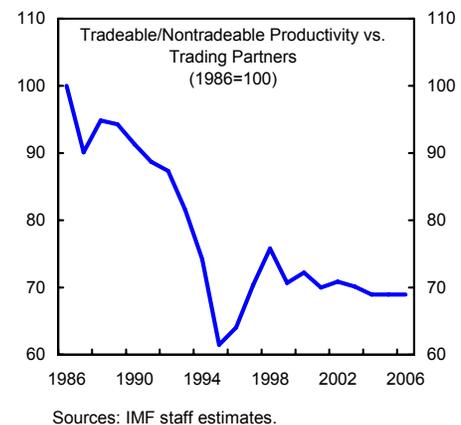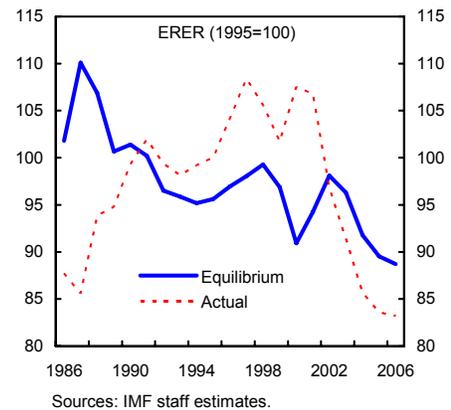
[6] For a detailed discussion of CGER methodologies, including estimated panel coefficients, see IMF (2006)

[7] Estimated by a panel cointegration, with data for 48 countries over 1980–2004.

[8] The precise misalignment is 9.3 percent, but with a multilateral consistency adjustment the misalignment rises to 9.5. For all three methodologies once exchange rate misalignments are calculated for all the countries in the panel, a final correction is made to ensure they are mutually consistent. This multilateral consistency is required by the fact that there can only be $n-1$ independent exchange rate misalignments among n currencies.

Indeed, government consumption has trended down as of late, reflecting in part the end of immigration-related spending,.

8.   **The MB methodology calculates the real exchange rate adjustment needed to bring the projected medium-run (underlying) current account into line with an estimate of the equilibrium or "norm" current account level.[9]** The approach entails two steps. First, the current account norm is estimated from a set of fundamentals: *fiscal balance*, *output growth*, *relative income*, *demographics (old-age dependency ratio)*, *NFA*, and the *oil trade balance*.[10] In the second step, the norm is compared with the underlying current account, and the magnitude of the required real exchange rate adjustment is derived by applying to the current account gap the elasticity of the current account to the real exchange rate.[11] Thus, exchange rate misalignment under the MB approach is essentially a by-product of current account misalignment. Since the approach does not assume an average misalignment of zero, many of the ERER-related problems do not arise. For Israel, the estimated norm current account is a surplus of 0.8 percent of GDP.

9.   **Staff estimates put the underlying current account at a surplus of 2.2 percent of GDP, implying an estimated 6.1 percent RER undervaluation.[12]** However, the risks to staff's estimate of the underlying current account are predominantly to the downside. The main reason is that there may well be more slack in the economy than medium-run output growth projections currently suggest, which would allow more domestic-demand driven growth to lower the current account and thus narrow the RER misalignment.[13]

10.   **The ES approach complements the ERER and MB methodologies by focusing on the relationship between the sustainability of a country's NFA position and its flow current account and real exchange rate.** Specifically, the ES method determines the current account balance that stabilizes NFA (in percent of GDP) at a benchmark value, which is then compared with the underlying current account. The benchmark value is determined by the most recently recorded NFA level (here end-2006). At end-2006, the NFA-stabilizing

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[9] The underlying CA is defined as the projected 2012 CA and assumes (i) a constant real effective exchange rate over 2008-12; and (ii) closed output gaps for all countries.

[10] Panel estimation with data for 54 countries over 1973–2004, using 4-year averages to remove cyclical effects.

[11] This elasticity is computed as: (export elasticity) x (export/GDP) – (import elasticity -1) x (import/GDP). In Israel's case, the elasticity of the current account to the real exchange rate was estimated at 0.26, using common export and import elacticities derived from panel estimations (-0.71 and 0.92, respectively), and Israel's own export and import shares of GDP.

[12] On a multilateral consistency basis.

[13] In staff's latest WEO projections, domestic-demand growth averages 3.6 percent in 2008–12. for further details, see Staff Report

current account was estimated at minus 0.1 percent of GDP. Similar to the MB approach, the magnitude of the required real exchange rate adjustment is then derived using the aforementioned trade elasticity.

11.   **The ES approach pins the real exchange rate undervaluation at 9.9 percent[14], but may also overstate the extent of undervaluation.** One concern with the ES method is the choice of the benchmark NFA value at the last period's level. For Israel, NFA have been trending higher and this may very well be appropriate with respect to future needs stemming from population aging, which is set to accelerate after 2010.[15] A higher benchmark value would lower the degree of undervaluation.

Net Foreign Assets
(Percent of GDP)

Sources: Lane and Milesi-Ferretti (2006)
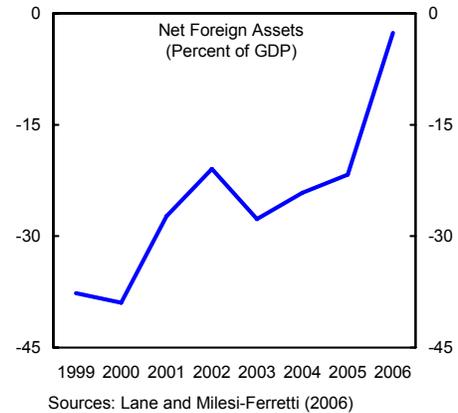
Summary of Estimated Real Exchange Rate Undervaluation Measures

	Percent
Real Effective Exchange Rate — Deviation from Trend 1/	9.6
Equilibrium Real Exchange Rate, CGER	9.5
Macroeconomic Balance, CGER	6.1
External Sustainability, CGER	9.9

1/ Average measure of CPI-based and ULC-based REER deviations from their five-year and twenty-year avergaes.

12.   **These different approaches to assessing the appropriateness of Israel's real exchange rate generate a range of estimates that are broadly suggestive of modest undervaluation**. While these estimates are subject to uncertainty, taken as a whole, they point to a real exchange rate undervaluation on the order of about 5–10 percent, with some downside risk.

D. Export Performance

13.   **Market penetration of Israel's exports increased significantly during the 1990's, but has been falling recently.**[16] Israel's share of world exports of goods increased by about 40 percent in value terms between 1990 and 2000. However, since then the market share has been on a decline, notwithstanding the about 20 percent depreciation of Israel's REER (by about 20 percent between 2001 and 2006). This suggests that competitiveness gains have not been apparent, but it may also reflect the recent global boom in

Market Share of Israel's Goods Exports
(Percent)
—— World
- - - - Advanced economies

Source: IMF, *Direction of Trade Statistics*.

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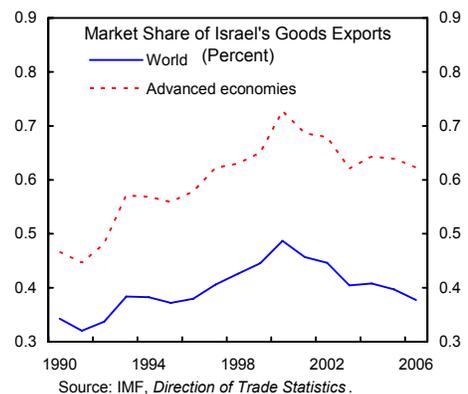
[14] On a multilateral consistency basis.

[15] Although the link between future demographic trends and estimated current account norms is found not to be robust across countries

[16] The analysis in this section pertains to *goods* exports. It ignores exports of services due to data limitations.

commodity prices, particularly energy prices, to which Israel's exports are hardly exposed.

14.   **A constant market share (CMS) analysis is applied here to help identify factors underlying Israel's goods export growth over the past couple of decades and more recently.** A CMS decomposes the change in Israel's exports into four effects—world trade, commodity composition, market distribution, and a residual—and can be expressed by the following equation and summary table below:

$$X^1 - X^0 = r\sum_i X_i^0 + \sum_i (r_i - r)X_i^0 + \sum_i \sum_j (r_{ij} - r_i)X_{ij}^0 + \sum_i \sum_j (X_{ij}^1 - X_{ij}^0 - r_{ij}X_{ij}^0)$$

where

$$X^t = \sum_i \sum_j X_{ij}^t = \sum_i X_i^t, \quad t = 1,0$$

and

X_{ij}^t = the value of Israeli export of commodity i to market j at time t,
r = the rate of growth of world exports,
r_i = the rate of growth of world exports of commodity i,
r_{ij} = the rate of growth of world exports of commodity i in market j.

Israel: CMS Analysis of Changes in Exports

(Billions of U.S. dollars, unless otherwise indicated)

	1988–2006	2001–06	2004–06
Change in exports	37.1	17.7	8.2
Average annual growth rate (percent)	9.1	10.0	10.1
Due to:			
World trade effect	51.5	25.0	9.9
Commodity composition effect	-7.5	-0.5	-0.7
Market distribution effect	-21.4	-11.2	-3.9
Residual	14.4	4.4	2.9

Sources: U.N., COMTRADE; and IMF Staff estimates.

- *The world trade effect* measures the impact of expanding global trade on Israel's exports. As an open economy, globalization should have a large effect. Indeed, during 1988–2006, the expansion in world trade is estimated to have contributed some US$51 billion to Israel's merchandise exports, significantly higher than the total US$37 billion gain in these exports.

- *The commodity composition effect* measures the contribution to exports from individual commodities. A negative value indicates that Israel's merchandise exports are concentrated in products with lower-than-average growth rates. Due to this effect, exports were reduced by about US$7.5 billion, or around 20 percent of the total value of exports gained since 1988. However, in recent years the effect of this measure has

become negligible, suggesting that merchandise goods exports are now more concentrated in products with about average growth rates.

- *The market distribution effect* reflects the contribution from export-partners' demand. A large negative value early in the period indicates that Israel's exports went to countries where demand growth was slower than the global average. More recently, the measure has become relatively more negative. This might reflect the large share of export market to advanced countries rather than to emerging markets, which have been growing more rapidly recently.

- *The residual* is a catch-all for other factors, including changes in competitiveness, and these have generally boosted exports.

E. Conclusion

15.   **The methodologies used in this paper suggest that Israel's real exchange rate is moderately undervalued, while gains in external competitiveness appear to have been eroded somewhat in recent years.** In some ways, regarding exports of goods, the depreciation of the REER has been largely offset by commodity composition and market distribution effects. At a constant REER, the current account is projected to settle at around 2 ¼ percent of GDP surplus over the medium-run. CGER estimations and other measures suggest that the real exchange rate may be undervalued by about 5–10 percent However, uncertainty with respect to the three CGER measures, notably the current account balance estimate for 2012, suggests the misalignment may well be somewhat narrower.

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II.   MEASURING FINANCIAL STABILITY: MARKET-BASED INDICATORS AND STRESS TEST[1]

A.   Introduction

1.   **Market-based indicators and stress tests can provide useful dimensions to the analysis of financial stability in Israel**. In its work on financial stability, Bank of Israel has mostly relied on a range of standard financial soundness indicators. The aim of this paper is to illustrate that this analysis can be further enhanced by developing the more forward-looking market based indicators and performing stress tests.

B.   Market-Based Indicators

2.   A number of indicators can be used to gauge likelihood of default of financial institutions based on prices of financial instruments. These indicators include distance to default (DD), bond prices, and credit default swaps.[2] Among their advantages is that they are available at high frequency, and incorporate market participants' forward-looking assessment of risks (unlike the more backward-looking accounting measures). Another practical advantage is that confidentiality is generally not an issue with market data. The market-based indicators also have limitations. They may not work well if securities are not publicly traded or their trading is limited. Also, if little information is publicly disclosed but much is collected by supervisors, prudential data can be superior to market-based indicators in measuring financial sector soundness. Moreover, securities prices reflect potential losses to the security holders, which may be different from losses to depositors. Finally, the market based indicators incorporate assumptions that may not capture extreme events adequately (e.g., some basic measures assume that asset values follow a lognormal process).

3.   **Empirical studies show that market-based indicators can outperform traditional measures of soundness when forecasting distress in individual financial institutions**. Market-based indicators have been shown to predict supervisory ratings, bond spreads, and rating agencies' downgrades in both developed and developing economies, performing generally better than "reduced form" statistical models of default or measures relying on financial statements. For example, literature on U.S. banks finds that supervisory assessments are worse than market indicators in predicting bank performance, but supervisors may be more accurate when inspections are recent (Berger, Davies, and Flannery, 2000). Similarly, literature on European banks finds that market-based indicators improve performance of models based on banking ratios (Tudela and Young, 2003 ; Gropp, Vesala and Vulpes, 2006).

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[1] Prepared by Martin Čihák, with inputs from Alexander Tieman, Kalin Tintchev, and Chanpheng Dara.

[2] See for instance Čihák (2007a) for definitions and a survey of the various market-based indicators.

4.   **For Israel, market-based indicators for banks and insurance companies are currently around their long-run average values**. Looking at the long-term developments (Figure 1), most DD observations are in the range of 3–8 standard deviations.[3] Both banking and insurance saw low DD values during the macroeconomic recession of 2002–03.[4] Subsequent to 2003 , both sectors had a strong period, with DDs reaching or getting close to their historical maximums. This was followed by a correction towards the mean in2006–2007. Insurance companies' DD appears more sensitive to stock market movements, as illustrated by the declining DD during the stock market decline in 2000–01 and also more recently during the turbulence of the second half of 2007 .

5.   **The assessment of recent financial stability developments presented by the market-based indicators differs from the picture painted by the accounting ratios**. Accounting indicators, such as nonperforming loans and capital adequacy ratios, suggest a continuous improvement in banking sector soundness since 2002 (see Table1). Market indicators paint a different picture, suggesting that bank soundness, after a substantial improvement between 2003 and 2005, may have been retreating in 2006 and 2007 (Figure1). The somewhat lower DD values in recent periods are consistent with the view that financial sector reforms are spurring rapid change. While this should make the system more resilient over the medium to long run, it comes at the expense of higher risks in the interim. Specifically, the lower DDs might reflect reform-related drops in franchise values, as banks are facing stiffer competition, and had to sell off their fund management business.

6.   **The market-based indicators also suggest that the system has weathered the current global turbulence relatively well thus far**. The reaction of banking DDs has been very muted, reflecting little apparent exposure to subprime mortgages. Stock market indicators for insurance companies recently have weakened as a result of the latest turbulence in equity markets, although not in a major way.

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[3] The use of market-based indicators is illustrated here on the DD, a measure derived from banks' stock prices. Results derived from bond prices are similar. There are no CDS data on the Israeli banks.

[4] Also, both banking and insurance saw very low DD values in 1997 (not shown here, but available upon request), reflecting concerns surrounding the Asian crisis.

Table 1. Israel: Standard Financial Soundness Indicators (Accounting Ratios), 2001−07
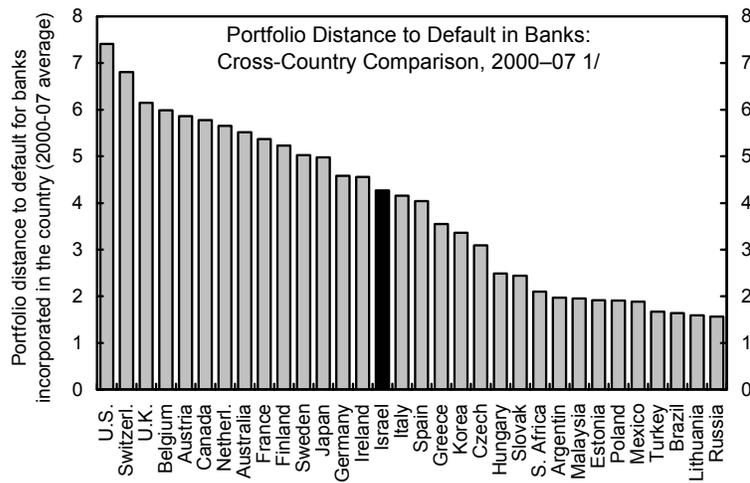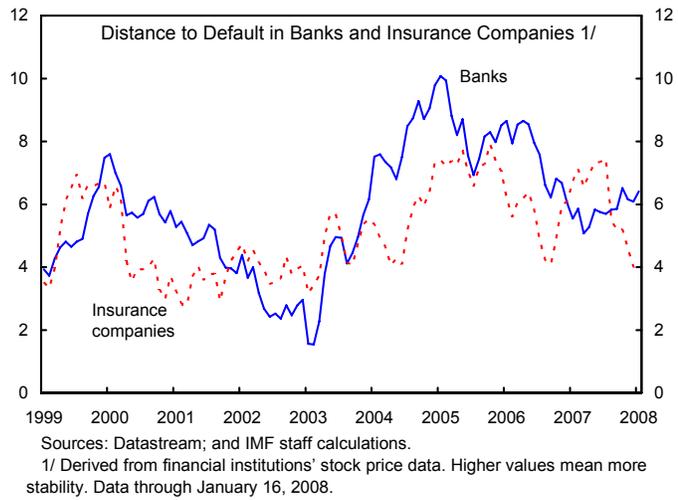
(Percent)

	2001	2002	2003	2004	2005	2006	2007 Mar.	2007 Jun.
Core Set								
Deposit Takers								
Regulatory capital to risk-weighted assets	9.4	9.9	10.3	10.8	10.7	10.8	11.0	11.1
Regulatory Tier 1 capital to risk-weighted assets	6.4	6.6	6.9	7.3	7.1	7.4	7.6	7.7
Problem loans to total credit	...	...	10.5	10.5	9.5	8.4	8.1	...
Nonperforming loans net of provisions to capital	...	35.1	33.3	31.0	27.2	21.2	20.3	18.7
Nonperforming loans to total gross loans	...	2.4	2.6	2.5	2.3	1.9	1.9	1.8
Of which:								
Other financial corporations (OFCs)	7.2	7.6	7.2	7.9	8.7	8.7	9.1	9.2
General government	3.6	3.5	3.3	2.7	2.5	2.2	2.1	2.0
Nonfinancial corporations (NFCs)	50.2	49.7	48.1	44.7	43.4	41.9	41.9	42.1
Other domestic sectors	24.5	24.7	26.0	28.4	28.5	29.3	28.8	28.2
Nonresidents	14.4	14.5	15.4	16.2	16.9	17.8	18.0	18.4
Return on assets	0.6	0.3	0.7	1.0	1.1	1.0	1.2	1.2
Return on equity	12.3	6.1	14.1	17.9	19.4	17.6	19.7	20.2
Interest margin to gross income	63.5	63.5	64.1	63.1	62.6	61.9	60.7	61.1
Noninterest expenses to gross income	65.5	64.6	60.2	59.7	61.7	66.2	62.3	61.4
Net open position in foreign exchange to capital	-0.5	4.3	2.1	4.1	-0.5	1.8	3.0	-4.2
Encouraged Set								
Deposit Takers								
Capital to assets	4.9	4.9	5.3	5.5	5.6	5.9	6.0	6.2
Gross asset position in financial derivatives to capital	...	...	36.0	32.5	28.7	24.6	21.9	22.9
Gross liability position in financial derivatives to capital	...	...	32.4	31.6	29.3	21.3	19.1	22.5
Trading income to total income	36.4	19.4	12.3	17.9	23.7	8.8	...	...
Personnel expenses to noninterest expenses	61.8	62.8	61.0	60.3	59.7	62.4	62.2	60.6
Spread between reference lending and deposit rates (basis points)	1.5	2.3	2.0	2.7	3.0	3.5	...	...
Customer deposits to total (non interbank) loans	118.7	115.3	115.6	117.7	119.5	118.2	117.0	117.3
Foreign-currency-denominated loans to total loans	34.8	36.0	35.4	34.5	31.4	28.1	28.0	28.6
Foreign-currency-denominated liabilities to total liabilities	38.0	40.6	40.1	41.5	42.5	40.7	39.9	41.3
Net open position in equities to capital	7.2	5.4	11.4	12.8	11.5	16.2	...	...
Other Financial Corporations (OFCs)								
OFCs' assets to total financial system assets	35.4	35.5	38.1	40.0	42.3	42.4	42.3	
OFCs' assets to Gross Domestic Product (GDP)	86.0	87.8	94.7	98.7	104.0	103.8	101.5	
Nonfinancial Corporations								
Total debt to equity	201.0	230.1	208.4	197.2	184.5	185.0	183.6	187.0
Return on equity	-8.6	-3.2	5.2	11.6	16.6	13.1	15.6	15.7
Earnings to interest and principal expenses	61.3	73.9	96.5	128.3	139.1	138.1	136.4	136.2
Households								
Household debt to GDP	27.1	28.1	28.3	27.7	27.9	30.7	30.1	30.2
Market Liquidity								
Average bid-ask spread in the securities markets (percentage of mid-point price)	...	...	...	...	0.0	0.0	0.0	0.0
Average daily turnover ratio in the securities markets	0.6	0.9	0.9	0.9	0.8	0.9	0.9	0.9
Real Estate Markets								
Residential real estate prices (annual percentage increase)	0.2	2.5	-6.1	-1.3	4.4	-4.3	-6.1	0.7
Residential real estate loans to total loans	10.9	11.8	11.9	12.4	13.1	13.9	13.9	13.8
Commercial real estate loans to total loans	18.2	18.2	17.9	16.6	16.1	16.0	16.1	16.2

Source: Bank of Israel.

7.   **In a cross-country comparison, the DDs for Israeli banks support the assessment of Israel's financial system soundness as broadly satisfactory**. The DDs for Israeli banks lag behind those for comparable advanced economy banks, but are stronger than most banks in emerging markets (Figure2). This is broadly in line with ratings agencies' ratings for the major banks (Fitch rates systemic risk and macro prudential strength of the Israeli banking system at D1, which is the rating for countries such as Poland and Hungary).

Distance to Default in Banks and Insurance Companies 1/

Sources: Datastream; and IMF staff calculations.
1/ Derived from financial institutions' stock price data. Higher values mean more stability. Data through January 16, 2008.

Portfolio Distance to Default in Banks: Cross-Country Comparison, 2000–07 1/

Sources: Datastream; and IMF staff calculations.
1/ Derived from banks' stock price data. Higher values mean more stability.

8.   **Market-based indicators can also be used to examine the spillover risks among financial institutions, a topic of practical relevance for financial stability analysis and supervision**. To illustrate this, two questions were analyzed: (i) to what extent are large Israeli banks exposed to market-wide shocks, affecting all of them simultaneously; and (ii) what is the scope for spillover of idiosyncratic shocks from one bank to other banks. The scope for spillovers among the Israeli banks was examined using the Extreme Value Theory framework. The methodology is characterized as follows:[5]

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[5] The approach is similar to that of Čihák and Ong (2007), which provides the methodology in detail.

- The data sample comprised the 5 large Israeli banks, accounting for 95percent of total Israel banking system assets. The sample period was 1999 to 2007 .

- To determine the spillover risk, a binomial logit model is applied to the distance-to-default (DD) data. The method examines the likelihood that a sizeable negative idiosyncratic shock experienced by a large Israeli bank would be followed by a similarly sizeable shock experienced by another large Israeli bank. Following the literature, such an event is called "co-exceedance," and "sizeable" is defined as the bottom 10 percent tail of the distribution of all 5 trading-day changes in DDs .

- Four control variables were used to account for common shocks affecting the local real economy, and domestic, global, and European markets. The calculations incorporate changes in the slope of the local term structure to represent developments in the domestic real economy; the stock price return volatility in the domestic stock market index to capture local market influences; the price return volatility in the Morgan Stanley Capital International All-Country World Index and European Index returns to account for global and European market shocks, respectively.

- The objective is to identify potential risk concentrations among Israel's systemically important banks, by distinguishing between the impact of common and idiosyncratic shocks. These calculations do not explore the exact nature of the links among financial institutions. Those may reflect direct financial links through the interbank market, but there may be spillovers even in the absence of explicit financial links between banks. In the presence of asymmetric information, difficulties in one bank may be perceived as a signal of possible difficulties in others, especially if market participants perceive opacity in banks' balance sheets, and other publicly available data may be uninformative (Morgan, 2002).

9.   **The preliminary results suggest that the spillover risks are spread far from evenly among the large Israeli banks (Table 2).** For example, the First International Bank of Israel has no significant spillover impact on other banks, while others have significant impact on a number of domestic and foreign banks at the same time. The banks with the biggest potential for spillovers are Hapolaim Bank and Mizrahi Bank. (As a side result, the tables also show the significance levels for the control variables. As expected, the local economy plays a significant role, as do global shocks. European shocks are less significant.) This analysis provides a useful additional information for assessing the systemic importance of individual banks. As expected, Hapoalim and Leumi have big effects on all others. But, the method is useful because banks with higher spillover risks for the rest of the system may have higher systemic importance than would be suggested by the more commonly used measures of size (e.g., deposits or assets), and may therefore warrant relatively more supervisory attention. Here this is the case for Mizrahi, which has significant effects on both Hapoalim and Leumi, although its assets are equivalent to less than 1/3 of those of Hapoalim or Leumi. When interpreting the results, one needs to keep in mind that the model is

estimated on publicly available data, and over a relatively benign period in financial markets with little disruption to the financial sector.

Table 2. Israel: Coexceedances among Large Israeli Banks, April 1999–September 2007

	Impact on:				
	Hapoalim	Leumi	Discount	Mizrahi	International
Impact from:					
Hapoalim	...	**	**	**	
Leumi	**	...	*	*	
Discount	*	*	...	*	
Mizrahi	**	**	**	...	
International					...
Control variables:					
Local economy	**	**	**	**	**
Global shocks	**	*	*	*	*
European shocks	*				*

Sources: Banks' annual reports; BankScope; Bloomberg; Datastream; and IMF staff calculations.

Notes: *... significant on 5 percent level; ** significant on 1 percent level.

C. Stress Testing

10.   **A set of basic stress tests was performed to assess the resilience of the banking sector to a variety of potential shocks**. The purpose of these tests was to examine the potential effects on banks' financial condition of a set of changes in risk factors, corresponding to a range of adverse events. The shocks can be considered extreme but with a positive, albeit small, probability of occurrence. The tests are based solely on publicly available data, which limited the extent of possible stress tests, and required a number of simplifying assumptions. Moreover, past data may capture only partly the type of extreme events that might happen in the future. The stress testing analysis therefore had to rely on a combination of experience from other countries, expert judgment, and sensitivity analysis. Therefore, the results should only be treated as approximations.

11.   **The tests combined single-factor sensitivity calculations and scenario analysis**. The single-factor scenarios are useful since they are simple and allow analysis of the partial impacts of the various shocks over time. The macroeconomic scenarios allow to reflect better the interplay of the numerous risk factors, all influenced by macroeconomic developments.

Sensitivity Analysis

12.   **Sensitivity analysis confirms that credit shocks had a large and more widespread potential impact on banks than any other single-factor shock, and that the impact of credit risk has declined**. A range of single-factor shocks to credit risk (i.e., general deterioration in credit quality) were carried out. The analysis was performed as a loan "migration" from the performing category to the nonperforming category, associated with an increase in provisioning. Table 3 shows some basic results, and Figure 3 illustrates the

relationship between the size of an NPL shock, the provisioning ratio, and the aggregate impact. The figure suggests (i) a reasonable degree of resilience of the banking system with respect to credit shocks; (ii) an increased resilience over time. Even if the NPL ratio increased by 10percent age points, the capital injection needed to bring all banks to satisfy the regulatory minimum would be roughly 4percent . To put the 10percent age point increase in the NPL ratio in perspective, the ratio has been declining from about 2.5 percent five years ago to somewhat below 2 percent in 2007 . So, this is clearly an extreme value going beyond the recent historical experience. However, it is not a completely implausible scenario, since if the NPL definition included all problem loans, according to the definition of the Banking Supervision Department, then the indicator value for mid-2007 would to about 9.5percent .

13.   **Credit risk migration has a material impact only if it implies migration from performing loans to NPLs**. Credit quality migration within the three sub-categories of NPLs (substandard, doubtful, and loss) would have only a small impact, given the low NPL ratio and the high provisioning rate in Israel. Moreover, the impact gets lower over time, indicating that the system has become more resilient to this type of shocks (Figure3 4).

14.   **For market risks, the following sensitivity tests were carried out** (Table 3):

- *Exchange rate*. The tests evaluated the direct (i.e., market price) effects on Israeli banks of a 15 percent and 30 percent depreciation and appreciation of the shekel against all other currencies. Direct losses arising from exchange rate shocks are negligible for most banks. That is not surprising, given that on the systemic level, the net open position in foreign exchange was -4.2 percent of capital as of end-June 2 007. Even a 50 percent exchange rate change would translate to at most 2.1 percent decline in capital (about 0.2percent age point decline in capital adequacy). The impact would be differentiated among banks, but no bank would breach the minimum capital adequacy requirement.

- *Interest rate*. The tests considered parallel upward and downward shifts in the yield curve by 5 percentage points, respectively, and parallel upward and downward shifts in the foreign currencies yield curve by 2 percentage points. Separate tests were performed to assess the exposure to the interest rate shock on Euro and U.S. dollar denominated assets and liabilities. The test covered the direct impact on banks' banking and trading books. The overall impact is bigger than the direct impact of the exchange rate shock, but still negligible in comparison with the credit risk impacts. As with the direct exchange rate risk, no bank would breach the 8 percent capital adequacy minimum. Banks are able to manage their interest rate risk through issuing loans that reprice very quickly.

- *Equity price risk*. Banks' exposure to equities is moderate. The overall net open position in equities has been increasing during the 2000 s, and reached 16.2percent of capital. Still, a hypothetical assumption of a rapid negative movement in stock prices would
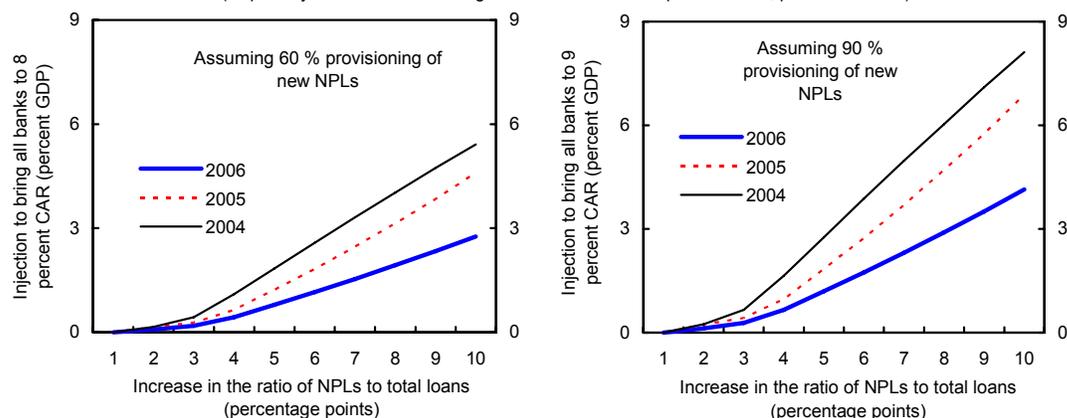
have limited direct impact on banks. For example, if the stock prices in the portfolios held by the banks declined by 50 percent (which corresponds to about 3 standard deviations, and goes beyond the experience of the last 10 years), the direct impact would decrease capital adequacy of the large 5 banks taken as a group only to about 10percent and would leave each one of the banks solvent.

- *Liquidity test*. A basic liquidity test was carried out, to assess the direct impact of a bank run on liquidity in the system. The mechanism of the test was a deposit outflow; the question being asked was how long a bank can survive without borrowing from the central bank or from other banks in the system on an uncollateralized basis. The parameterization of this test was complicated by the fact that there are no system-wide data on rapid deposit withdrawals in the Israeli banking system. The exercise was therefore based on a combination of publicly available data and expert judgment based on parameters from other countries. The results of the deposit liquidity stress tests suggest that liquidity buffers are high in banks. Even in an extreme scenario assuming that 20 p ercent of all demand deposits are being withdrawn every day, the banks can use only their liquid assets, and have no recourse to other banks or to the lender of last resort, it would still take three days for the first bank to become illiquid, and five days for all the major banks to become illiquid.

Scenario Analysis

15.   **Scenario analysis focused on three hypothetical downside scenarios**. The above calculations are only approximate, as individual shocks would most likely be accompanied by a broader macroeconomic stress that would impact banks also through channels other than just their direct exposures to market risks. This is addressed in scenario analysis, which considers how capital account shocks would affect the economy against a background of rising macro-financial linkages. While the scenarios have been informed by Israel's recent experience, relationships that worked in the past generally break down during times of dislocation. Accordingly, these scenarios draw on the experience of a wide number of countries that have undergone similar exceptional scenarios.

Basic Credit Risk Sensitivity Analysis, 2004–06
(Capital injection needed to bring all banks to at least 8 percent CAR; percent of GDP)

Injection to bring all banks to 8 percent CAR (percent GDP)

Assuming 60 % provisioning of new NPLs

2006
2005
2004

Increase in the ratio of NPLs to total loans
(percentage points)

Injection to bring all banks to 9 percent CAR (percent GDP)

Assuming 90 % provisioning of new NPLs

2006
2005
2004

Increase in the ratio of NPLs to total loans
(percentage points)

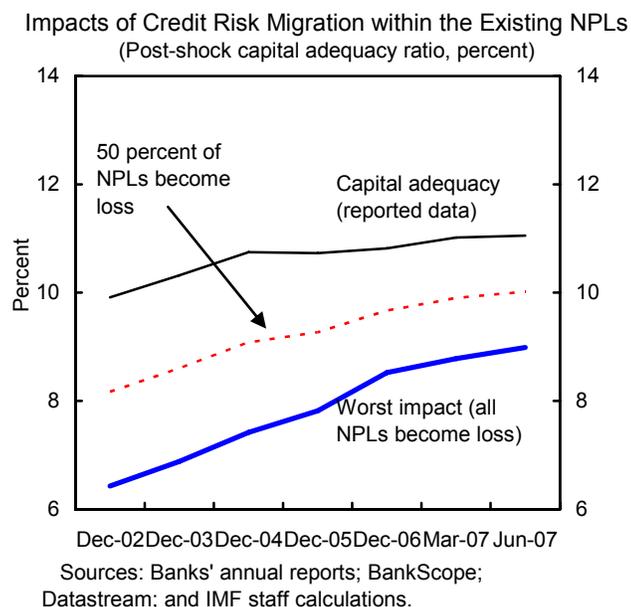Sources: Banks' annual reports; BankScope; Datastream; and IMF staff calculations.

Table 3. Israel: Summary Results of Sensitivity Analysis, End–2006

	Losses (Percent of Tier 1 capital)			System CAR (Percent)	Injection 1/ (Percent of GDP)
	Aggregate	Median	Standard deviation		
Credit risk					
Increase in nonperforming loans by two standard deviations 2/	38.3	22.8	15.1	7.7	1.3
Increase in nonperforming loans by 100 percent	1.9	2.5	3.1	10.7	0.0
Substandard and doubtful loans become loss	1.0	0.4	2.4	10.7	0.0
Interest rate risk (direct impact, banking, and trading books)					
Israeli shequel					
Interest rates up by 500 basis points	0.7	-2.3	5.1	10.3	0.0
Interest rates down by 500 basis points	-0.7	2.3	5.1	10.4	0.0
Euro					
Interest rates up by 200 basis points	0.4	0.0	2.4	10.5	0.0
Interest rates down by 200 basis points	-0.4	0.0	2.4	10.5	0.0
U.S. dollar					
Interest rates up by 200 basis points	0.3	0.1	2.6	10.6	0.0
Interest rates down by 200 basis points	-0.3	-0.1	2.6	10.5	0.0
Exchange rate risk (direct impact)					
Israeli shequel					
Appreciation by 15 percent	0.8	0.8	6.4	10.9	0.0
Depreciation by 15 percent	-0.8	-0.8	6.4	11.0	0.0
Depreciation by 30 percent	-1.6	-1.6	12.8	10.9	0.0
Euro					
Appreciation by 15 percent	-0.5	-0.1	6.4	10.3	0.0
Depreciation by 15 percent	5.0	0.1	6.4	10.8	0.0
U.S. dollar					
Appreciation by 15 percent	0.1	0.0	0.6	10.8	0.0
Depreciation by 15 percent	-0.1	0.0	0.6	10.8	0.0

Sources: Banks' annual reports; BankScope; Datastream; and IMF staff calculations.

1/ Injection (of new capital or additional income) to ensure that all banks have a CAR of at least 9 percent.
2/ Standard deviation of the aggregated ratio of NPLs to total loans for the whole period for which data are available.

Impacts of Credit Risk Migration within the Existing NPLs
(Post-shock capital adequacy ratio, percent)

Sources: Banks' annual reports; BankScope;
Datastream; and IMF staff calculations.

16. **Two scenarios attempted to measure the potential effects that a slowdown in the U.S.. economy, and a period of high political instability could have on the healthiness of Israeli banks**. Scenario I assumed that the deterioration in credit quality affects only the loans in the sectors directly influenced by the recent episodes and the loans that are classified as problem loans in those sectors default. Scenario II assumed that there is a larger deterioration in the credit quality of bank loans and all problem loans default. The reasoning behind the design of Scenarios I and II is that during a slowdown, the riskier borrowers are those that are likely to suffer higher deterioration. This is the case of those loans that are already nonperforming or in a watchful status (special-mention category) both of which are included in the definition of problem loans. Given the lack of data on collateral value, the mission assumed that the recovery rate in case of default is zero, which is a strong assumption.

17. **An additional scenario was based on an extensive analysis of 17 financial crises in other countries**. Calibrating extreme scenarios and mapping them into Israeli data is challenging. Past data for Israel are likely to provide only very limited information about the behavioral relationships in the case of crisis. Scenario III therefore used instead data from 17 countries that actually went through major banking crises.[6] In terms of the level of GDP, Israel is above the sample average, even though below the advanced economy average. Also, compared to the sample average, Israel is characterized by better governance and

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[6] The following crises were included in the sample: Indonesia 1997, Korea 1997, Philippines 1997, Thailand 1997, Argentina 2001, Brazil 1998, Mexico 1994, Uruguay 2002, Bulgaria 1996, Czech Republic 1997, Russia 1998, Slovak Republic 1998, Turkey 2000, Finland 1991, Sweden 1992, Italy 1990, Spain 1977, and United Kingdom 1991. The dating (year of onset) is based on the database by Caprio and Klingebiel (2003).
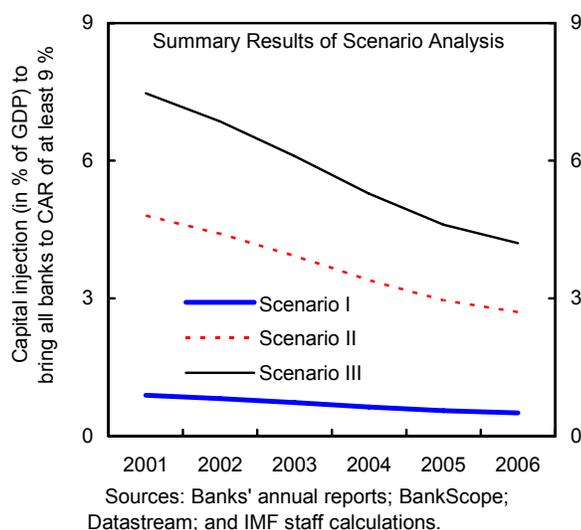
transparency standards (which should in principle limit the risk of crisis and its potential costs) and a higher credit to GDP ratio (which, on the other hand, indicates a higher potential for impact). The experience from these 17 crises suggested the following for the parameterization of the stress tests:

- In the event of such a crisis, it is realistic to assume a **steep exchange rate depreciation** in the first few months after the shock, but some appreciation thereafter. This "overshooting" phenomenon occurs in most of the case studies considered here. The average depreciation of the exchange rate in the sample a year after the crisis was 33 percent, and many countries have experienced considerably larger depreciations.

- The average **increase in the NPL ratio** in the crisis countries was 9.6 percentage points a year after the crisis, with a substantial variation from country to country (the cross-country standard deviation of the increase was 9.1). The characteristic of this approach is that it captures the whole credit risk impact conditional on the event of a crisis. It does not identify what part of the NPL increase is due to exchange rate, which part is due to interest rate, which part reflects real estate price decline, and so on. It is a more comprehensive approach of measuring the overall credit impact.

- The **recovery rates on bank assets** in crises vary widely. For a sample of 10 systemic banking crises included in Hoelscher and Quintyn (2003), the average recovery rate was 59 percent, with a standard deviation of 33 percent. The bulk of the country observations is in the 10–40 percent recovery rate range, which would imply a 60–90 percent "loss given default" range. Thus, to capture a range of the crises experience, is reasonable to use a 60 percent provisioning rate as a starting parameterization, and to test how results would change if the average provisioning rate were 90 percent.

18.   **The three downside scenarios confirm that resilience of the financial system has improved**. Not surprisingly, these extreme scenarios would have substantial impact on the banking sector. The mildest scenario, Scenario I, would reduce the aggregate Tier 1 capital by 23 percent and decrease the systemic CAR ratio to 8.4percent . Scenario II would reduce the aggregate Tier 1 capital by 58 percent and decrease the systemic CAR ratio to 5.5 percent. Finally, Scenario III would completely wipe out the aggregate Tier 1 capital and turn the systemic CAR ratio into a negative number, roughly -3 percent . What is important to note, however, is that the impact of all the three scenarios would be appreciably smaller in2006 than if the shocks hit in earlier years (Figure 5).

19.   **The impact of Scenario III would be substantial, but smaller than the average impact of past crises, indicating a relative robustness of the Israeli banks**. The capital injection required to bring all banks to the minimum CAR in this scenario would be equivalent to about 4 percent of GDP. That is a substantial costs, which reflects the substantial shocks assumed in this scenario. Interestingly, however, these costs are low compared to the average fiscal costs of resolving banking crises in 1994–2003, which were

18 percent of GDP (Carstens, Hardy, and Pazarbasioglu, 2004). There are reasons why the costs could be lower in Israel, such as the quality of governance and transparency standards in Israel compared to an average crisis country. However, those are not explicitly incorporated in the stress tests performed here. The reasons why the impact is relatively low in this calculation are the relatively higher capitalization and relatively lower risk exposures (including a lower credit to GDP ratio) of the Israeli banking system compared to average of actual crisis countries.

Summary Results of Scenario Analysis

Sources: Banks' annual reports; BankScope; Datastream; and IMF staff calculations.

D. Conclusions

20.   **Market-based indicators provide a useful additional dimension to the analysis of financial stability in Israel**. The indicators paint a more mixed picture of recent financial stability developments than the accounting ratios, which is most likely a reflection of the market assessment of challenges and risks associated with the recent reforms. In a cross-country comparison, the indicators place Israel's banking system close to the average of advanced and emerging countries, which is in line with the assessment based on accounting ratios and rating agencies' ratings. The market-based indicators also allow to identify spillover risks among major Israeli banks; the key finding from this calculation is that the spillover risks are far from evenly distributed among the banks.

21.   **The basic stress tests suggest that resilience of the Israeli banking system has improved in recent years**. A comparison over time shows that the capital injections needed to bring all banks in compliance with the minimum capital adequacy requirements have been declining appreciably over time. This reflected a combination of increasing buffers (improving capitalization and profitability) with generally decreasing exposures.

22.   **The stress tests confirm credit risk as the main source of risk.** Banks' exposures to direct interest rate risk are limited, as most of banks' loan book is in floating rates, and the duration of banks' trading portfolios is relatively short. Banks also have low direct exchange

rate risk, reflecting their relatively low foreign exchange positions, and their exposures to equity risk are moderate. Banks are liquid at present, which was reflected in positive results of tests of the impact of sudden withdrawals.

23.   **Further work would be useful on modeling the impact of substantial stress of Israeli banks**. The present note is based only on publicly available information and does not benefit from the much more detailed supervisory data. For example, supervisory information on individual bank-to-bank exposures could be used to run interbank contagion stress tests in the manner described in Čihák (2007b), and compared with the results of the spillover analysis presented in this note.

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III. FINANCIAL SECTOR DEVELOPMENT[1]

A. Introduction

1.   **The Israeli government has made far-reaching reforms to financial markets in recent years.** Markets once characterized by limited product and provider choice and by restricted investment opportunities have been transformed by initiatives aimed at increasing competition. Reduced government borrowing and growing business demand for credit have led to a much enhanced role for capital markets. There are new opportunities for international investors and financial institutions. Further significant reforms are in train to provide for increased pension contributions from the workplace and greater mobility of savings between different products and providers. These ambitious reforms are producing benefits but they also call for more advanced regulatory frameworks and supervisory practices.

2.   This chapter sets out recent developments in the banking and insurance sectors, takes stock of the reform program and suggests priorities for the development of regulation and supervision of the financial sector, with an emphasis on banking and insurance regulation.

B. Developments in the Banking Sector

3.   **Israel has a large banking system comprised mainly of established domestic-owned banks with limited foreign participation**. The system had assets of NIS 1,008 billion or about US$250 billion (160% of GDP) at end-September 2007. The system is concentrated, with the five largest banking groups accounting for about 95 percent of system assets. Of these five groups, Bank Leumi and Bank Hapoalim together control 60% percent of the system's assets. Two foreign banks, Citigroup and HSBC, have long-established branches but account for less than 1 percent of total assets. In addition, branches of BNP Paribas and State Bank of India began operating in Israel in 2007 but have not yet filed reports with the Bank of Israel.

4.   **Banks' performance and financial strength have been improving in recent years.** (See Table 1 for key data on the banking system.) In the first half of 2007, the banking system reported a pre-tax return on assets of 1.2 percent compared with 1.0 percent in 2006. Capital ratios are also strengthening. These improvements have been driven by one-time gains from their sale of fund management businesses under recent reforms (see Section D on

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[1] Prepared by Ian Tower, Michael Moore (both MCM) and John Palmer (external expert).

the reform program); sharp reductions in net new provisions for bad debts; tighter control on spending, including staff costs; and renewed growth in lending fed by a strong economy[2].

5. **The banks enjoy ample liquidity, primarily from deposits from the public, including from foreign offices.** At September 2007, they depended on other banks for less than 5 percent of their total funding. Their funding from abroad (excluding from related offices) was 14.5 percent of liabilities at the same date.

6. **Although the system continues to hold high levels of problem loans, the quality of loan books is improving.** Loans classified as problem loans[3] amount to nearly 8% of total credit. Non-performing loans account for only a portion of problem loans, but remain significant, at 1.8% of the total. Total provisions for loan losses were NIS 31.6 billion at June 2007. Construction and real estate lending accounts for around one third of problem loans and provisions. However, new loan loss provisions (net of recoveries) have fallen sharply in 2007, to NIS 1.3 billion in the first nine months compared with NIS 2.4 billion in the same period of 2006. And the continuing high stock of non-performing loans reflects a conservative approach, partly because of regulatory requirements, to releasing provisions and writing off bad loans. Overall, it is clear that there has been a major improvement in asset quality.

7. **All the banks have exposure to the turmoil in global credit markets and significant losses have been incurred by one group**. The scope for further losses appears limited, provided that AAA mortgage-backed securities other than sub-prime are not significantly impaired. (Box 1 sets out a fuller discussion and data on the banks' exposures.)

Table 1. Israel: Banking System Key Indicators, 2003–07

(Percent)

	2003	2004	2005	2006	2007Q2
Capital ratios (capital to risk-weighted assets)	10.3	10.8	10.7	10.8	11.1
Total problem loans to total credit	10.5	10.5	9.5	8.4	7.7
Nonperforming loans to total gross loans	2.6	2.5	2.3	1.9	1.8
Nonperforming loans net of provisions to capital	33.3	31.0	27.1	21.2	18.7
Pre-tax return on assets	0.7	0.9	1.1	1.0	1.2
Pre-tax return on equity	14.1	17.9	19.4	17.6	20.2

Source: Bank of Israel.

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[2] Total post-tax extraordinary gains, mainly from fund management disposals, contributed over 40% of post-tax profits in 2006, falling to under 20% in the first nine months of 2007 as most disposals were completed.

[3] 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.

**Box 1: Major five banks' reported exposures to and losses on US mortgage
and related assets**

A number of Israeli banks have significant exposure to US mortgage markets, mainly through offices in the US and Europe. In November 2007, the Bank of Israel instructed banks to disclose all their US mortgage-related assets at September 30 2007. Disclosures of nearly $10 billion were made by the five major groups, which compares with some $15 billion in aggregate equity at the same date. Some banks have written down assets (mainly structured products). But the effect on profitability and capital has been small for most. Even for the one banking group most affected, losses recognized to date do not exceed full year profits in 2006.

The scope for further losses appears limited, provided that AAA mortgage-backed securities (MBS) other than sub-prime are not significantly impaired. Across the system, there is now limited exposure to structured products, i.e. CDOs and SIVs (amounts reported by banks at end-September ranged from 3 to 12 percent of equity). The bulk of relevant assets ($7.5 billion or 51 percent of aggregate equity at end-September 2007) are MBSs, either issued or guaranteed by US federal housing finance agencies (over half the total) or AAA-rated and not exposed to US sub-prime mortgages. Banks have not been experiencing the funding pressures seen in other markets.

Table: Major five banking groups' exposure to US mortgage and related assets, End–September 2007

(Millions of U.S. dollars)

Bank	Hapoalim	Leumi	Mizrahi	Discount	FIBI
Total exposure	4,580	1,883	35	2,350	432
Mortgage-backed securities 1/	3,708	1,087	12	2313	306
Of which: Federal agencies	425	1051	-	2287	159
Collatorized debt obligations/collatorized loan obligations	218	426	-	29	24
Strucutred investment vehicles	371	-	-	-	-
Other structured products	-	-	-	-	102
Other asset-backed securities	85	137	23	-	-
2007Q3 losses 2/	30	-	6	-	1
2007Q3 charges to equity 2/	116	33	8	-	3
Net profits, 2006	795	837	153	197	121
Equity, 2007Q3	4,773	5,116	1,316	2,284	1,320
Structured products/equity	12%	8%	-	1%	10%
Total exposure (excl. Fed agencies)/equity	87%	16%	3%	3%	21%
Total exposure (excl. Fed agencies)/profits	523%	99%	23%	32%	226%

Sources: Banks' Q3 2007 statements; and Bank of Israel banking system database.

1/ Data for Leumi includes a subprime mortgage-backed security of $9.5 million.

2/ Since the publication of the Q3 statements, Bank Hapoalim has announced further losses of $ 260 million (on its exposure to SIVs) and charges to equity of $ 90 million (in relation to its MBS portfolios). Bank Leumi reported with its Q3 statement a further charge to equity of $22 million to the second half of November.

8.   **There remain significant challenges for the banking system**:

- **Capital levels remain low compared with their peers in other countries.** Capital ratios for the five largest banks range from 10.3 to 12.1 percent at end-September 2007 (the regulatory minimum is 9 percent). The Bank of Israel has asked banks to increase capital ratios further against potential economic slowdown and in advance of the implementation of the new Basel II capital standards in 2009, the impact of which on bank capital adequacy remains unclear.

- **The banks face strategic challenges resulting from the recent financial market reforms.** Reforms of the financial sector in the past few years have required banks to divest their interests in insurance and fund management and have promoted capital markets and institutional investors as a competing source of finance for the business sector. The share of the banks in business sector financing has fallen from nearly three quarters in 2003 to just over a half in 2007. (See Table 2). Revenues of some NIS 2 billion a year (in 2006, five largest banks) from managing funds have been lost. Meanwhile, new opportunities in domestic markets, particularly in distribution of pensions and insurance, are opening up more slowly than expected. While delivering greater competition in financial services for the economy, the reforms have reduced the ability of the banks to diversify and strengthen their earnings base.

Table 2. Israel: Credit to the Business Sector, 2003–07

(Percent of total credit)

	2003	2004	2005	2006	2007Q3
Share of:					
Banks	73.6	67.8	61.6	56.3	53.4
Institutional investors	10.6	13.0	18.6	22.2	24.5
Nonresidents	15.2	17.7	16.9	17.8	16.2
Household (mutual funds)	0.6	1.5	2.9	3.8	5.9
Share of tradable bonds	8.4	10.6	14.1	18.4	22.0
Share of non-tradable bonds	6.7	8.4	11.1	12.1	12.4

Source: Bank of Israel.

9.   **The recent experience in US markets has underlined the need for banks to have clear strategies and strong controls over foreign operations.** The banks already have a large number of overseas offices. At the end of 2006, the major five groups had 147 such offices, with assets accounting for 18% of their total assets and 10% of their earnings in the first half of 2007. Given limited scope for diversification domestically, some banks see overseas expansion as their only real strategic option. A number of acquisitions have been made in recent years (see Box 2) and there are also potential opportunities from the growing operations abroad of their major Israeli corporate customers. Overseas diversification will expose the banks to new risks, requiring them to respond to new risk-management challenges.

Box 2: Recent overseas acquisitions by Israeli banks

Bank	Date	Amount	Acquisition
Bank Hapoalim	May 2005	SwFr 102mn	Inter Maritime Bank, Switzerland (private banking)
Bank Hapoalim	March 2006	$ 30 mn	Investec United States (broker dealer)
Bank Leumi	August 2006	$ 46 mn	Eurom Bank, Romania (retail and corporate banking)
Bank Hapoalim	November 2006	$ 161 mn	BankPozitif, Turkey (retail and corporate banking)
Bank Hapoalim	November 2007	$ 70 mn	Demir Kazakhstan Bank (retail and corporate banking)
Bank Hapoalim	December 2007	$ 136 mn	75 percent of OJSC Ukrainian Innovation Bank (retail and smaller corporate banking)

C. The Insurance Sector

10.   **Israel enjoys a relatively developed, although concentrated, insurance sector.** At June 2007, the five largest groups accounted for nearly 80 percent of total gross premiums, and an even higher proportion in life insurance. Total assets of the sector at mid-2007 were NIS 211 billion (32% of GDP), which compares with NIS 1,008 billion for the banks. Annual premium income for life and general insurance business is broadly equal (NIS 16 billion and NIS 18 billion respectively in 2006). Rates of penetration (measured by the ratio of insurance premiums to GDP) are slightly below the average of OECD countries, more so in life business where insurers compete with other long term savings products. There is greater foreign involvement than in the banking sector: the Italian group Generali owns 70% of the Migdal Group.

11.   **The current shape of the industry is the product of years of reform and consolidation.** Life insurance has been substantially deregulated—formerly, savings-based products carried high guarantees and had to be invested in prescribed forms of guaranteed return government bonds. Life products are now substantially "participating" (with no or low guarantees and investment risk passed to policy-holders)[4] and firms can invest freely.

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[4] Participating policies now account for 65% of the total assets of insurance companies, including assets covering general insurance liabilities (insurance companies in Israel write both life and general business).

However, ownership restrictions relating to insurers have been tightened. There is now a ceiling of 5 percent on insurance company holdings in banks and vice versa.

12.   **A key risk in general insurance business is catastrophe, particularly earthquake losses** (Israel is located on the African-Syrian Rift, although there has been no major quake in the region since 1927). Around 80 percent of this risk is reinsured, mostly with major global reinsurance companies. In other respects, general insurance risks are similar to those in other markets, with motor insurance accounting for some 50 percent of premiums.

Table 3. Israel: Insurance sector Key Indicators, 2004–07

(Percent)

	2004	2005	2006	2007Q2
Capital ratios (capital to assets)	5.2	5.2	5.4	6.2
Capital surplus (surplus over required capital/total capital)	...	17.5	21.2	23.8
Pre-tax return on equity	21	27	23	36
General insurance: combined ratio (losses + expenses/premiums)	0.98	1.00	0.97	0.98
Credit (share of total assets)				
Participating policies	21	16	17	...
Others	12	29	31	...
Investments abroad (share of total assets)				
Participating policies	9	14	18	...
Others	3	4	4	...

Sources: Ministry of Finance; and Bank of Israel.

13.   **In life insurance business, insurers have limited market risk and the main risk is improvements in longevity.** Liabilities on guaranteed return business written before 1991 (when products were reformed) were matched by holdings of fixed rate government bonds. Business written since 1991 has been entirely on a "participating" basis – all the market and credit risks on investments (although not any related operational risk, e.g. from mismanagement of investments) are borne by policyholders. Insurance risks, however, fall to the insurance company itself and there is material exposure to improvements in longevity: many participating policies are written with guaranteed annuity rates. However, most policyholders in practice take lump sums at maturity and annuities in payment are therefore limited.

14.   **Insurance company profitability is high, in part reflecting weak capital adequacy**. Return on equity for the sector as a whole has been at or in excess of 20 percent since 2003 and reached nearly 40 percent in the first half of 2007. Relatively high gearing (measured by a simple capital to assets ratio) together with the weaknesses in the solvency regime (discussed further below) suggest that high profitability is at least partly attributable to low levels of capital. There is no material exposure to US sub-prime and related risks.

15.   **Insurance companies are more diversified as a result of the reforms.** For example:

- Most insurers are now part of broader financial services groups with an increasing emphasis on fund management. Some NIS 120 billion in funds under management (in provident and mutual funds) have so far been transferred to insurers following recent financial sector reforms (see below), almost equal to their total life insurance assets of some NIS 140 billion. Insurers are increasingly able to engage with customers on the basis of their specific needs (for life insurance, particular types of pension cover etc) rather than simply selling from an established list of products. The management of insurers is now moving onto a group basis (often including regulated insurers and unregulated affiliates), for example with a group Chief Executive Officer and single group wide functions covering risk and internal audit.

- Insurance groups are also extending more credit – mostly to businesses via bond purchases in the capital markets but also directly from their own and from investors' funds and via specialist unregulated affiliate companies engaged in consumer credit, factoring and leasing. However, retail lending operations remain limited, although one insurer has a significant mortgage subsidiary. Insurance companies' share of total credit to the business sector, around 6%, remains modest.

- Some companies have been making acquisitions in insurance markets abroad, although on a more limited scale than the banks. For example, the Clal Group began operating in Romania in 2006 through a new insurance company.

16. **Insurers also face new competition in fund management and in distribution and advice.** While insurers acquired most of the banks' fund management operations, others were bought by new entrants. These new firms are well-placed to compete and offer wider portfolio management services (for example to higher net worth customers) as well as established products such as mutual funds. The banks retain a large share of marketing and advisory business for long term savings products and benefit from charges paid by insurers and other product providers that are fixed by regulation. The recent reforms also provided for banks to be permitted to advise on pensions, a market considered to have strong growth potential. While the Ministry of Finance has chosen to allow only smaller banks to give such advice at present, the major banks will be permitted to enter the market this year.

17. **Overall, however, developments in the Israeli financial sector appear positive for insurance.** Increased diversification should reduce the overall risk profile of insurers; and added scale should lead to greater scope to invest in better systems and controls and advanced risk management. At the same time, insurance firms and their affiliates are assuming new or enhanced risks, such as credit risk, with which they have less experience.

D.   The Financial Sector Reform Program

18.   **Although most of the scheduled financial sector reforms have been completed, important measures are outstanding.** While major reforms started in the 1990s, the pace has accelerated in recent years. The main objectives of the program have been:

- To increase competition between sectors, particularly for savings. The key initiative is the 2005 Bachar Committee reforms[5]. To reduce their share of total savings, the banks were required to dispose of all their interests in fund management. But they were permitted to continue to distribute and advise on provident and mutual funds (charges have been set by regulation) and are now being allowed to advise on pension products and life insurance. The disposal of banks' interests in fund management is largely complete but the reform of advice and distribution arrangements is continuing.

- To create new opportunities for foreign participation: foreign-owned firms were encouraged to acquire fund management interests from the banks and some of the larger funds now have foreign-owned managers; foreign-owned banks now act as underwriters in the capital markets and as primary dealers in government bonds; the Bank of Israel sees the planned sale of the remaining government interest in a bank (10% of Bank Leumi) as an opportunity to attract a significant foreign participant.

- To widen the investment choices of institutional investors[6]. Asset allocation rules have been liberalized and tax provisions favoring domestic investment removed. The money markets have been deepened through the start in late 2007 of a repo market (sale and repurchase of securities). However, issuance of asset-backed securities has been limited so far and further work is required on the legal and regulatory framework that would permit securitization to grow significantly.

- To widen the range of products and services available to users of financial markets. A key objective has been to develop the capital markets as an alternative source of credit for the business sector. For retail consumers, the reforms have enabled the creation of new savings vehicles including money market funds and funds of funds (but money market accounts are not permitted at present). Greater access to foreign fund managers and to mutual funds marketed into Israel from abroad should soon be possible under plans for the recognition of foreign regulatory regimes.

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[5] The Bachar inter-ministerial committee reported in 2004 on actions necessary to establish a more efficient and competitive capital market. Legislation giving effect to its main recommendations was passed in July 2005.

[6] The Bachar Committee defined these as the insurance companies, pension and provident funds.

- To improve the infrastructure of financial markets: a key change has been the introduction in June 2007 of a real time gross settlement system (RTGS) for payments, bringing finality to intraday payments by banks and their customers. RTGS will facilitate the inclusion of the Israeli shekel in the Continuous Linked Settlement (CLS – the international mechanism for reducing foreign exchange settlement risk) in due course. There are also plans for enabling alternative trading systems to operate in Israel.

19. **A further key objective has been to increase the number of people saving for retirement.** Major reforms were carried out to the pension funds in 2003, resulting in the creation of new funds on a stronger financial basis. The priority now is to increase employee participation in occupational schemes: coverage for workers previously without such pensions has just been introduced [7]. A related objective for 2008 is to provide for increased mobility of savings between different products and providers. (Limited portability, e.g. of savings under life insurance policies between insurers, is already possible.)

20. **The authorities are committed to consolidating and extending the reforms.** A new inter-ministerial committee on capital markets has been established under the leadership of the Ministry of Finance to plan the next stages of development of the markets. The focus of the committee will be on considering the international competitiveness of the financial sector. The committee will report in the summer of 2008.

21. **Overall the reforms are comprehensive, have led to more diverse financial markets and appear to be generating benefits for the economy.** While the full effects of the reforms, particularly the significant new extension of occupational pensions, will take time to be felt, financial markets are already deeper and more competitive and offer greater product range. There is increased scope for investors to reduce risk through diversification. The sector is now much more open to the world. The reforms should make the economy less vulnerable to domestic shocks. While it will also become more vulnerable to adverse developments abroad, the financial system should become more resilient overall.

22. **It is also appropriate for the authorities to take stock of the results so far and the next stages.** While an immediate priority is completion of the outstanding reforms, there are aspects on which the authorities could usefully focus, including:

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[7] On December 30, 2007, the government ratified an agreement between the Histadrut labor federation and the Manufacturers Association of Israel that will provide pension benefits from January 1, 2008 to around a million employees without an occupational pension plan and who have worked for their employer for nine months. The plan will be implemented in phases, with employers and employees together contributing 2.5 percent of salary in the first year, increasing to 15 percent by January 2013. Of the 15 percent, employers will contribute 10 percent and employees 5 percent. The salary covered will be capped at the national average earnings.

- Areas where increased competition may lead to more risk, particularly as financial institutions adjust their strategies to reflect the impact of the reforms, for example, through expansion overseas. The reforms are also significantly changing the distribution of risks in the economy, from banks to capital markets and to households. There is a need for careful monitoring of these risks and for appropriate responses, through strengthening of regulation of financial market participants (see following sections) and better awareness of risk on the part of consumers.

- The continued opening up of the financial sector to international markets. The experience of many other countries suggests that formulating a vision to guide the international integration of the financial system can be useful. This work could include consideration of the prospects for increasing foreign participation in domestic markets still further, especially in banking, where foreign involvement is limited.

- Elements of the reforms that impose restrictions on financial market participants to develop their business, in particular the prohibition on ownership links between banks and insurance companies and the fixing by regulation of charges for the distribution of certain savings products. The imposition of these restrictions (and the forced disposal by banks of their fund management interests) was seen by the Bachar Committee as key to addressing lack of competition and potential conflicts of interest identified with the previous dominance of the banks in the savings market. But they reduce diversification opportunities, for insurance companies and particularly for banks. They may not remain appropriate in the longer run as markets develop and competition intensifies further.

E. Recent Developments in Banking and Insurance Regulation

23.   **In addition to the challenges presented by the reformed domestic markets, Israel needs to keep pace with developing international standards.** The Basel II capital standards for banks are now being implemented in Europe and other markets and a new solvency regime for insurers is under discussion in Europe (Solvency II). International Financial Reporting Standards are now widely used. Extensive changes are being made by the Israel Securities Authority (ISA) to improve disclosure and strengthen enforcement of standards. The ISA has made the use of International Financial Reporting Standards (IFRS) mandatory for all listed companies (except for the banks[8]) from 2008. The main focus here is on banking and insurance supervision.

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[8] The Bank of Israel sets accounting standards for banks.

Banking supervision

24.   **Banking supervision is carried out by the Bank Supervision Department of the Bank of Israel (the Department).** It is responsible for the regulation of bank-customer relations as well as prudential supervision and Anti-Money Laundering (AML). Staffing, now around 130 in total, has fallen since 2005 as a result of departures at all levels and limited recruitment. This is due in part to salaries that are uncompetitive with the financial sector. But efforts are being made to rebuild staff numbers to some degree this year.

25.   Significant progress has been made in a number of areas of the Department's work in the past two years[9]:

- **Progress is now being made on implementation of the Basel II capital standards for banks**. The Bank of Israel has set a target of the end of 2009 for banks to adopt the standardized approach for credit risk. This is a realistic target given that limited work had been done on Basel II, by the Department and the banks, before early 2007. Banks are now preparing for the new standards, in consultation with the Department. At the same time, the banks are enhancing existing economic capital models to equip them for the more advanced approaches under Basel II in due course. For the Department, Basel II preparations (now coordinated by a project team under an overall program plan) and staff shortages have necessitated a major shift in resources from other important work.

- **A new more risk-based approach to the supervision of banks is being developed.** The Department has recognized the need to improve its approach to risk identification and the allocation of its limited resources and has developed a new framework for risk-based supervision. A pilot has recently been undertaken onsite at one of the major banking groups and findings are being reviewed ahead of implementation. In addition, the Department has adopted a more proactive approach on key issues, including capital adequacy, where it is requiring banks to improve capital ratios ahead of the implementation of Basel II and against a possible slowdown of the economy. More generally, the extent of consultation and discussion with the banks is reported by both banks and the Department to have improved.

- **Significant progress is being made in improving Anti-Money Laundering (AML) supervision.** The Department has required banks to undertake reviews by external auditors of their compliance with AML requirements. In addition, the Department has benefited from an onsite evaluation by the MoneyVal organization out in November 2007, the final report on which is now awaited.

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[9] See Israel: Selected Issues, IMF Country Report No 06/121, March 2006, Chapter V for an analysis of the issues in 2005.

26.   On other issues raised, progress has been more difficult to achieve given the priority accorded to Basel II and the limitations on resources. In addition to general points applicable to both banking and insurance regulation (see below), these include:

- No decision as yet on whether and how to apply International Financial Reporting Standards to banks. At present, banks are subject to a mixture of US GAAP (although new standards are implemented later than in the US) and local standards based on IFRS. This hybrid approach may not be easily understood outside Israel.

- A continued heavy call on the Department's resources from bank-customer relations work of a type (for example handling of customer complaints) usually undertaken in other countries by agencies separate from the banking supervisor and funded by fees.

- No progress on consideration of an explicit deposit insurance scheme, which was the subject of a recommendation in the 2001 Financial Sector Stability Assessment[10].

Insurance supervision

27.   **Insurance supervision in Israel is a responsibility of the Ministry of Finance.** The Commissioner of Capital Markets heads a unit within the ministry, the Capital Markets, Insurance and Savings Division (CMISD), responsible for policy and supervision of 23 insurers as well as provident and pension funds. Staff number 96 at present (covering all types of institution) and increases are planned in coming years.

28.   **Insurance supervision has been considerably strengthened in the last couple of years to address key risks in the sector.** The main aims are to deliver improved products and better treatment for customers, financially stable companies and more open and competitive markets. Recent initiatives include:

- **Proposals to strengthen solvency requirements in the near future**. The aim longer run is to align requirements closely with Solvency II and the present interim strengthening is designed to be consistent with its likely direction. The CMISD has also taken steps to prevent a deterioration in solvency pending the introduction of the new requirements: insurers have been asked not to pay out dividends.

- **Increased attention to reserving adequacy in both life and general insurance**. A particular challenge for a number of years has been to ensure there is adequate reserving for longevity risk. The CMISD plans to rely more on firms' own assessments of reserving needs in this area from Q4 2007. This emphasis on reserving

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[10] Israel: Financial Stability Assessment, IMF Country Report No 140, September 2001.

has been reinforced by proposals to require auditors to engage an appropriately qualified actuary when assessing whether liabilities have been fairly stated.

- **Extensive efforts to improve the quality of the management and controls of insurance companies.** Enhanced requirements on corporate governance, internal audit, risk management (with a particular focus on credit risk), and the appointment and role of actuaries have been or are now being introduced. These have been reinforced by application of the Sarbanes Oxley (SOX) section 302 framework. The CMISD believes that these changes will significantly improve risk management at insurance companies.

- **Major improvements in insurance company reporting**. IFRS 4 has been implemented and remaining international standards take effect in 2008. The CMISD has sought to develop better qualitative as well as quantitative reporting (of risks and how they are managed, for example). The opinion of the appointed actuary is published with annual statements. As a result, reporting requirements for insurers are now broadly aligned with international standards. The CMISD is also requiring Embedded Value (EV) reporting by insurers, starting in May 2008. In other countries, EV frameworks have been an industry initiative.

29. There are further important initiatives now in preparation.

- **The CMISD is developing a framework for risk-based supervision.** At present, the CMISD relies on a combination of offsite reviews and onsite inspections (both "full scale inspections" and "focused audits" – onsite reviews targeting particular risks or concerns at an individual firm and often carried out at the insurance company's expense). Work is now starting on upgrading this approach to a full risk-based supervision model.

- **Plans and processes are being developed to supplement reserving and solvency requirements with analysis of firms' internal risk measurement techniques**. Companies are being required to develop DFA (Dynamic Financial Analysis) and other techniques to set out their own view of the adequacy of their financial resources.

- **Further enhancement of consumer protection requirements**. For example, the CMISD is preparing new requirements on the conduct of claims handling by insurance companies.

30. In addition to general points applicable to both banking and insurance regulation (see below), there are two particular issues that should be covered in future insurance regulatory reforms by the CMISD and government:

- **The CMISD should be freed from various constraints in the exercise of its powers and given full independence from government.** The Commissioner and CMISD enjoy a high degree of de facto independence from government, for example in enforcement decisions, rules-making and resource allocation. However, certain intervention powers have to be exercised by the Minister of Finance, including the appointment of a special manager to a failing insurance company; and rules on solvency must be approved by the Finance Committee of the Knesset.

- **The CMISD needs to develop its approach to the supervision of insurance groups in addition to its focus on individual insurance companies.** Because insurance companies are now increasingly parts of wider groups, they are more exposed to risks arising elsewhere in the group and to financial weakness at group level. At present the main focus of the regulation of group risks is on ring-fencing individual insurance companies through a framework of limits on the extent to which their own funds, and those of policyholders, may be invested in related parties. Similar approaches have proven to be ineffective in other countries. The focus going forward should be on ensuring that the group, including the holding company for the financial services businesses, is adequately capitalized on a consolidated basis. Supervision of insurance groups would also be strengthened if the CMISD were given specific legal authority to conduct consolidated supervision that included holding companies.

F. Next Steps for the Development of Regulation

31. **Regulation of banking and insurance has been strengthened by recent developments but significant challenges remain.** Particularly noteworthy are:

- the strong focus on improving capital adequacy, both in the medium term through revised measurement frameworks (Basel II and Solvency II) and shorter run through measures to increase capital ratios; and

- the priority given to developing risk-based supervision for both sectors.

There has also been a clear focus on enforcing AML requirements in both sectors, although the results and recommendations of the MoneyVal assessment will need to be studied carefully. Regulation in both sectors now faces significant, similar challenges in the future.

32. **It is critically important that regulators are able to build the expertise necessary to support the more complex regulatory system now being put in place.** In both sectors, the focus on corporate governance, risk management and controls, and the development of risk-based supervision is increasing the importance of having expert supervisors with an understanding of market practice and the skills to handle relationships with all levels of a regulated firm. In addition, the development of more advanced approaches to capital and solvency standards will increase the need for particular technical skills, notwithstanding the

availability of options such as outsourcing and use of consultants for certain work. Basel II makes this a particularly urgent issue for banking supervisors. Acquiring these skills requires greater recruitment flexibility and competitive pay scales, in line with the practice in most advanced countries.

33.   **Regulators need also to consider their broad approach to regulation, including moving away from a strongly rules-based approach.** The Department's approach is notably rules-based and prescriptive. And the CMISD, in reforming the regulation of insurance companies, is putting in place detailed rules to cover most aspects of insurance firms' operations, including dealings with customers and handling of claims. Rules-based approaches are always well-intentioned but they may give rise to unintended consequences, because detailed rules relieve firms of the responsibility to develop practices suitable to their particular business models. Over the longer term, a less prescriptive approach will be better aligned with market forces to deliver financial services at a lower cost for consumers.

34.   **Regulators should also consider building into their approaches such disciplines as cost benefit analysis and consideration for the impact of regulation on international competitiveness.** Both the Department and the CMISD consult on new proposals. They should consider extending this to consultation on their overall regulatory program and priorities. All regulation carries costs to consumers, firms and to regulators themselves. In a detailed, rules-based framework, the costs tend to be higher; and smaller firms, with smaller staffs and fewer resources tend to be more heavily penalized by prescriptive regulation. It is important to balance the benefits of regulation to consumers with the need to permit firms to earn competitive returns and to remain sound and well-capitalized. All this calls for regulators to submit major new initiatives to careful cost-benefit analysis.

35.   **Developing their approaches in these ways would bring regulators in Israel more into line with best practice in advanced economies.** Regulators in such countries are now combining rules-making with greater reliance on principles and more emphasis on the regulator issuing higher level guidelines covering the behaviors expected of regulated entities. Firms and their Boards are required to put in place detailed policies and procedures to implement the regulator's guidelines as appropriate to the firm's particular business model. In this environment, an important supervisory task is to review a firm's compliance with its own Board-approved policies and procedures.

36.   **As increased competition brings more risk, there is a need for a strong capacity to manage and resolve financial stress if and when it emerges.** The growing complexity of Israel's financial sector is adding to the challenges that would be faced in the event of a crisis affecting a major banking or insurance group. In particular, the recent growth of capital markets and of the international commitments of banks and insurance companies have added to the channels by which shocks could be transmitted and complicated the management of any crisis. And any increase in foreign participation in the domestic banking or insurance

sector would bring further challenges in this area, especially in the banking sector where all the major banks are at present domestically-owned.

37.   A thorough approach to preparing the ground for any crisis would include:

- **Reviewing and updating relevant aspects of the legal framework.** For example, regulators should have clear perspectives on their supervisory powers and procedures for intervening to limit potential losses to depositors and policyholders. And the authorities should have considered the adequacy of the insolvency law framework. Such work in Israel would include completing consideration of the need for an explicit deposit insurance scheme.

- **Developing policies and procedures for handling the main practical challenges that might arise**, covering, for example, the circumstances in which a bank or an insurance company may be permitted to lend to an affiliate or be granted waivers from certain rules (e.g., intra-company lending restrictions, capital and solvency requirements); and procedures for communicating with regulators overseas.

- **Simulating crises to test the resilience of the crisis management framework and to identify areas for improvements;** potential scenarios could range from the collapse of a single smaller bank or insurance company to the resolution of a large holding company that would require the close collaboration of all three regulatory agencies and appropriate co-ordination with authorities overseas.

38.   **Contingency planning should involve collaborative working between the regulators.** In particular, the lines of communication and respective roles among the three regulatory agencies (the Israel Securities Authority as well as the Department and CMISD) need to be clear. The recent development of a memorandum of understanding concerning the cooperation and exchange of information among the three regulators is a positive step towards ensuring a process for cooperation, but more will be required to ensure that processes are robust.
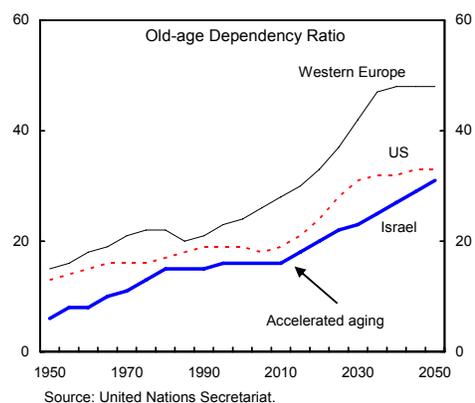
IV. TOWARD A NEW FISCAL RULE: WHAT MIGHT WORK WELL FOR ISRAEL[1]

A. Introduction

1. Israel's experience with fiscal rules is mixed. Early targets were amended frequently, but more recently, adherence to expenditure growth ceilings helped lower the fiscal deficit and public debt ratio. Still, at just over 80 percent of GDP, the public debt ratio remains high by international standards and is vulnerable to adverse shocks. Also, the latest framework—introduced only three years ago—is now considered untenable over the medium run. A search for a new rule is underway and a higher ceiling on the growth in real expenditure is being considered. This paper discusses various rules that could help build on the recent success in moving toward a more intertemporally consistent fiscal policy. But rather than advocate for a particular expenditure growth ceiling, the paper stresses the need to anchor any new fiscal rule on the objective of lowering the public debt ratio.

2. **International experience with fiscal policy rules has varied as well, but generally points to important beneficial effects, particularly when supportive fiscal institutions operate effectively.** However, some rules have resulted in procyclical tendencies; e.g., strong revenues in cyclical upturns have enabled expenditures to grow more rapidly within a nominal deficit limit. Similarly, a deficit ceiling may require a contractionary response to a recession-induced revenue shortfall. Nonetheless, numerical fiscal rules have generally played an important role in containing spending and deficit biases, by guiding or imposing constraints on policy makers' discretion. Furthermore, budget rules that have been augmented with ceilings on expenditure growth, or on debt accumulation, seem to have had success in disciplining spending trends.

3. **Israel would stand to benefit from adopting a new fiscal rule that is both responsive to temporary shocks (e.g., cyclical dynamics) and provides for a sustainable policy anchor.** In this paper, we propose a new fiscal rule that is anchored on the objective of lowering the public debt to 60 percent of GDP by 2015. The 60 percent ratio is chosen because it is widely considered a benchmark, more specifically, an upper limit, and affords the economy a measure of protection from growth shocks; the date 2015 is relevant because it marks a period where Israel's population begins to age at an accelerated pace—lower interest spending on public debt would permit

Old-age Dependency Ratio
Western Europe
US
Israel
Accelerated aging
Source: United Nations Secretariat.

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greater pension and health care spending without triggering adverse fiscal dynamics. The new rule would be flexible with respect to uncertainty about the business cycle and exogenous shocks, but would be designed to avoid large or systematic deviations from the target by means of a built-in error correction mechanism that caps the accumulation of public debt.

4.   **The paper is structured as follows:** Section B assesses Israel's fiscal performance against its fiscal rules over the past two decades. Section C reviews the international experience with fiscal rules. Section D introduces a couple of proposed new rules for Israel as well as scenario analysis and simulations to illustrate their key characteristics. Section E discusses institutional considerations for effective implementation of the new rule. Section F concludes.
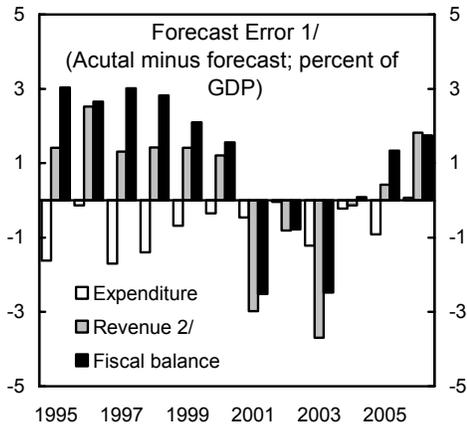
B. Fiscal Rules in Israel – Historical Context

5.   **Fiscal discipline in Israel improved substantially after the stabilization program of 1985.** 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 about 1 percent today. 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 been insufficient to achieve enough protection against adverse debt dynamics during economic growth shocks (Figure 1). Despite noticeable progress, Israel's debt position is still among the highest relative to OECD countries, while that for the deficit improved only recently (Figure 2).

6.   **Israel's experience with fiscal rules dates back to 1991.[2]** The Deficit Reduction Law (DRL) called for the incorporation of medium-run fiscal targets, which were aimed at compensating for the lack of a fiscal policy anchor. The targets were intended to bind future governments, thereby making fiscal policy more transparent and credible. However, successive governments found it difficult to meet the deficit targets set by the DRL, particularly during periods of weak economic activity (Table 1). More recently, the DRL has been augmented with a real expenditure growth ceiling of 1.0 percent in 2004–05 and 1.7 percent since 2006 (excluding spending on account of the West Bank/Gaza disengagement and 2006 war), which together with strong output expansion, helped meet the deficit targets. The central government deficit ceilings for 2008 and 2009 are 1.6 percent and 1.0 percent of GDP, respectively.
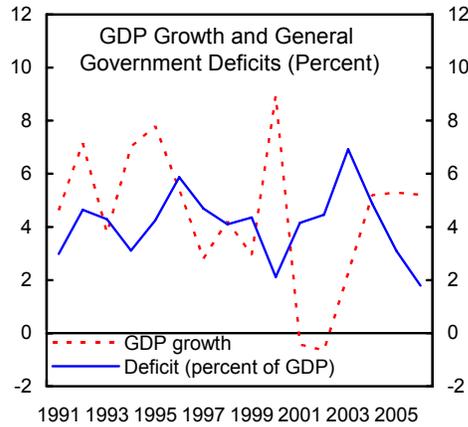
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[2] The recognition that large increases in public spending—associated with the substantial wave of immigration from the former Soviet Union during the early 1990's—would result in a deterioration of the fiscal position, prompted the adoption of the Deficit Reduction Law in 1991. The law was intended to send a signal to the markets that the rise in the deficit was transitory (Flug, 2006).

Forecast Error 1/
(Acutal minus forecast; percent of GDP)

☐ Expenditure
☐ Revenue 2/
■ Fiscal balance

1995 1997 1999 2001 2003 2005

Sources: Ministry of Finance; and IMF staff estimates.

1/ Central government. Forecast errors are defined as the difference between the reported actual and budget projections. A negative (positive) value implies the outcome underperformed (exceeded) budget expectations.

GDP Growth and General Government Deficits (Percent)

----- GDP growth
—— Deficit (percent of GDP)

1991 1993 1995 1997 1999 2001 2003 2005

Sources: Central Bureau of Statistics; Ministry of Finance; and IMF staff estimates.

Table 1. Central Government: DRL Ceiling Versus Actual Deficits, 1992–2009

Deficit Targets by year announced	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
1991	6.2	3.2	2.2	0.0														
1994 1/			3.0	2.8	2.5													
1997						2.8	2.4	2.0	1.8	1.5								
2000 2/									2.5	1.8		1.5						
February, 2002											3.0	2.0	1.5	1.0				
June, 2002												3-3.5	2.5-3	2-2.5	1.5-2	1-1.5		
2004 3/ 4/													2.5-4.0	3.4	up to 3.0			
2006 5/																2.0	1.5	1.0
Actual Deficits 6/	3.6	2.3	2.2	3.9	3.6	2.5	2.2	2.3	0.7	4.2	3.6	5.4	3.6	1.9	1.0	0.0		

Sources: Ministry of Finance and Bank of Israel.

1/ No specific deficit targets were given for the years 1995-1997. The only requirement was that the deficit, as percent of GDP, would decrease compared to 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 compared to the previous year, and that the deficit in 2003 would be up to 1.5 percent of GDP. Numbers underlined represent the deficit targets that the government approved when it presented the budget for this year.

3/ In 2004, the DRL was amended to include ceilings on expenditures growth between 2005-10. 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/ In the 2005 budget, the original deficit target was 3 percent of GDP, but it was later revised upward to account for the estimated cost of Gaza disengament of 0.4 percent of GDP.

5/ In 2006, the DRL was further modified, with the 1 percent cap on the growth in real expenditure (ex. war related items) rising to 1.7 percent, starting in 2007, with the deficit target falling gradually to 1 percent by 2009.

6/ Actual deficits reflect the revisions made to national accounts in July 2006, the result of which raised GDP by a cumulative 5 percent through end-2005.

7.   **Since the DRL targets were not adjusted for the cycle, the law had to be amended continuously (Table 1)**. Moreover, because the DRL prescribed the ex ante nominal deficit path, it appears to have created a bias for overly optimistic revenue projections at times of slow economic growth and overly pessimistic projections during a strong expansion phase. In fact, an analysis of Israel's fiscal forecast errors shows that under-performance (over-performance) on the fiscal balance since the mid-1990s has been mainly driven by lower-than (higher-than)-expected revenue.[3]

[3] See also Elekdag, Epstein, and Moreno-Badia (2006).

Figure 1. Israel: General Government Finances, 1980–2006 1/
(Percent of GDP)
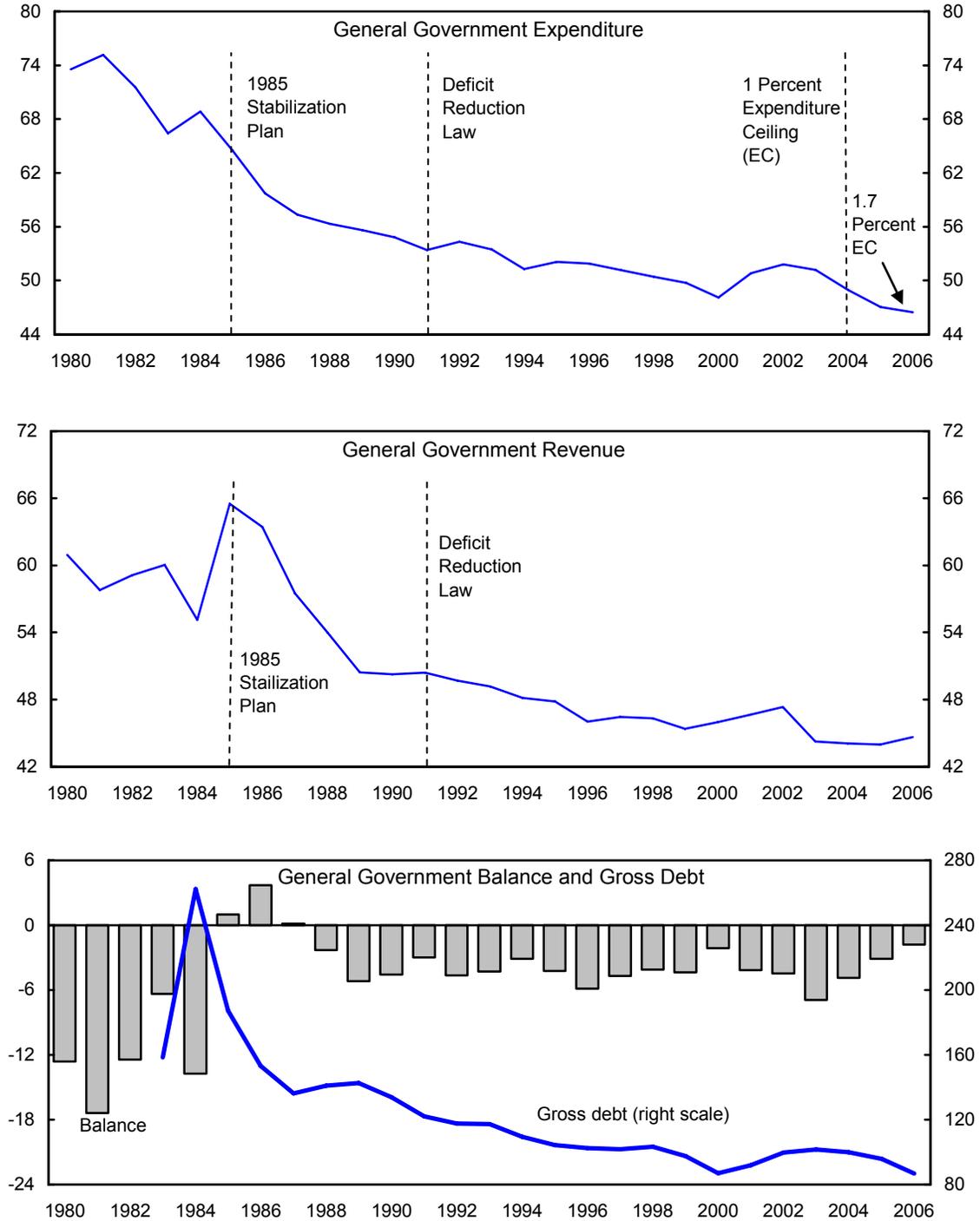
Sources: Central Bureau of Statistics; and IMF staff estimates.
1/ The 1 percent expenditure ceiling was enacted at the end of 2003, but it only applies to the period 2005–10.

Figure 2. International Comparison: General Government Finances, 2003–06
(Period average, percent of GDP)
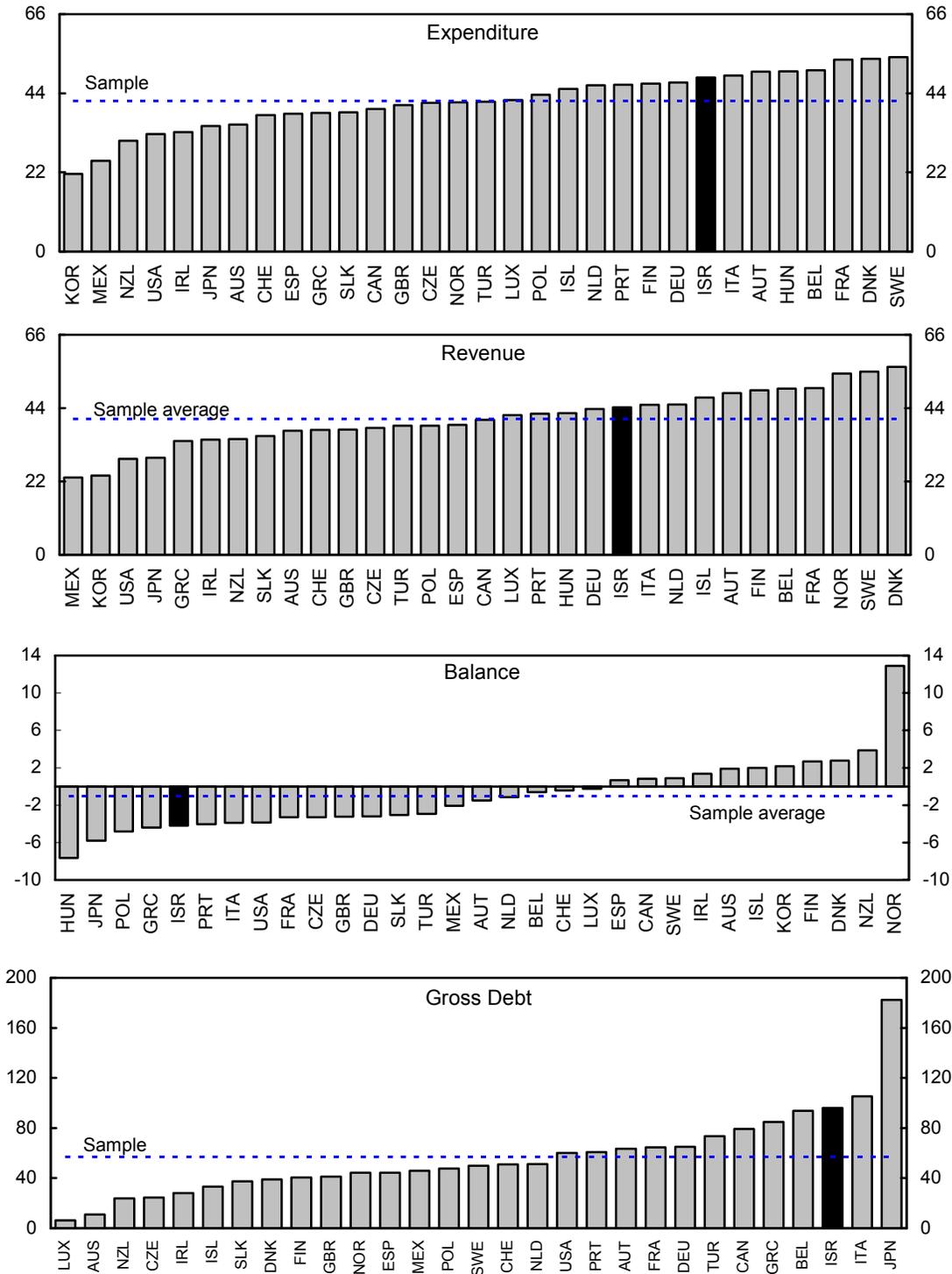
Sources: Central Bureau of Statistics; and IMF, *World Economic Outlook* .

C. Lessons from International Experience

8.   **Countries have found the adoption of fiscal rules to be an important mechanism by which governments can either seek to contain imprudent use of discretion or to signal commitment to fiscal discipline.** This, in turn, helps reassure capital markets and thereby lowers interest rates on public debt. Rules have become an increasingly popular response to the deficit bias (see Debrun et al., 2008 for detailed evidence on rules in the EU-25). They tend to fall into four broad categories: (i) *deficit rules*, which include balanced-budget rules, the golden rule— requiring a balanced budget excluding investment spending—and deficit limits; (ii) *debt rules*, which place limits on gross or net public debt; (iii) *expenditure rules*, which impose ceilings on total spending (or spending growth in real or nominal terms) or on specific categories of spending; and (iv) *revenue rules*, which are meant to put a lid on the overall tax burden or to allocate ex-ante unexpected revenue windfalls.

9.   **Each of these rules has pros and cons, and there is a growing tendency to combine them in the hope to fully exploit their respective benefits.** While fiscal rules have generally been found to enhance fiscal discipline, they face three major criticisms. First, they may encourage procyclical policies. This is clearly the case for *tightly binding* deficit and debt rules because they are more likely to bind in bad time, forcing procyclical fiscal contractions, but often prove unable to encourage adjustment in good times. Revenue rules can also lead to procyclicality, especially if they are not specified in terms of a ratio to GDP. By contrast, expenditure rules let automatic stabilizers on the revenue side play fully and do not hinder an appropriate response to business cycle fluctuations, but they can allow drift in the underlying deficit and debt objectives. Second, rules are often blamed for deteriorating the quality of fiscal policies because they are generally silent on the nature of the required fiscal adjustment. This clearly depends on the extent to which "forced" fiscal adjustment is more likely to be based on distortionary tax increases or cuts in productive discretionary expenditure (e.g. investment). Third, if rules fail to reflect a genuine commitment to fiscal discipline, they are likely to encourage creative accounting and off-budget operations, which reduces the overall transparency of the budget and weakens democratic control over it.

10.   **More sophisticated rules have been proposed to alleviate those criticisms but they introduce new complexities.** [4] Concerns about procyclicality have led to the specification of targets in cyclically-adjusted terms, whereas "qualitative" issues have been addressed by excluding specific spending or revenue items from the target. This is for instance the case in the United Kingdom which combines a debt limit (currently 40 percent of GDP) with a cyclical version of the golden rule (current spending less current revenue must be in balance over the cycle). Also, under the EU's Stability and Growth Pact,

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[4] See Kopits and Symansky (1998) for detailed discussion on fiscal policy rules, including their key characteristics. They define a good rule as being simple, transparent, coherent with the final goal, but mindful of other goals of public policies.

budgetary developments are assessed in cyclically-adjusted terms (although targets remain unadjusted), and attention is paid to qualitative aspects of fiscal policy, including the costs of specific structural reforms. In Sweden, the quality issue is addressed by using expenditure rules to implement a budget-balance rule. While adding complexity can help avoid some of the problems inherent in rules, it raises serious implementation concerns, both from a technical and from an institutional perspective. On the technical side, cyclical adjustment is more an art than a science, and the definition of spending categories is always subject to interpretation. On the institutional side, complex rules are hard to implement, and possibly even harder to monitor, making them prone to manipulations and preventing democratic accountability mechanisms to operate fully.

11.   **An effective implementation of fiscal rules requires supporting institutional arrangements, including a legal basis and mechanisms promoting self-compliance.** A strong legal apparatus supporting enforcement is an important dimension of a rules-based fiscal framework. Rules with a statutory or even constitutional basis are in principle more likely to discourage policymakers to deviate from the targets than a formal statement in a coalition agreement. Regardless of the type of "sanction" for violating the rule (pecuniary, reputational, etc.), an effective enforcement procedure must make deviations costly.[5] Moreover, the risk of manipulation and creative accounting calls for the rules to operate in a propitious institutional setting that minimizes opportunities for such manipulations and enhances real-time monitoring of budget performance. In this regard, non-partisan fiscal surveillance mechanisms, such as fiscal agencies or committees, can play a useful role (i) by providing specific inputs to the budget process, such as unbiased macroeconomic projections, (ii) by analyzing budget plans and their implementation, or (iii) by formulating recommendations (see Kumar and Ter-Minassian, 2007). For instance, in Chile, manipulations of the cyclically-adjusted-balance rule are minimized thanks to a panel of independent experts who assess the cyclical position of the economy and provide revenue projections. In Belgium, a non-partisan body makes recommendations on the coordination of fiscal policies among entities, supporting the implementation of rules that concern the general government. Sweden has recently established a Fiscal Policy Council (*Finanspolitiska rådet*) to monitor compliance with the objectives of fiscal policy, including long-run sustainability, a surplus target and an expenditure ceiling. The Council also assesses consistency of fiscal policy with macroeconomic stability, and evaluates the transparency and clarity of budget documents, as well as the quality of forecasts and forecasting methodologies.

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[5] Enforcement translates deviations from targets into some subjective cost ("disutility") for the decision-maker.

Table 2. International Comparison of Fiscal Rules

	Type of Rule/Objective	Planning Horizon	Coverage	Statutory Base
Israel	Deficit and expenditure ceilings.	Multiyear.	Central government.	Law
European countries				
Denmark	Structural budget balance.	Multiyear.	General government.	Political agreement.
Estonia	Budget balance.	Multiyear.	General government.	Political agreement.
	Debt in percent of revenues.	Annual.	Local government.	Law.
Finland	Budget balance.	Multiyear.	Central government.	Political agreement.
	Budget balance.	Multiyear.	Local government.	Law.
	Debt in percent of GDP.	Multiyear.	Central government.	Political agreement.
France	Golden rule.	Annual.	Local government.	Law.
Lithuania	Ceiling on net borrowing.	Annual.	Central government.	Law.
	Budget balance.	Annual.	Local government.	Law.
Netherlands	Expenditure ceilings	Multiyear.	General government.	Coalition agreement.
Poland	Debt in percent of GDP.	Annual.	General government.	Constitution.
Slovak Republic	Debt in percent of revenues.	Annual.	Regional and local	Law.
Slovenia	Debt in percent of GDP.	Multiyear.	General government.	Coalition agreement.
	Debt ceilings.	Annual.	Local government.	Law.
Spain	Budget balance.	Over the cycle.	General government.	Law.
	Debt ceilings.	Annual.	Regional government.	Law.
	Debt in percent of revenues.	Annual.	Local government.	Law.
Sweden	Budget surplus on average.	Over the cycle.	General government.	Political agreement.
Switzerland	Budget balance - Debt-Brake rule	Over the cycle.	Central government.	Constitution.
United Kingdom	Golden rule.	Over the cycle.	General government.	Law.
	Debt in percent of GDP.	Over the cycle.	General government.	Law.
Other countries				
Australia	Budget balance and debt ceiling.	Over the cycle	General government.	Law.
Brazil	Debt in percent of revenues.	Annual.	Central and local	Law.
Colombia	Debt in percent of revenues.	Annual.	Central and local	Law.
India	Golden Rule.	Multiyear.	Central government.	Law.
New Zealand	Operational balance.	Over the cycle	General government.	Law.

Sources: Danninger (2002), European Commission (2006), Lundback (2007), Corbacho and Schwartz (forthcoming).

12.   **Among existing fiscal rules, the Swiss debt-brake rule has attracted a lot of attention. It stipulates a balanced central government budget over the cycle.[6]** The rule specifies a one-year ahead ceiling on central government expenditure that is equal to the corresponding projected cyclically-adjusted revenue. Thus under this rule, it is possible to run a deficit in recession and a surplus in expansion, but over the whole cycle, it is designed so that deficits and surpluses cancel out. The objective is to allow expenditure to remain relatively independent of cyclical variations, while taxes act as automatic stabilizers. Trend GDP is calculated as an extrapolation of a Hodrick Prescott (HP)-filtered historical output time series. At the end of each year, any deviation from the cyclically-adjusted balance is kept in a fictional account, which is debited when there is an unanticipated deficit and credited in case of an unanticipated surplus.[7] Thus, the budget balance for the year $t+1$ can be expressed as:

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[6] The sub-national governments (Cantons) are not integrated, nor coordinated with the federal government, but generally have balanced budget rules in place already (Lundback, 2008).

[7] For detailed reviews of the Swiss debt-brake rule, see Danninger (2002) and Bodmer (2006).

$$BAL_{t+1} = E_t\left(R^{cyl}_{t+1}\right) - G^c_{t+1} + A_{t+1}$$

where $E_t\left(R^{cyl}_{t+1}\right)$ denotes the expectations at time t of the cyclically adjusted revenue at time $t+1$; G^c_{t+1} is the corresponding spending ceiling for the period $t+1$; while A_{t+1} represents an error-correction adjustment factor that rectifies for past differences between budget targets and outcomes. A full record of these deviations is maintained in the aforementioned fictional account.

13.   **The rule requires the Swiss government to eliminate any negative balance in the fictional account.** No timeframe is specified, unless the negative balance exceeds 6 percent of annual federal expenditure (about 0.6 percent of GDP), in which case the account must be brought down to below 6 percent within three years—hence the debt-break mechanism. Switzerland's performance under the debt-brake rule is considered relatively strong, albeit the period of implementation has so far been short.[8] The rule is seen as instrumental in achieving fiscal consolidation in recent years—central government balance improved from a deficit of 0.9 percent of GDP in 2003 to a surplus of 0.5 percent of GDP in 2006, and gross debt has fallen from 53.3 percent of GDP to 46.9 over the same time period. The implementation of the debt-brake rule was initiated right around a cyclical trough, thus a subsequent recovery helped revenue over-perform and the fictional account has yet to accumulate any negative balance.[9]

D.   Proposed New Fiscal Rule for Israel – A Debt Brake Approach

14.   **Given its propensity to deviate from previous targets, Israel stands to benefit from a debt-break type instrument that disciplines spending trends and systematic deviations from the target, yet is flexible with respect to temporary shocks, including cyclical fluctuations.** There are a few different ways to achieve this goal and two of the variations are suggested here. *One approach is a variant of the Swiss approach, which targets the deficit over the cycle. An alternative approach is based on expenditure ceilings tied to a normative debt path.* While an expenditure rule does not require estimates of the business cycle to be consistent with a countercyclical fiscal stance, regular adjustments in expenditure ceilings are needed to prevent undesirable drifts in the debt ratio. Both of these rules share error-correction mechanisms in case past targets are missed.

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[8] The mechanism was supposed to govern central government budgets starting from 2003. In practice, however—due to a large structural deficit during an unexpected recession that year—it began to take effect with the 2004 budget (Bodmer 2006).

[9] In fact, the fictional account generated a total credit of around 1.3 percent of GDP between 2004–06, which was largely due to an increase in the expenditure ceiling each year that subsequently were under-executed.

15.   **The ultimate objective would be to reduce the public debt to 60 percent of GDP by 2015.** This objective could be achieved by maintaining central government balance (which is typically equivalent to a general government deficit of 1 percent of GDP) over the cycle. For operational purposes, the central government balance (cash basis) constitutes the appropriate variable to target. The reasons are that the authorities have direct policy control over it and that local governments are relatively small and significantly under the control of the central government.[10] However, it will also be important that, relative to the existing rules, the coverage of the central government is wider, particularly if the new rule relies on an expenditure growth ceiling. A key item to include is government spending through the National Insurance Institute (NII), equivalent to about 5 percent of GDP, which is not included in the current budget growth ceiling.[11]

The Swiss Debt-Brake Approach

16.   **In the Swiss Debt-Brake approach, the government would target the deficit over the cycle to eliminate a pro-cyclicality bias that is otherwise inherent in nominal budget balance rules.** At the end of each year, any deviation from the budget balance target would be recorded in a fictional account, per the debt-brake concept. The planned deficit in the following year will be set according to two criteria: (i) the cyclical position and (ii) the amount accumulated in the fictional account (i.e., accumulation of past deviations). Thus, in periods when the economy is believed to be below (above) potential the deficit target will rise (fall) such that the structural deficit is unchanged. In addition, given the high debt to GDP ratio, and to minimize the risk of confusing a permanent shock with a cyclical downturn, the deficit target will decline (rise) if the debt in the fictional account increases.

17.   **The built-in error correction mechanism (ECM) serves to ensure that debt cannot permanently deviate from the path to 60 percent of GDP by 2015.** The ECM comprises of a linear and a quadratic term. The linear term acts mainly to reduce the countercyclical policy when the debt begins to deviate from its targeted path, while the quadratic term represents a more significant fiscal adjustment once the accumulated liabilities in the fictional account exceed a certain threshold (e.g., 2 percent of GDP) and

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[10] The difference between the central government balance (cash basis) and the general government balance (accrual basis) comprises the deficits of the local governments (averaging about zero percent of GDP over the past five years) and interest accrued on inflation-index-linked government debt. The latter can vary widely as a function of inflation but has averaged around 1 percent of GDP over the past five years.

[11] NII expenditure and revenue (vis-à-vis the public) amount to about NIS 45 billion and NIS 25 billion, respectively. To close the gap, the government transfers to NII, on a net basis, some NIS 20 billion. This allows the government to circumvent the expenditure growth ceiling, for example, by increasing its transfers to NII without reflecting the corresponding increase in spending in the budget. A similar loophole exists with respect to the collection and outlays of health related taxes.

achievement of the planned debt reduction is therefore considered at risk. Specifically, the deficit, in percent of GDP, for the budget year $t+1$ can be expressed as (a positive value):

$$def_{t+1} = defTAR - \alpha ygap_{t+1} + \beta FA_t - \gamma \left(FA_t\right)^2 \qquad \text{if } FA_t \geq 2$$

$$= defTAR - \alpha ygap_{t+1} \qquad \text{if } FA_t < 2$$

where $defTAR$ is the specified deficit target (1 percent of GDP for the general government deficit—this is the equivalent to the operationally-relevant target of central government balance);[12] $ygap_{t+1}$ is the output gap projected in period $t+1$; α represents a cyclical factor; FA_t denotes the accumulated balance in the fictional account at period t; while β and γ are parameter values (between 0 and 1) that determine the speed of adjustment as described above. If economic dynamics are governed mainly by cycles or transitory shocks, then one may consider setting $\gamma = 0$ and the level of β according to the preferred countercyclical policy. However, if the economic dynamics are more erratic and exposed to permanent shocks, one may want to set higher level of γ and hence adjust faster to unfavorable shocks and minimize the deviation of debt from its planned trajectory so as to protect the economy from adverse public debt dynamics.

18.   **Under a baseline scenario, in which the new fiscal rule takes effect in 2010, the public debt is expected to reach 60 percent of GDP by 2015 (Figure 3).** In the scenario analysis below, we assume that (i) the public debt reaches 78 percent of GDP at end-2009 and (ii) the output gap is zero when the rule takes effect. For the purpose of illustration, we also assume that $\beta = \gamma = 0.125$ and $\alpha = 0.4$ (revenue/GDP ratio)[13]. Therefore, a simplified version of the rule can be written as:

$$def_{t+1} = 1 - 0.4 ygap_{t+1} + 0.125 \left(FA_t - \left(FA_t\right)^2 \right)$$

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[12] While, for operational reasons, the central government balance constitutes the appropriate variable to target, all further scenario analysis and simulations are based on the corresponding general government balance, since it is more closely associated with changes in the overall public debt.

[13] Sensitivity analysis suggests the results are robust to (small) changes in the parameters values.

Figure 3 juxtaposes the baseline scenario with a negative output shock scenario.[14] Under the baseline case, real GDP growth is assumed to hover around potential between 2010–17—an illustrative eight-year cycle. Since the economy is operating close to potential, accumulated liabilities in the fictional account never reach the threshold 2 percent of GDP, and thus the quadratic adjustment is never triggered. That is, the deficit path would follow a *simple* over-the-cycle process ($defTAR - \alpha ygap_{t+1}$) throughout the cycle. By construction, given stable growth around potential, this would amount to a debt path almost identical to the one generated from a nominal (constant) central government balance, or a general government deficit target of 1 percent of GDP.

19.   **If the economy is hit by a large negative shock, the debt-brake mechanism would impose greater discipline on the deficit path.** Under this illustrative scenario, the economy is hit with significant slowdown in the first three years following implementation of the rule. The output gap reaches *minus* 10 percent by 2012, while accumulated liabilities in the fictional account quickly exceed the 2 percent of GDP threshold. However, the quadratic adjustment triggered early on would suppress the deficit from rising too much, so that by the end of the (half) cycle, the debt ratio would more quickly revert to the baseline path.

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[14] The potential growth series is updated using a moving average of real GDP growth on a rolling eight-year basis. An alternative measure of potential growth using an HP filter shows very similar results.

Figure 3. Israel: Scenario Analysis One, 2009–17 1/
(Percent of GDP, unless otherwise indicated)
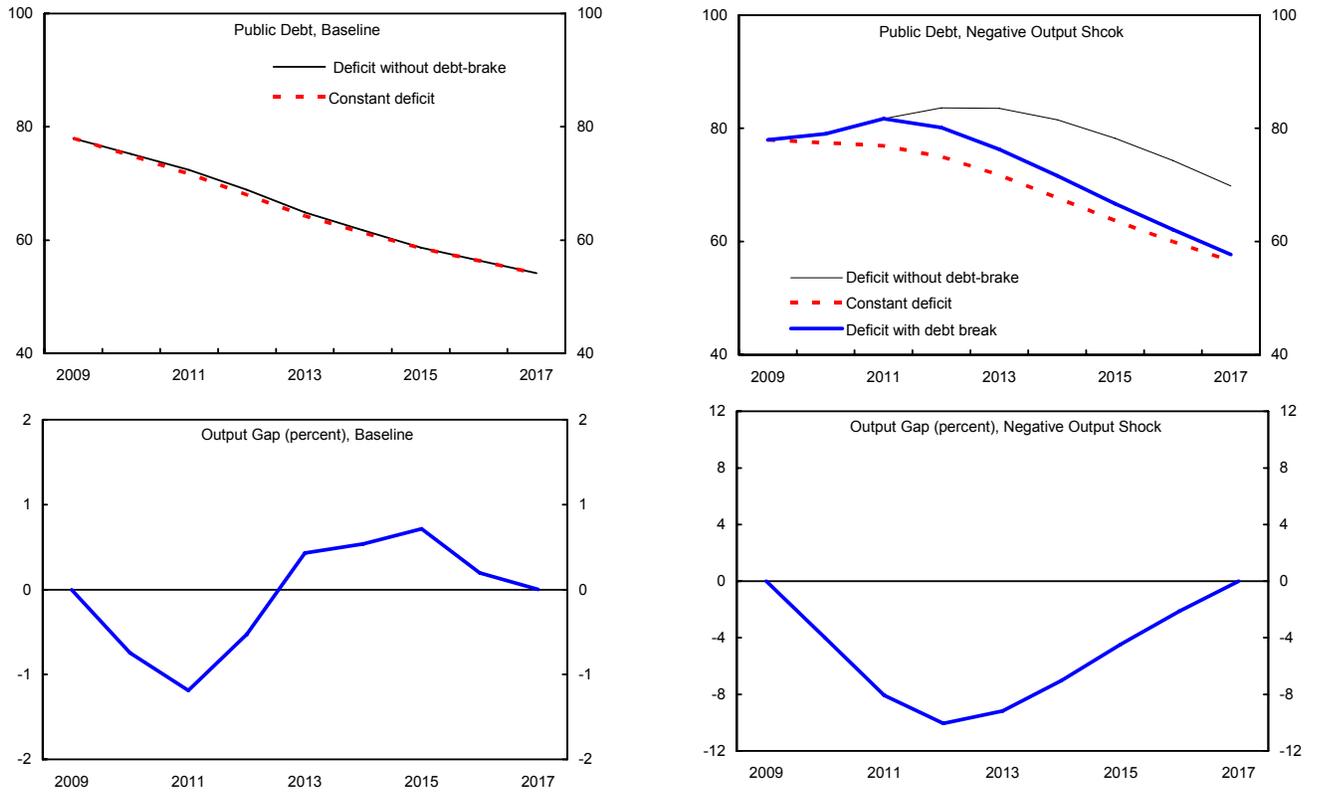
Sources: IMF, World Economic Outlook; and IMF staff estimates and calculations.

An alternative Debt Brake

Trade-offs

20.	**The debt-brake rule described above fulfills many criteria of a good rule, but the explicit reference to the business cycle is a potential drawback.**[15] The Swiss-type debt-brake mechanism is arguably transparent, coherent with the final goal (putting a lid on the public debt), and mindful of fiscal stabilization. However, it raises a number of technical issues in terms of parameterization, and its implementation may be complicated by the explicit cyclical-adjustment mechanism for the deficit target. More specifically, while Switzerland is a mature economy with mild cyclical fluctuations, it is arguably more difficult to determine the cyclical position of a dynamic economy subject to potentially large shocks like Israel. Likewise, the permanent versus transitory nature of disturbances is harder to detect. One additional difficulty relates to the operation of the correction mechanism in case slippages result from significant mistakes in the estimation of the output gap (larger errors are likely at turning points).

21.	**Alternatives to the debt brake rule are potentially numerous, but involve trade-offs as regards the desirable characteristics of rules.** Expenditure rules have been tested quite successfully in Israel and could be redesigned to allow for greater short-run flexibility, while keeping debt firmly on a declining path. In light of international experience, a multi-year (say 3 years) rolling ceiling on nominal expenditure growth could effectively contain budget deficits, while preserving automatic stabilizers without explicit reference to the output gap.

22.	**There are, however, major drawbacks to an expenditure-rule-only approach.** The first is that undesirable slippages could still occur on the revenue side, undermining the discipline-enhancing effect of the rule. Second, and related, an expenditure ceiling per se does not map into a specific debt path, making the link between the rule and the ultimate objective questionable. Third, a strict expenditure rule hinders an appropriate response to unforeseen events such as natural disasters, wars, and social unrest. Escape clauses thus appear unavoidable, with potentially harmful effects on the credibility of the rule.

23.	**A budget-balance target with a binding deficit ceiling (like in the SGP) is closer to the debt reduction objective and provides room for automatic stabilizers without requiring explicit cyclical adjustment.** The challenge, however, is to give a prominent role to the budget balance target. If governments maintain deficits close to the ceiling in good

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[15] Another conceptual issue is that the debt brake leads to a debt-to-GDP ratio that is asymptotically zero. This is the reason why, in the version proposed in the previous section, the rule would be revisited once public debt has been reduced to 60 percent of GDP.

times, they would find themselves in the uneasy position to either contract fiscal policy in bad times, or change the rule when it imposes inadequate policies.

An expenditure rule anchored in a debt objective

24.   **A valuable alternative rule could be based on the following principles:**

    a. The rule should trigger a correction when debt deviates excessively from a desirable norm (coherence with the final goal of bringing down the debt to an acceptable level);

    b. the rule should avoid explicit reference to a measure of the business cycle (simplicity);

    c. the rule should be easy to communicate to the public (transparency);

    d. the rule should reduce the likelihood of forcing pro-cyclical contractions, while encouraging the allocation of revenue windfalls to debt reduction when the latter is needed (mindful of other goals);

    e. the rule should allow for lower taxes in the case of more ambitious expenditure outcomes;

    f. the rule should be resilient in the face of unforeseen events unrelated to business cycle developments.

25.   **One possibility would be to explicitly anchor an expenditure rule in a long-run debt objective.** Such rule would include (i) a specific debt path (the norm) leading to a certain long-run debt objective (in terms of GDP); (ii) a deficit norm consistent with the desirable debt path; and (iii) a medium-run expenditure growth cap consistent with the (ex-ante) deficit norm. As discussed above, an expenditure rule preserves automatic stabilizers in the face of unexpected shocks to economic activity. It would also appear as a natural continuation of the existing framework, reducing the risk of sending ambiguous signals to the public regarding the commitment to fiscal discipline.

26.   **Given the possibility of ex post deviations from the debt norm, a feedback mechanism from debt to expenditure is required.** If debt is below the norm, there is admittedly no need for such automatic correction unless there are reasons to believe that the debt norm is somehow socially optimal. That said, as long as the desirable debt path is declining, there is a case for setting expenditure targets such that debt declines at the same pace as the norm until some long-run desirable ratio—say 60 percent of GDP—is reached.

27.   **Two main approaches can be envisaged to make the ECM operational.** The *first* is to set a constant maximum growth rate for nominal expenditure consistent with the debt objective, and allow for adjustments of the expenditure growth ceiling only when actual

public debt deviates too much—say 5 percentage points of GDP—from the normative debt path. The *second* procedure would be to schedule regular revisions of the expenditure growth ceiling—say every 3 years—following a formula that specifies the extent to which past deviations from the debt norm are to be corrected over the period.[16] Of course, the two approaches could be combined, allowing for a reset of expenditure growth caps in case public debt is deemed off-track between two scheduled revisions. However, under most circumstances, the parameters of the ECM formula could be set to prevent non-scheduled revisions.

28.   **The debt as the anchor of the expenditure rule is key for the credibility of the framework because it establishes full consistency with the ultimate objective of reducing the high public debt ratio**—the implicit tax on future generations and a key source of economic vulnerability. As indicated above, the discipline-enhancing impact of expenditure rules is vulnerable to revenue measures (tax cuts) and unforeseen emergency expenditures that can weaken the link between expenditure restraint and debt. The debt anchor helps alleviate the problem: should tax cuts or emergency spending threaten the debt objective, the feedback mechanism would require lower expenditure ceilings. Also, adjustments to the expenditure ceilings are easy to understand if they are tied to an explicit debt path so that such revisions should not threaten the credibility of the framework. These adjustments to the expenditure ceiling arise without the potential complexity of managing a fictional account, as in the previously discussed proposal. Finally, this rule can still operate after the public debt ratio reaches a steady state debt-ratio that is deemed acceptable and institutionalizes a medium-run expenditure framework.

29.   **The credibility that comes with an "anchored" expenditure rule may erode the countercyclical response of fiscal policy.** By definition, controlling debt accumulation means that expenditure growth is tied to expected revenue growth over time. This has two major implications. First, one cannot exclude procyclical contractions, if a protracted slowdown causes unacceptable deviations of public debt from the norm (similar to the negative output shock scenario illustrated in Figure 3). Likewise, the rule would allow for procyclical expansions in cases where persistent high growth drives actual debt ratio well below the norm. The second implication is that the method adopted to prepare the revenue assumptions underlying the expenditure growth ceilings is critical in shaping the cyclical properties of the rule. In particular, if government officials were to *perfectly* predict future revenues, an "anchored" expenditure rule would exhibit the same cyclical behavior as (ex-ante) debt or budget-balance rules because expenditure growth would be allowed to accelerate in good times and would have to decelerate in bad times. In practice, however, cyclical turning points are hard to predict, leaving room for automatic stabilizers to operate in

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[16] In both cases, and to speed up debt reduction, negative deviations from the norm would only trigger an upward correction of the expenditure ceiling when debt is at or below 60 percent.

case of unexpected downturn or upturn. Overall, the "anchored" expenditure rule should be significantly less procyclical than debt or budget-balance rules while achieving similar objectives in terms of sustainability. Moreover, revenue assumptions could also be formulated to favor a countercyclical response of the fiscal stance. One option is to systematically base revenue assumptions on some trend nominal GDP growth (as in the Swiss case). All else equal, this would relax (tighten) expenditure growth ceilings when actual GDP growth falls short of (exceeds) potential, regardless of whether the slowdown (upturn) is expected or not.[17]

Implementation

30.   **The above framework rests on nominal expenditure growth caps that reflect the debt stabilization objective.** Linking expenditure to debt requires three elements: (i) a debt norm, (ii) a debt-feedback mechanism, and (iii) a procedure setting the expenditure ceiling.

31.   **In a deterministic setting, there is a one-to-one mapping between any desirable debt reduction objective (by a certain date) and a constant budget-balance.** As discussed above, a constant central government balance (equivalent to a general government deficit of 1 percent of GDP), would drive public debt down to about 60 percent of GDP by 2015. The implied debt path, denoted by, could constitute a good norm for debt, although many alternatives are possible. One important practical issue is whether there should be opportunities to revise the normative debt path. While escape clauses can admittedly threaten the credibility of a rule, sticking to implausible objectives has the same effect. Hence, revisions to the debt norm should be allowed under well-motivated conditions, including national emergencies or significant errors in the underlying assumptions about long-run growth, interest rates, population aging-related spending, etc., while recognizing the need for supportive fiscal surveillance mechanisms in order to avoid damaging the credibility of the rule. One would therefore expect the debt norm to be adjusted infrequently, and only when circumstances make the existing debt target untenable. The potentially adverse effect of the debt escape clause on credibility could be further contained if the adjustment procedure was non-partisan or, at a minimum, subject to strict external scrutiny by non-partisan bodies.

32.   **Because the budget reflects a variety of unexpected disturbances, an ECM is needed to prevent undesirable drifts from the debt norm**. A natural way to proceed, is to make the required policy correction proportional to past deviations. The time frame for implementing the correction is critical. For instance, if the ECM is applied on a yearly basis, deviations from the norm are not allowed to persist for long, but shock persistence can

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[17] Of course, another option is to use an estimate of trend (or cyclically-adjusted) revenue levels. That would relax (tighten) expenditure growth ceilings when the output gap is negative (positive). However, this approach amounts to reintroduce the output gap at the center of the picture, which has some drawbacks, as already discussed.

quickly lead to a potentially strong procyclical response. A multi-year approach thus seems more appropriate to reduce the risk of procyclicality, with nominal expenditure ceilings being defined for a number of years. Ceilings would not be revised during the period (allowing for automatic stabilizers on the revenue side to play fully) unless exceptional circumstances (e.g. related to geopolitical shocks) demand an immediate adjustment in the expenditure framework[18]. In principle, revisions could also be triggered by unacceptably large deviations from the debt norm within the medium-run planning horizon. However, to the extent that a credible ECM guarantees the progressive elimination of such deviations, it seems preferable to limit opportunities to revise expenditure ceilings within the planning horizon.

33.   **Assuming a 3-year, non-overlapping planning horizon, the "anchored" expenditure rule would work as follows:**

- **Step 1:** the government determines a desirable path for the debt-to-GDP ratio, including a fixed date for reaching some constant, long-run target (here 60 percent by 2015).

- **Step 2:** every 3 years, an annual nominal growth ceiling is set for total government expenditure.[19] If debt is above the long-run objective, the ceiling should be set such that the debt ratio is expected to decline at least as fast as the debt norm over the planning horizon (see the Appendix for algebra). The decline in the debt ratio should be greater if debt is above the norm at the beginning of the planning horizon, in line with a well-specified ECM. If debt is at or below the long-run objective, the ECM could work symmetrically.

- **Escape clauses:**

  - Step 1 could be repeated if redefining the normative debt trajectory is needed to preserve the credibility of the rule, either because it is untenable as a result of exceptional circumstances (to be defined) that escape government's control, or because it appears insufficiently ambitious to provide any meaningful guidance to policymakers (this could be the case if the debt stock is affected by shocks unrelated to the deficit, such as large valuation effects or liquidation of assets

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[18] The rule would have to specify the precise events that could trigger an increase in expenditure above the ceiling.

[19] For reasons related to simplicity, transparency and consistency with the ultimate objective, total expenditure should be subject to the ceiling even though some expenditure items are not under the control of the government, including interest payments or investment projects financed by specific external grants.

whose proceeds can impact debt reduction). Stronger fiscal surveillance mechanisms would play an important role in this regard.

- Because large upward deviations from the debt norm can occur quickly, the rule may also specify a debt trigger beyond which step 2 would have to be repeated before the end of the normal planning horizon. Such a re-set procedure would preserve the credibility of the ECM by preventing that a strict application of the ECM produces a politically infeasible adjustment during the next 3-year period.

34.   **To compare public debt dynamics and the cyclical properties of fiscal policy, simulations have been performed using the following assumptions:**

a. The 3-year expenditure ceilings are binding and met every single year so as to ensure a constant reduction in the debt ratio (see Appendix). There is no possibility to revise those ceilings during the planning horizon.

b. Medium-run expenditure plans are based on trend GDP growth to allow for automatic stabilization. Under the rule, the fiscal stance will be tighter when actual growth is above potential (as revenue gains are saved) and looser when it is below potential.

Comparing the proposed rules: hitting the debt target vs. automatic stabilization

35.   **The discussion of alternative rules revolves around the potential trade-off between the credible realization of the debt objective and the flexibility of fiscal policy in the face of unexpected developments.** To assess the comparative performance of the various rules discussed in this chapter, Table 3 and Figure 4 display implied debt paths and selected summary indicators pertaining to four rules: a constant central government balance (general government deficit of 1 percent of GDP), the modified Swiss debt-brake discussed above, and two variants of the alternative debt-brake rule, one where the error-correction parameter (lambda) is 0.2 and one where it is 0.4. Table 3 proposes three measures of realization of the debt target: the root mean squared deviation (RMSD) from the norm, the mean deviation from the norm, and the deviation from the norm in 2015 (60 percent of GDP).

36.   **To measure the procyclical bent inherent in the fiscal rule, the table reports the sum of pro-cyclical impulses over the period 2010–15**: namely *improvements* in the primary balance during bad times, and *deteriorations* of the primary balance in good times. The higher the indicator, the more procyclical the rule. A negative number indicates that over the period, fiscal impulses have been countercyclical. We define "good" ("bad") times as periods in which actual *growth* is above (below) potential.

Table 3: Comparative Performance of Alternative Fiscal Rules for Israel, 2010–15

	Constant CG balance (GG deficit of 1 percent of GDP)	"Swiss" debt brake	Alternative ECM debt brake (lambda=0.2)	Alternative ECM debt brake (lambda=0.4)
	Baseline			
Root mean square deviation with respect to the norm path (percent of GDP, 2010–15)	0.91	**0.90**	0.97	0.96
Mean error with respect to the norm path (percent of GDP, 2010–15)	-0.51	**0.02**	0.73	0.66
Difference from 60 percent in 2015	-1.44	-1.33	0.13	**-0.08**
Procyclicality (+ is procyclical; - is countercyclical)	1.43	0.25	**0.14**	0.43
	Amplified cycle			
Root mean square deviation with respect to the norm path (percent of GDP, 2010–15)	**2.23**	3.75	3.38	3.42
Mean error with respect to the norm path (percent of GDP, 2010–15)	**-0.13**	0.65	1.29	1.20
Difference from 60 percent in 2015	-2.67	-4.26	**-1.89**	-2.04
Procyclicality (+ is procyclical; - is countercyclical)	1.79	**-3.08**	-0.41	-0.40
	Negative output shock			
Root mean square deviation with respect to the norm path (percent of GDP, 2010–15)	**5.09**	8.92	9.11	8.61
Mean error with respect to the norm path (percent of GDP, 2010–15)	**4.51**	7.84	8.55	7.75
Difference from 60 percent in 2015	5.19	9.07	4.07	**1.74**
Procyclicality (+ is procyclical; - is countercyclical)	1.51	0.04	-2.89	**-3.64**

Sources: IMF, *World Economic Outlook*; and IMF staff estimates and calculations.

Figure 4. Israel: Simulated Debt Path under Various Fiscal Rules, 2009–17
(Percent of GDP, unless otherwise indicated)
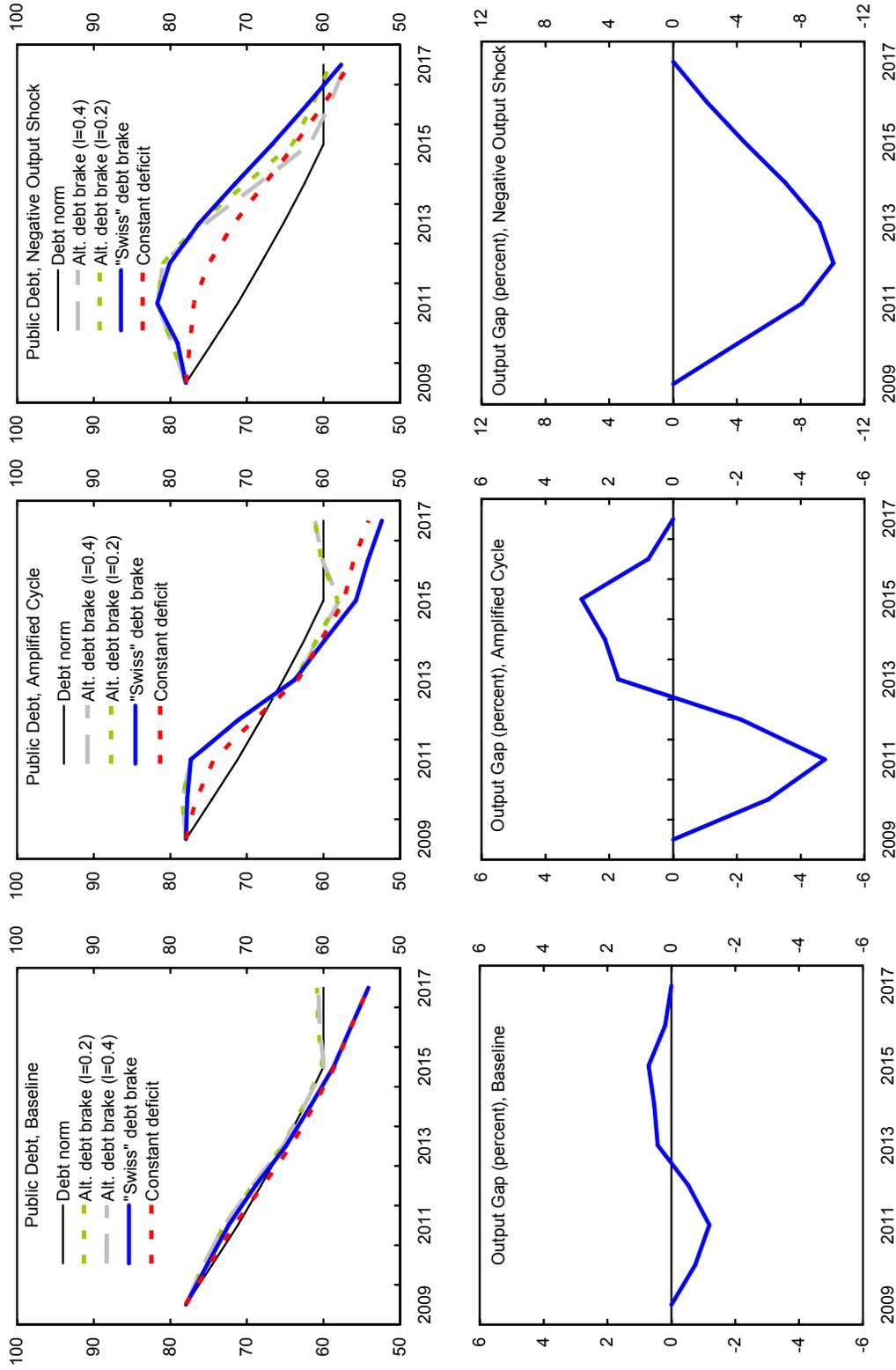
Sources: IMF, World Economic Outlook; and IMF staff estimates and calculations.

37.   **Two key conclusions emerge from the "beauty contest."**

    a. **Both the Swiss debt brake and the alternative ECM rule exhibit a lower pro-cyclical bent than the constant deficit rule,** especially when cyclical fluctuations are more pronounced, or when a large output shock occurs. In these cases, fiscal impulses (as measured by the change in the primary balance) are generally countercyclical.

    b. **None of the proposed rules can entirely preclude procyclical policies.** Procyclicality is, however, a built-in feature of the deficit rule whereas procyclical impulses under both the Swiss debt brake and the alternative ECM rule are circumstantial. They arise when the rule requires a correction of past deviations, that is at the end of 3-year period (alternative ECM) or when the fictional account needs to be replenished (Swiss rule).

    c. **The alternative ECM rule entails a more precise targeting of the 2015 debt objective,[1]** while allowing for greater flexibility in response to shocks (as indicated by the higher RMSD). The Swiss debt brake, by contrast, produces the largest negative deviation when cyclical fluctuations are more pronounced because cyclical revenues are fully saved.

E. Institutional Considerations

38.   **Enhanced transparency and governance are key for successful implementation of the fiscal rule**. Research shows that rules need supporting fiscal institutions to work well. To be credible, the fiscal rule needs to be supported by enforcement and monitoring mechanism. As such, and in line with previous recommendations,[2] effective enforcement of the new rule would require the following:

- *Better budgetary preparation and transparency*, in line with the recommendations of the 2003 Fiscal ROSC.

- *Stronger fiscal governance*, including an institutional set-up to help monitor independently the implementation of any new fiscal rule.

- *Improved long-run fiscal planning*, including analytical work to better understand long-run challenges. Israel's old-age dependency ratio will resemble that of the United States by 2050.

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[1] Unlike the Swiss debt-brake rule, where the ECM is triggered based on deviations from a pre-specified level of deficits accumulation, the alternative ECM rule is anchored more explicitly on a targeted debt path, i.e., the correction mechanism is based directly on deviations from a "norm" debt path objective.

[2] See IMF Country Report (2007)

39.   **A strong legal basis and non-partisan fiscal surveillance are also vital for effective results.** It is critical to have a robust legal basis and a clear mechanism through which policymakers would suffer some loss if they do not abide by the rule. That is, the fiscal rule needs to enhance accountability as regards the commitment to fiscal discipline. Both the alternative ECM and the Swiss debt brake proposals would also greatly benefit from non-partisan fiscal surveillance mechanisms, e.g., fiscal agencies/committees, (i) to monitor developments in real time and provide an authoritative assessments of whether the government is sticking to the rule; (ii) provide unbiased forecasts and estimates of potential output growth and level; and (iii) have a central role in changes to the debt norm. In the specific case of the expenditure framework, there would be additional merit for an independent agency to establish the existence of exceptional circumstances. Indeed, as discussed above, a strict expenditure rule could hinder the appropriate response to unforeseen events (e.g., geopolitical, natural disasters), and thus escape clauses may be unavoidable. However, in order to protect against eroding the credibility of the rule, it is important that loopholes are not excessively prevalent. Instead, strong fiscal surveillance mechanisms should be devised to support implementation in the spirit of the new rule.

F. Conclusion

40.   **A revised rules-based approach to fiscal policy in Israel is under consideration**. The objective of anchoring a new rule on a decline in the public debt to 60 percent of GDP by 2015 features in the policy debate. Also, there is agreement that achieving this goal would require maintaining a broadly balanced central government budget, equivalent to a general government deficit of about 1 percent of GDP. However, there is less agreement on what type of rule would best assure the attainment of this objective. This paper aims to contribute to the debate, by proposing two rules that are based on a debt-brake concept: a variant on the Swiss debt-brake framework and an alternative error-correction-mechanism rule (ECM) built on an expenditure growth ceiling and public debt target.

41.   **Both rules exhibit a lower pro-cyclical bent than a constant deficit rule, but the ECM rule is more transparent and better fits with Israel's current fiscal framework.** While the Swiss-type debt-brake rule fulfills many criteria of a good framework—coherent with its final goal and mindful of fiscal stabilization—its implementation may be complicated by the explicit cyclical-adjustment mechanism. Moreover, the alternative ECM is arguably more transparent, easier to understand, and consistent with the present framework in Israel. In any event, enhanced transparency and governance, including effective enforcement and proper response to unforeseen disturbances, will be key for successful implementation of the new rule. This will require strengthened fiscal surveillance mechanisms.

APPENDIX—Algebra for the alternative ECM rule

Formally, the multi-year ECM could be defined as follows. Taking a given year $x+1$ as the starting point of a planning period of s years, the government should set (at the end of period x) nominal expenditure ceilings for each year between $x+1$ and $x+s$.[3] These ceilings should be consistent with a certain debt objective for the period. If actual debt in year x is below the normative path $\{d^*_\tau\}^T_{\tau=t_0}$, that is if $d_x \leq d^*_x$, but above the long-run goal $\tilde{d}$, then the government should preserve the margin with respect to the norm and aim at reducing debt at the same pace as the norm. If actual debt is above the norm ($d_x > d^*_x$), then expenditure ceilings should ensure a faster reduction in the debt ratio over the coming s years ($\Delta_{x+1,x+s}d^{**}$) but not entail an over correction: $\left|\Delta_{x+1,x+s}d^*_t\right| < \left|\Delta_{x+1,x+s}d^{**}\right| \leq \left|d^*_{x+s}-d_x\right|$.

One specific functional form for the required debt reduction over the period $[x+1, x+s]$ could be written as:

$$\Delta_{x+1,x+s}d^{**} = \begin{cases} \Delta_{x+1,x+s}d^* - \lambda_x\left(d_x - d^*_x\right), \text{if } d_x > d^*_x \text{ and } d^*_{x+1} < d^*_x, \text{or if } d^*_{x+1} = d^*_x = \tilde{d} \\ \Delta_{x+1,x+s}d^*, \text{if } d_x \leq d^*_x \text{ and } d^*_{x+1} < d^*_x \end{cases},$$

with $\lambda_x = \lambda_o + \lambda\left(d_x - d^*_x\right)$ and $0 < \lambda_x < 1$. The adjustment speed λ_x is set to increase along with the extent of the actual deviation from the norm, but can never exceed 1 (full correction in a single period). This ensures an accelerated convergence to the normative path $\{d^*_\tau\}^T_{\tau=t_0}$ when the deviation is large. The constraint on the adjustment speed guarantees that the required fiscal effort does not lead to an overadjustment. Considering normal business cycles, this mechanism introduces a downward drift in the debt ratio as long as debt remains above the long run goal $\tilde{d}$. The symmetry in the error correction mechanism can be restored when the long run debt objective is met, providing more leeway for expenditure growth when debt is below $\tilde{d}$.

The expenditure ceilings can be defined in nominal terms: $\overline{G}_{x+1},...,\overline{G}_{x+s}$ such that $\overline{G}_{x+1} = \left[\tau_{x+1} - b^*_{x+1,x+s}\right]E_xY_{x+1},...,\overline{G}_{x+s} = \left[\tau_{x+s} - b^*_{x+1,x+s}\right]E_xY_{x+s}$. E_x is the expectations operator

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[3] Parameter s (the length of the planning horizon) reflects the authorities' choice on the trade-off between flexibility in the response to unforeseen events and the timely realization of the debt objective. A reasonable benchmark could be the length of a normal legislature. It could also be shorter given the potentially large forecast errors at longer horizons. For instance, $s = 3$ in the Swedish case.

conditional on information available at the end of year $t-1$, $b^*_{x+1,x+s}$ is an annual budget-balance that needs to be achieved over the planning horizon in order to deliver the desired debt reduction $\Delta_{x+1,x+s}d^{**}$. It is given by $b^*_{x+1,x+s} = \left[\dfrac{(1+g)^{-(s+1)}-1}{\sum\limits_{j=0}^{s}(1+g)^{-(s-j)}} \right] d_x - \Delta_{x+1,x+s}d^{**}$, where g is the predicted growth rate of nominal GDP. Alternative formulations of the expenditure rule include a cap on nominal expenditure growth consistent with $\overline{G}_{x+1},...,\overline{G}_{x+s}$.

In normal circumstances, expenditure ceilings are set for *s* years, to preserve automatic stabilizers on the revenue side. However, expenditure rules require a certain flexibility (see above). First, excessive deviations from the debt norm should be avoided (e.g. because of tax cuts, stock-flow adjustments, or large forecast errors in average interest rate and GDP growth).[4]. Hence, if in any year $k \in [x+1; x+3]$, $d_k > d^*_k + m$, where $m > 0$ is the maximum deviation allowed from the debt norm, a new set of tighter expenditure ceilings covering years $k+1$ to $k+3$ should be defined. Second, revisions of expenditure ceilings (and possibly the debt norm itself) should be allowed to accommodate exceptional circumstances (e.g. defense and security spending, natural disaster,…).

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[4] Again, setting a threshold for acceptable deviations is a matter for discussion, but 5 to 10 percent of GDP seems an appropriate range if one wants to avoid significant contractions in bad times.

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