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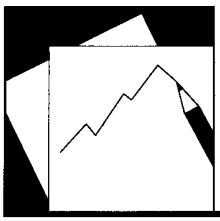

IMF Working Paper

A New Fiscal Rule: Should Israel "Go Swiss?"

Xavier Debrun, Natan Epstein, and Steven Symansky

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A New Fiscal Rule: Should Israel "Go Swiss?"

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Authorized for distribution by Jörg Decressin

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Abstract

We propose a fiscal rule that fulfills a specific debt reduction objective while maintaining significant fiscal flexibility—two overarching concerns in Israel. Not unlike the Swiss "debt brake," the rule incorporates an error-correction mechanism (ECM) through which departure from the debt objective affects binding medium-run expenditure ceilings. Two variants of our ECM rule are shown to be superior to a comparable deficit rule in terms of attaining the debt objective and allowing for fiscal stabilization while supporting medium-term expenditure planning. Given its relative sophistication, a proper implementation of the ECM rule requires supportive fiscal institutions, including independent input and assessment.

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Keywords: Fiscal rules, public debt, fiscal stabilization.

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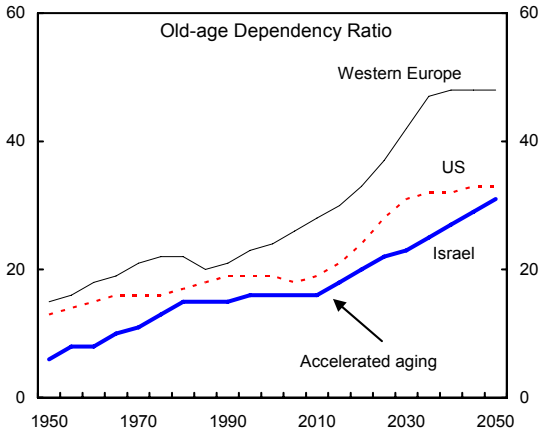
I. INTRODUCTION

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 four 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, which is currently debated among Israeli policy makers and would have to depend on tax policy, the paper stresses the need to anchor any new fiscal rule on the objective of lowering the public debt ratio.

International experience with fiscal policy rules has varied as well but generally points to important beneficial effects, particularly when supportive fiscal institutions operate effectively, and there is the political will for successful implementation. 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 policymakers' discretion. Furthermore, budget rules involving expenditure or debt ceilings seem to have had success in disciplining spending trends.

Israel would stand to benefit from adopting a new fiscal rule that is both responsive to temporary shocks (e.g., cyclical dynamics, geo-political) and provides for a sustainable policy anchor. In this paper, we propose a new fiscal rule that is anchored on a feasible objective of lowering Israel's 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 adverse 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 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



Source: United Nations Secretariat.

deviations from the ultimate fiscal anchor by means of a built-in error correction mechanism that caps the accumulation of public debt.

The paper is structured as follows: Section II assesses Israel's fiscal performance against its fiscal rules over the past two decades. Section III reviews the international experience with fiscal rules. Section IV introduces a proposed new rule for Israel as well as scenario analysis and simulations to illustrate the rule's characteristics. Section V briefly discusses institutional considerations for effective implementation of the new rule. Section VI concludes.

II. Fiscal Rules in Israel—Historical Context

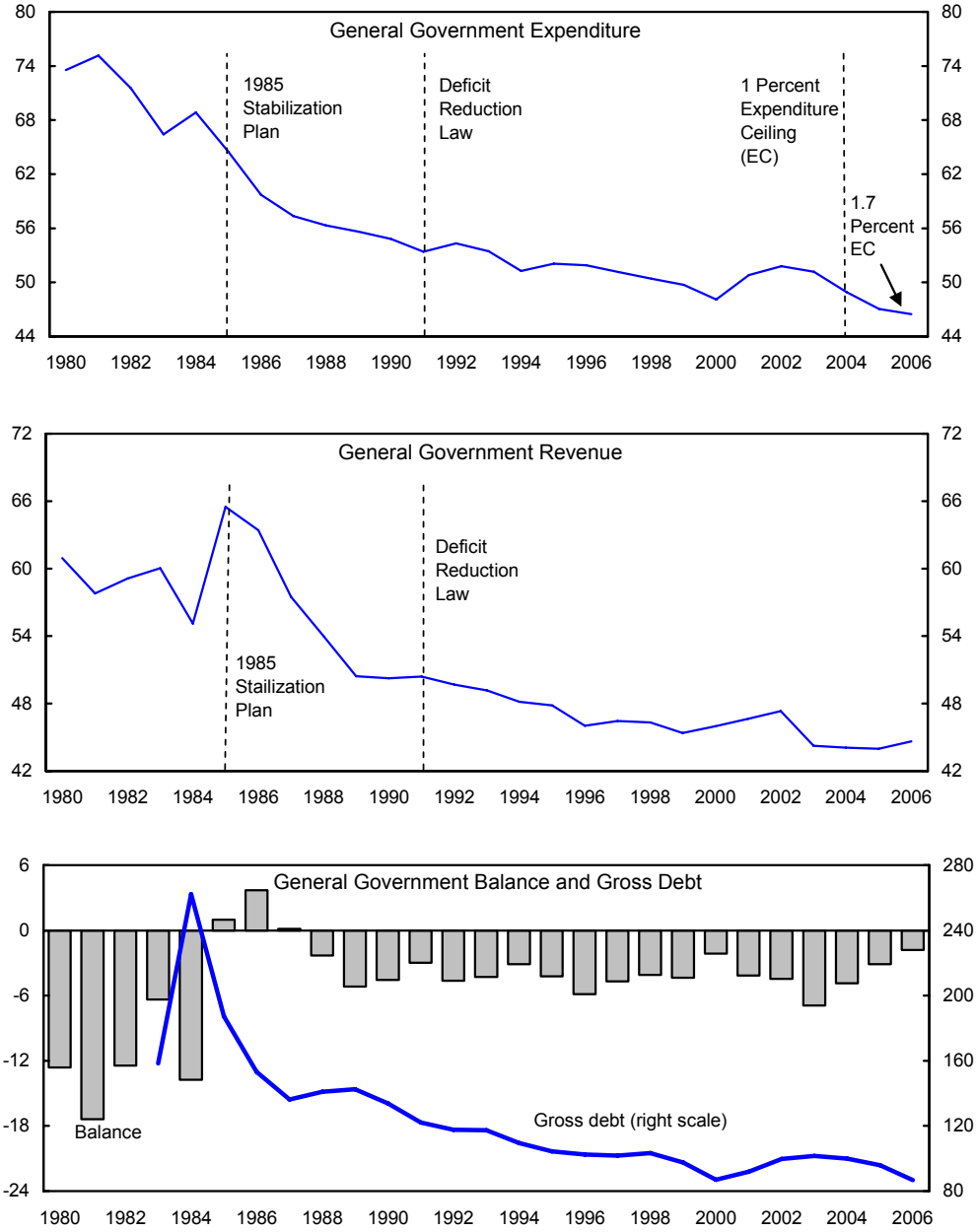
Fiscal discipline in Israel improved substantially after the stabilization program of 1985. Since the mid-1980s, public expenditure has been reduced by more than 16 percent of GDP. This has enabled the general government deficit to be reduced from about 14 percent of GDP in 1984 to about 1 percent today. 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 (as evidenced during the 2001–02 downturn, see 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).

Israel's experience with fiscal rules dates back to 1991.[1] 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, 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. 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.[2]

[1] The recognition that large increases in public spending—associated with the substantial wave of immigration from the former Soviet Union during the early 1990s—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). See also Brender (2008) for review of Israel's experience with fiscal rules over the past two decades.

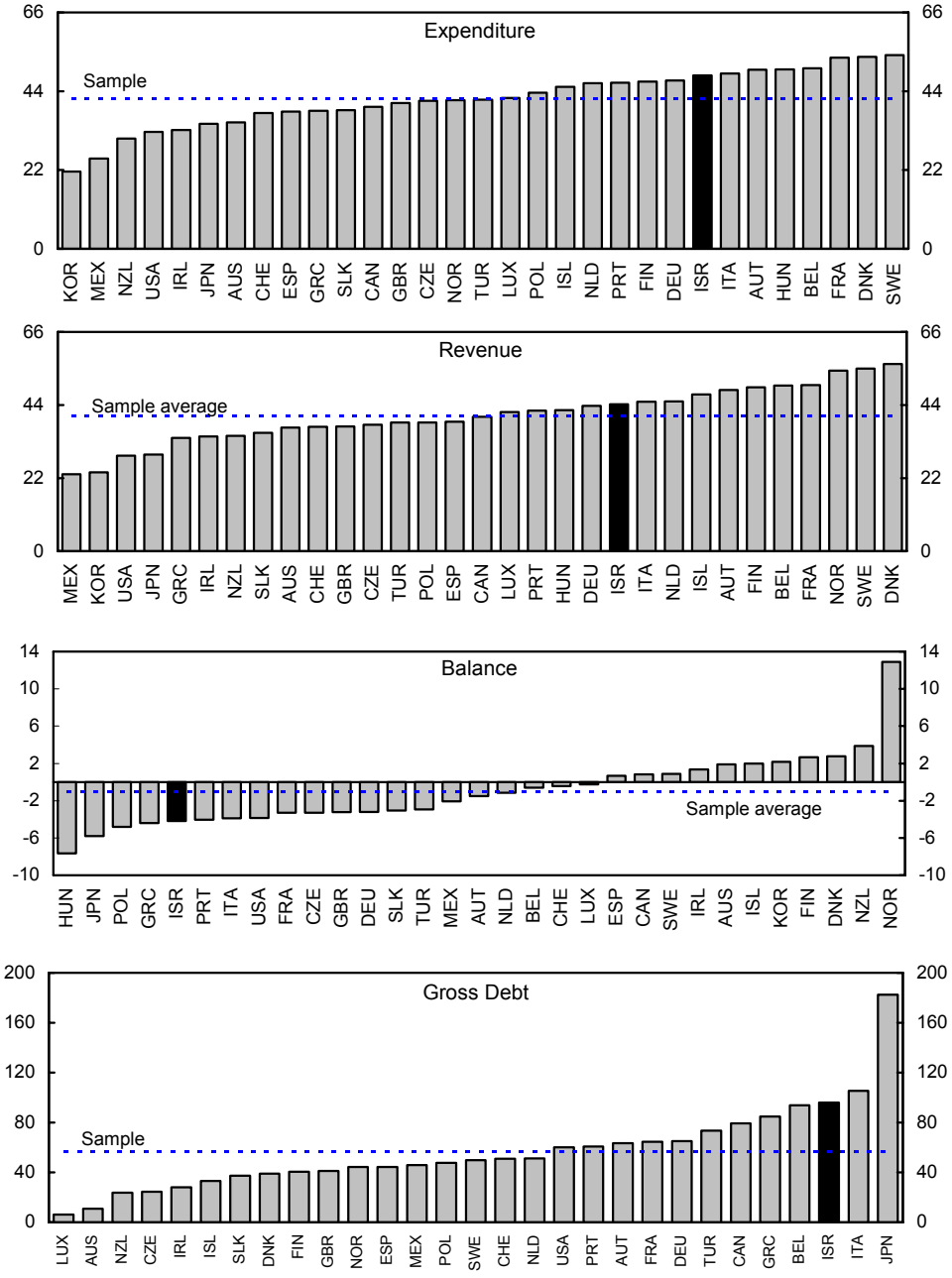
[2] See Elekdag, Epstein, and Moreno-Badia (2006).

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*.

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.

III. Recent International Experience

From a macroeconomic perspective, a *fiscal rule* is generally understood as "a permanent constraint on fiscal policy, typically defined in terms of an indicator of overall fiscal performance" (Kopits and Symansky, 1998).[3] While fiscal rules enshrined in laws or constitutions have a long history, they were long confined to subnational entities in federal countries (e.g., the United States, Switzerland) or to exceptional circumstances (e.g., postwar stabilizations). Since the 1990s, mounting public debts and clear evidence of destabilizing (procyclical) fiscal policies have prompted a growing number of countries to subject the central government itself to explicit limits on fiscal discretion. This section briefly summarizes recent international experience with fiscal rules.

A. The Growing Appetite for Fiscal Rules

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 a firm commitment to fiscal discipline. To the extent that fiscal rules are perceived by capital market participants as cementing such commitment, lower interest rate premia tend to follow the adoption of these rules (Hallerberg and Wolff, 2006). The appetite for fiscal rules has

[3] They further define a "good" rule as being simple, transparent, coherent with the final goal, but mindful of other goals of public policies.

been particularly pronounced in the European Union, where most member states complemented the common rules set out in the Maastricht Treaty with national arrangements (Debrun, et al, 2008).

Fiscal rules 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.

Each of these rules has pros and cons, and there is a 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 strict deficit and debt rules because they are more likely to bind in bad times, 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. They also encourage medium-term planning by ministries. However, they can allow drift in the underlying deficit and debt. Second, rules are often blamed for deteriorating the quality of fiscal policy because they are generally silent on the composition of the required fiscal adjustment. This clearly depends on the extent to which a "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.

More sophisticated rules have been proposed to alleviate those concerns, but they introduce new complexities that can be hard to manage. 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, 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 and cyclicality issues are largely tackled through binding expenditure ceilings consistent with a budget-balance objective (Table 2).

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).

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 (needed for the golden rule) 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 impeding democratic accountability mechanisms.

There is growing recognition among researchers and policymakers that an effective implementation of fiscal rules requires supporting institutional arrangements, including a legal basis, an enforcement procedure (or at least mechanisms promoting self-compliance), and independent monitoring. Indeed, regardless of the type of "sanction" (pecuniary, reputational, etc.) for violating the rule, deviations from binding fiscal targets must entail some subjective cost ("disutility") for the decision maker (see Beetsma and Debrun, 2007, for a formal analysis of enforcement issues). A strong legal basis is generally thought to foster compliance because the violation of statutory or even constitutional obligations carry a greater reputational loss (and possibly even explicit punishments) than if the obligation arises from a public statement or a coalition agreement.

Likewise, independent monitoring helps effective enforcement and increases reputational effects through the public debate. It also reduces the risk of manipulation and creative accounting. In this regard, nonpartisan 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 by relying on a panel of independent experts that assesses the cyclical position of the economy and provides revenue projections. In Belgium, a nonpartisan 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.

B. Flows, Stocks, and the Rule's Ultimate Objective

Although the ultimate objective of any fiscal rule is to correct a bias associated with purely discretionary policies—typically a penchant for excessive deficits and procyclical policies—existing frameworks often fail to provide a precise characterization of that objective. One potential risk is that, over time, the operational target at the center of a rule may become inconsistent with the ultimate objective. For example, a fixed primary surplus target set to reduce the public debt to GDP ratio will ultimately lead to an accelerated accumulation of government assets, a situation that is neither economically desirable nor politically sustainable. Likewise, a fixed deficit ceiling could become inconsistent with desirable public debt outcomes, if potential nominal growth turns out to be different from what was anticipated when the ceiling was set.[4] The necessity to revise the target at some point in the future is potentially harmful for the credibility of the rule, which instead commands stability and predictability.

The examples above underscore one practical issue in the design of fiscal rules, namely the choice of fiscal indicator to which the constraint applies. Budgetary flows are generally preferred because they are more directly under the control of policymakers than stocks of assets and liabilities, which are subject to shocks on interest rates, exchange rates, and asset prices. However, the ultimate objective of fiscal sustainability concerns long-run trends in stocks, hence the risk of inconsistencies.

[4] For instance, under the assumption of 5 percent nominal growth, a 3 percent deficit ceiling ensures that public debt asymptotically converges to a number below 63 percent of GDP. If permanent GDP growth is actually 4 percent per annum, the same deficit could only guarantee that the public debt will stabilize below 78 percent of GDP.

One natural solution to stock-flows inconsistencies is to set up an explicit feedback (or error-correction) mechanism by which the rule's operational target (flows) is adjusted to reflect developments in stocks. The Swiss "debt brake" rule exhibits that feature, and has consequently attracted a lot of attention.

The rule stipulates a balanced central government budget over the cycle[5] by specifying 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.[6] Thus, the budget balance for the year $t+1$ can be expressed as:

$$BAL_{t+1} = E_t\left(R_{t+1}^{cyl}\right) - G_{t+1}^{C} + A_{t+1}$$

where $E_t\left(R_{t+1}^{cyl}\right)$ denotes the expectations at time t of the cyclically adjusted revenue at time $t+1$; G_{t+1}^{C} 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. The Balance of the fictional account is determined as the accumulated difference between revenue and expenditure deviations minus discrete adjustments A_t any prior year (Danninger, 2002).

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.[7] The rule is seen as instrumental in achieving fiscal

[5] 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).

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

[7] 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).

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. However, the rule has not really been tested since the implementation of the debt-brake rule was initiated around a cyclical trough, thus a subsequent recovery helped revenue overperform and the fictional account has yet to accumulate any negative balance.[8]

IV. A New Fiscal Rule for Israel—A Debt Brake Approach

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. The first is a variant of the Swiss approach, which sets a ceiling on the deficit over the cycle and imposes a correction of past deviations from the ceiling. The second rule relies on binding expenditure ceilings tied to an explicit debt path objective. While such a rule does not require estimates of the business cycle to be consistent with a countercyclical fiscal stance, regular adjustments in expenditure ceilings—governed by a formula-based feedback mechanism—are needed to prevent undesirable drifts in the debt ratio. Both of these rules share error-correction mechanisms, preserving consistency with a debt stabilization objective, avoid excessive procyclicality, and encourage medium-term expenditure planning.

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 was achieved in 2007 and 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 largely under the control of the central government.[9] However, it will also be important that, relative to the existing rules in Israel, the coverage of the central government is wider, particularly if the new rule relies on an expenditure growth ceiling. For example, a key item that is not currently included in the budget growth ceiling is government spending through the National Insurance Institute (NII), which is equivalent to about 5 percent of GDP. Since the operating surplus of the NII is transferred to the government, the government can direct the NII to pay more to the public, and this will not be reflected in the budget as higher expenditure, but

[8] In fact, the fictional account generated a total credit of around 1.3 percent of GDP between 2004 and 2006, which was largely due to under-execution of the expenditure ceilings.

[9] 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.

rather as lower revenue. A similar loophole exists with respect to the collection and outlays of health related taxes; these outlays should also be included in the ceiling. On the other hand, the authorities may wish to exclude from the new rule expenditures that are fully foreign financed.[10]

A. A Swiss-Like Error Correction Mechanism

In line with the Swiss Debt-Brake approach, as described below, 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. The planned deficit in the following year will be set according to two criteria: (i) the cyclical position and (ii) the balance of the fictional account (i.e., the sum of past deviations from the target) if the latter shows an excessive accumulation of liabilities. 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 target will be tightened (loosened) if the debt in the fictional account increases (decreases).

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 a linear and a quadratic term, but it is only effective once the accumulated liabilities in the fictional account exceed a certain amount (e.g., 2 percent of GDP) and realization of the planned debt reduction is therefore considered at risk. 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 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):

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

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

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

[10] In Israel's case, bilateral foreign transfers are predominantly aimed for imports of military items. Fluctuations in this spending category are large and tend to rise at times of military conflicts—hence, their exclusion would help mitigate the need to use related escape clauses. Moreover, as these transfers are fully directed to imports, they do not affect domestic demand.

balance);[11] $ygap_{t+1}$ is the output gap projected in period $t+1$; α represents a cyclical factor; FA_t denotes the accumulated asset position 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.

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).[12] Under these assumptions, the rule can be written as:

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

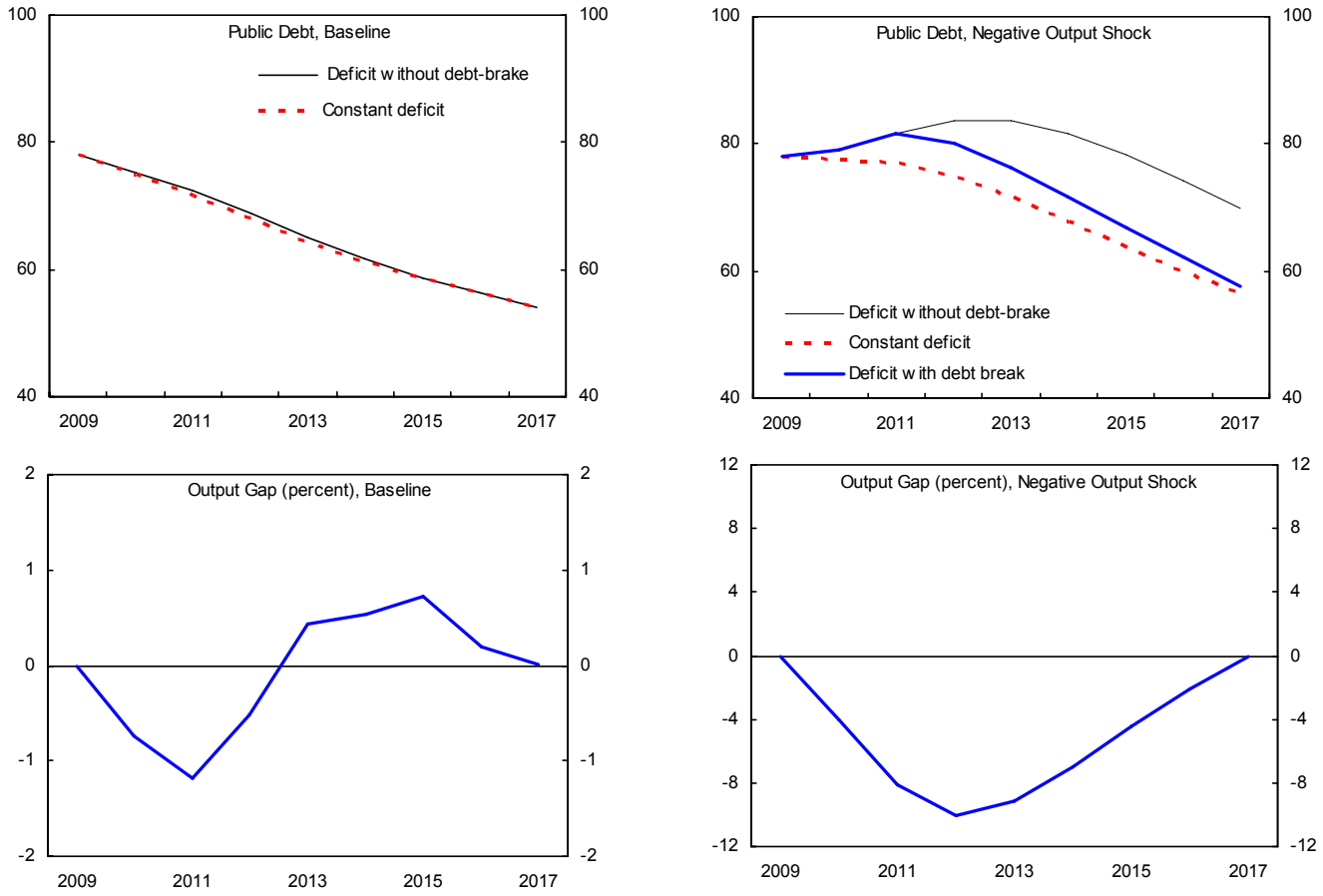
Figure 3 juxtaposes the baseline scenario with a negative output shock scenario.[13] Under the baseline case, real GDP growth is assumed to hover around potential between 2010 and 2017—an illustrative eight-year cycle. Since the economy is operating close to potential, accumulated liabilities in the fictional account never reach the threshold 2 percent of GDP, and thus the error correction 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.

[11] 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.

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

[13] 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, 2009–17 1/
(Percent of GDP, unless otherwise indicated)



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

If the economy is hit by a large negative shock (also shown in Figure 3), the error correction 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 of potential GDP 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 shock the debt ratio would more quickly revert to the baseline path.

B. An Expenditure Rule with a Debt Feedback

Trade-offs

The Swiss-like ECM rule described above fulfills many criteria of a good rule, but the explicit reference to the business cycle is a potential drawback.[14] The arrangement is arguably transparent, coherent with the final goal (putting a lid on the public debt), and mindful of fiscal stabilization, but 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 often harder to detect, and Israel has been subject to large noncyclical shocks (e.g., military conflicts) that must be taken into account in setting rules. 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).

Alternatives to the Swiss-like 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 multiyear (say three years) ceiling on nominal expenditure growth could effectively contain budget deficits, while preserving automatic stabilizers without explicit reference to the output gap.

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 correspond to a well-specified 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.

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 times, they

[14] Another conceptual issue is that the debt brake leads to a debt-to-GDP ratio that is asymptotically zero in the Swiss case of balanced budget, and less than 20 percent of GDP under the assumption of a 1 percent deficit and 6 percent nominal growth. This is the reason why, in the version proposed in the previous section, the rule would have to be revisited once public debt has been reduced to 60 percent of GDP.

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

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

- 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);
- the rule should avoid explicit reference to a measure of the business cycle (simplicity);
- the rule should be easy to communicate to the public (transparency);
- 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);
- the rule should allow for lower taxes in the case of more restrained expenditure outcomes;
- the rule should be resilient in the face of unforeseen events unrelated to business cycle developments.

The ECM at the core of the debt brake approach explicitly anchors an expenditure rule in a long-run debt objective. Such a 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. While there are three components to this rule, the debt (and deficit) represents the *anchor* used in determining expenditure paths. Thus, the three-year expenditure ceilings become the *implementation* component of the rule and the focus during budget policy discussions. 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 in Israel, reducing the risk of sending ambiguous signals to the public regarding the commitment to fiscal discipline.

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.

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 three years—following a formula that specifies the extent to which past deviations from the debt norm are to be corrected over the period.[15] 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 nonscheduled revisions, and including both corrections tends to add an unnecessary degree of complexity.

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), biased revenue forecasts, 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 Swiss-like ECM. 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.

The credibility that comes with an "anchored" expenditure rule may erode some of 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 could not discourage procyclical expansions in cases where persistent high growth drives actual debt ratio well below the norm. However, in both of these cases, the policy response may be appropriate even if it is viewed as procyclical. The second implication is that the method adopted to prepare the revenue assumptions underlying the expenditure growth ceilings is key 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

[15] 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 of GDP.

(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 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.[16]

Implementation

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 (see the Appendix).

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 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 nonpartisan or, at a minimum, subject to strict external scrutiny by nonpartisan bodies.

[16] 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 framework, which has some drawbacks, as already discussed.

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 timeframe 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 quickly lead to a potentially strong procyclical response. Furthermore, it can complicate medium-term budget planning by ministries. A multiyear approach thus seems more appropriate to reduce the risk of procyclicality, with nominal expenditure ceilings being defined for a number of years, which adds more certainty in budget development and medium-run planning. 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.[17] 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.

Assuming a three-year, fixed planning horizon, binding expenditure ceilings would be implemented 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 three years, an annual nominal growth ceiling is set for total government expenditure.[18] 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

[17] The rule would have to specify the precise events that could trigger an increase in expenditure above the ceiling and the process that would be followed to enact these changes.

[18] 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.

debt stock is affected by shocks unrelated to the deficit, such as large valuation effects or liquidation of assets 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 reset 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 three-year period.

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

- The three-year nominal expenditure ceilings are binding and met every single year so as to ensure a constant reduction in the debt ratio (see Appendix).[19] There is no possibility to revise those ceilings during the planning horizon.

- 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. However there can be an element of procyclicality when the expenditure ceilings are recalculated every third year.

C. Comparing the Proposed Rules: Hitting the Debt Target While Preserving Automatic Stabilization

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 paper, 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 Swiss-like ECM discussed above, and two variants of the debt-based ECM, one with a constant error-correction parameter (lambda) of 0.2, and one that is effectively nonlinear with a variable lambda that increases with positive deviations from the debt norm and decreases with negative deviations (see Appendix). 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).

[19] A detailed discussion of operational aspects of expenditure rules (real vs. nominal ceilings, comprehensiveness of coverage, contingency margins under the ceiling) is beyond the scope of this paper. See Ljungman (2008) for a recent survey.

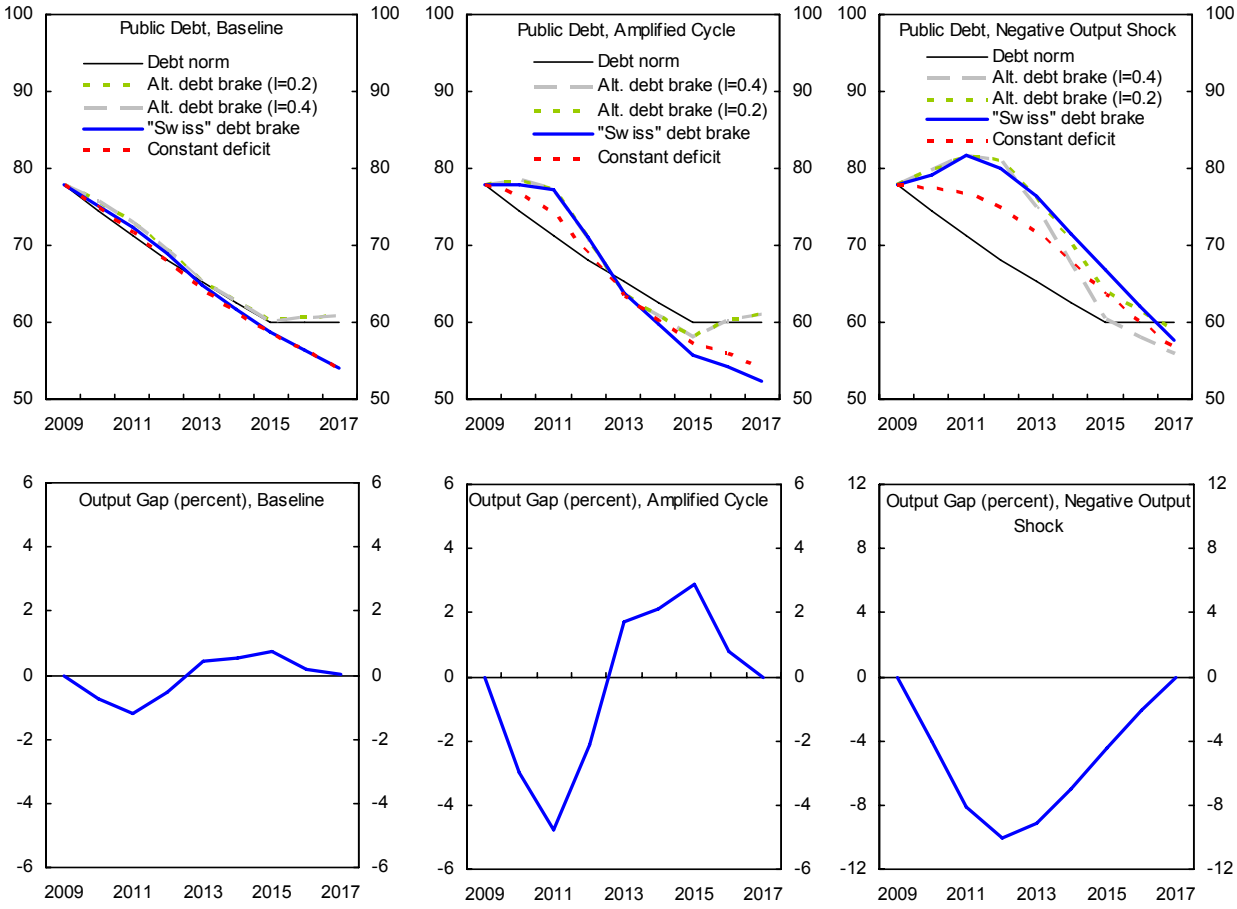
Table 3: Comparative Performance of Alternative Fiscal Rules for Israel, 2010–15

	Constant CG balance (GG deficit of 1 percent of GDP)	"Swiss" debt brake	Alternative ECM debt brake (lambda=0.2)	Alternative ECM debt brake (variable lambda)
		Baseline		
Root mean square deviation with respect to the norm path 1/	0.91	**0.90**	0.97	0.97
Mean error with respect to the norm path 1/	-0.51	**0.02**	0.73	0.72
Difference from 60 percent in 2015	-1.44	-1.33	0.13	**0.10**
Procyclicality (+ is procyclical; - is countercyclical)	1.43	0.25	**0.14**	0.48
		Amplified cycle		
Root mean square deviation with respect to the norm path 1/	**2.23**	3.75	3.38	3.39
Mean error with respect to the norm path 1/	**-0.13**	0.65	1.29	1.26
Difference from 60 percent in 2015	-2.67	-4.26	**-1.89**	-1.94
Procyclicality (+ is procyclical; - is countercyclical)	1.79	**-3.08**	-0.41	-0.41
		Negative output shock		
Root mean square deviation with respect to the norm path 1/	**5.09**	8.92	9.11	8.38
Mean error with respect to the norm path 1/	**4.51**	7.84	8.55	7.27
Difference from 60 percent in 2015	5.19	9.07	4.07	**0.34**
Procyclicality (+ is procyclical; - is countercyclical)	1.51	0.04	-2.89	**-4.09**

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

1/ Percent of GDP (2010–15).

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.

To measure the procyclical bent inherent in discipline-enhancing fiscal rules, the table reports the cumulative pro-cyclical impulses over the period 2010–15 namely, *improvements* in the primary balance during bad times,[20] and *deteriorations* of the primary balance in good times (in percent of GDP). 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.

Several key conclusions emerge from the "beauty contest."

- Not surprisingly, our two debt-based ECM rules 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 often countercyclical.

- 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 ECM rules are circumstantial. They arise when the rule requires a correction of past deviations that is at the end of a three-year period (alternative ECM) or when the fictional account needs to be replenished (Swiss ECM).

- The expenditure rule entails a more precise targeting of the 2015 debt objective,[21] while allowing for greater flexibility in response to shocks (as indicated by the higher RMSD). The Swiss ECM, by contrast, produces the largest negative deviation when cyclical fluctuations are more pronounced because cyclical revenues are fully saved.

V. INSTITUTIONAL CONSIDERATIONS

Enhanced transparency and governance are key for successful implementation of fiscal rules. To be credible, rules need to be supported by enforcement and monitoring mechanisms. This would include stronger budget preparation procedures, stricter transparency requirements, improved medium-term fiscal planning, and explicit analyses of long-run challenges.[22] A strong legal basis and nonpartisan fiscal surveillance are also vital for effective results, especially if escape clauses are introduced. Moreover, it is critical to have a robust legal basis and a clear mechanism through which policymakers would suffer some loss if they do not

[20] The results presented here are only suggestive as they depend on specific assumptions about deterministic business cycles. A more robust analysis should be based on stochastic simulations reflecting the joint conditional probability distribution of shocks affecting the determinants of debt dynamics (budget balance, GDP growth, interest rates and exchange rates, as in Celasun, Debrun, and Ostry, 2006). Such analysis is beyond the scope of this paper.

[21] 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.

[22] See IMF Country Report (2007).

abide by the rule. That is, the fiscal rule needs to enhance accountability as regards the commitment to fiscal discipline.

Both the debt-based and Swiss-like ECM proposals would also greatly benefit from nonpartisan 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.

VI. Conclusion

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 a rule based on a debt-brake concept. The idea behind our proposal is to ensure the credibility of a debt reduction objective while allowing for fiscal stabilization and supporting medium-run expenditure planning. This is achieved through explicit error-correction mechanisms preventing temporary deviations from fiscal targets to have permanent effects on debt. We propose two alternative ECMs: a variant on the Swiss approach (based on cumulative deviations from a cyclically adjusted deficit target), and an expenditure growth ceiling with a debt-feedback component. However, we do not advocate for a specific expenditure growth ceiling, which would have to depend on governments' tax policy objectives, and instead focus on the need to anchor any new rule on the goal of achieving a lower public debt ratio.

Both rules exhibit a lower pro-cyclical bent than a comparable constant deficit rule. While the Swiss-like-ECM 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 debt-based ECM rule is more transparent and arguably more in line 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 Debt-Feedback Expenditure Rule

This Appendix provides some illustrative algebra describing a multiyear expenditure rule with a debt-based ECM. 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 $x+s$.[23] These ceilings should be consistent with a certain debt objective for the period. If actual debt in year *x* is below the normative path $\left\{ d_\tau^* \right\}_{\tau=t_0}^{T}$, that is if $d_x \le d_x^*$, but above the long-run goal $\widetilde{d}$, 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 along a transitional path $\left\{ d_\tau^{**} \right\}_{\tau=x}^{x+s}$, but not entail an over correction: $\left|\Delta_{x+1,x+s} d_t^*\right| < \left|\Delta_{x+1,x+s} d^{**}\right| \le \left|d_{x+s}^* - d_x\right|$.

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

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

with $\lambda_x = \lambda_o + \lambda\left(d_x - d_x^*\right)$ and $0 < \lambda_x < 1$. In line with the quadratic correction mechanism of the Swiss variant, 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 $\left\{ d_\tau^* \right\}_{\tau=t_0}^{T}$ when the deviation is large. The constraint on the adjustment speed guarantees that the required fiscal effort does not lead to an overadjustment. Simulations in the text consider two cases: $(\lambda_0, \lambda) = (0.2, 0)$ and $(\lambda_0, \lambda) = (0.2, 2.5)$. Considering normal business cycles, this mechanism introduces a downward drift in the debt ratio as long as debt remains above the long run goal $\widetilde{d}$. 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 $\widetilde{d}$.

The expenditure ceilings can be defined in nominal terms: $\overline{G}_{x+1}, ..., \overline{G}_{x+s}$ such that $\overline{G}_{x+1} = \left[\tau_{x+1} - b_{x+1,x+s}^*\right] E_x Y_{x+1}, ..., \overline{G}_{x+s} = \left[\tau_{x+s} - b_{x+1,x+s}^*\right] E_x Y_{x+s}$. E_x is the expectations operator conditional on information available at the end of year $t-1$, $b_{x+1,x+s}^*$ is an annual budget-

[23] 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.

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 $b^*_{x+1,x+s} = \left[\frac{(1+g)^{-(s+1)}-1}{\sum_{j=0}^{s}(1+g)^{-(s-j)}}\right]d_x - \Delta_{x+1,x+s}d^{**}$, where *g* is a constant 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).[24]. 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,…).

[24] 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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