

## THE DETERMINANTS OF ISRAEL'S COST OF CAPITAL: GLOBALIZATION, REFORMS AND POLITICS

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We examine fluctuations in the risk premium on Israeli sovereign debt traded in the US between 1996 and 2000. We find that, during this period Israel's risk premium was affected predominantly by global events, most notably the crises in Asia and Russia. Domestic and regional events (e.g., the peace process, political changes, terrorist attacks, and economic reforms) had a miniscule immediate impact on the risk premium. In the year 2000, by contrast, Israeli bond prices were more affected by Israel-specific events, perhaps as a result of dramatic events in that year, or due to the absence of major global emerging-market crises. We also examine abnormal stock returns of Israeli companies traded in the US and find that, in contrast with Israel's sovereign debt, some domestic political events appear to have had an impact on their cost of capital even prior to 2000. Much like Israel's sovereign bonds, Israeli stock prices were far more sensitive to domestic events in 2000 than in earlier years.

### 1. INTRODUCTION

Reforms and institutional changes can make a country attractive to foreign investors, so that there is capital inflows and constraints on investment imposed by domestic savings are alleviated. In addition, in the current era of globalization, a country's cost of foreign capital may be affected by events taking place in other, occasionally even distant economies. In this paper we examine these issues by investigating the impact of domestic and foreign events on Israel's cost of foreign capital. In the first part of the paper we examine weekly data on Israeli sovereign debt traded in the US in the late 1990s and in 2000. In the second part of the paper we use daily stock market data on Israeli technology companies traded on US stock markets.

The results we obtain are different for 1996–99 than for 2000. Until 2000, the risk premium on Israel's sovereign debt was, for the most part, determined jointly with the risk premium on sovereign debt of other emerging markets. In fact, one could predict short-term movements in Israel's risk premium fairly well by observing movements in the 'spread' (risk premium) of Turkey, Greece, Brazil and many other (not quite fully developed) economies. By contrast, domestic and regional events rarely made an impact on the risk that foreign investors associated

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with Israel's debt during that period. Even events, which at the time were considered important for the on-going peace process (e.g., the 1998 Wye Accord) or economic reforms and liberalization (e.g., the privatization of Bank Hapoalim), failed to impress foreign investors during 1996–99 (or, at the very least, were fully anticipated).

The picture that emerges from examining the year 2000 is quite different, with sovereign bond prices fluctuating much more in response to Israel-specific events, although even during 2000 such fluctuations were smaller than was the case with earlier responses. The difference between 2000 and the earlier years could be due to the dramatic events of that year, most notably those relating to the peace process and its collapse, the withdrawal from Lebanon, and others. These events were extensively covered by foreign media and may have made investors change the way they evaluated Israel's sovereign debt. Another possible explanation is that the absence of major crises in emerging markets during 2000 may have raised the relative importance of country-specific factors. In other words, our findings are consistent with the view that co-movement across different markets is higher in periods of crisis (e.g., Forbes and Rigobon, 1999).<sup>1</sup>

One implication of the results is that the government of Israel as well as Israeli firms are exposed to foreign shocks to their cost of capital over which they have no control, and should probably hedge against these risks. Another implication is that most domestic reforms and political changes (at least prior to 2000) seem to have been hard to evaluate, or not credible enough to elicit an immediate market response (i.e., were not considered 'news' or were mostly anticipated). This is in line with Mauro, Sussman, and Yafeh (2002), who find that the impact of global events on the bond prices of emerging markets in the 1990s was far greater than that of domestic events. For example, the Russian default crisis of summer 1998 affected the risk premium on sovereign debt of many emerging markets far more than any domestic event, in line with our findings for the Israeli risk premium. Domestic events may have a cumulative impact on a country's cost of capital once they are incorporated into a well-understood 'summary statistic,' such as Moody's or S&P's credit rating. Nevertheless, our findings suggest that a country is unlikely to be significantly rewarded in the short run for adopting the 'right' policies.

In addition to analyzing bond prices, we also examine stock price data on Israeli companies traded in the US, mostly high-tech firms listed on NASDAQ. Note that the relative size of the Israeli equity market traded abroad is quite large and, at times, its market value exceeded that of companies listed only locally. Moreover, as opposed to other emerging markets, American and other foreign institutions invest in Israeli equity almost exclusively via US listings. The picture that emerges from these data is somewhat different from that observed in the sovereign bond data even before 2000. As is the case with sovereign debt, most domestic events, including economic reforms that were often considered very important by the local media, did not have any impact on the stock returns of Israeli companies traded in the US. Furthermore, stock prices of Israeli companies traded in the US experienced larger fluctuations during periods of volatility in foreign equity markets (such as the NASDAQ) than they did as a result of domestic political events. However, there have been several domestic and regional *political* events that

<sup>1</sup> Recent figures published by the Bank of Israel suggest another possible explanation: starting in 2000, the fraction of government bonds traded abroad and held by Israeli citizens increased substantially. This may have also contributed to the increased impact of domestic events on bond yields and spreads.

did not affect Israel's sovereign debt, but elicited a stock market response. For example, during 2000, stock prices of Israeli high-tech companies fluctuated dramatically, even beyond the NASDAQ index. In some cases, this appears to have been in response to domestic Israeli events, while in others Israeli stocks displayed high volatility for other reasons, possibly related to their overwhelming concentration in the volatile software and IT sectors.

The rest of the paper is organized as follows: In Section 2 we provide some information on the sovereign debt data used for this study, and present our empirical approach. Section 3 presents our findings on the determinants of sovereign debt 'spreads.' In Section 4 we analyze data on stock returns of Israeli companies traded in the US. Section 5 contains further discussion of the results, especially the differences between the results on bonds and stocks, and the results for 1996–99 and 2000, and offers some conclusions.

## 2. SOVEREIGN DEBT: DATA AND EMPIRICAL APPROACH

Because of data constraints, much of the analysis is focused on 1996–99, with some experiments carried out for 2000 as well. At present, it is hard to tell whether or not our findings for this period can be generalized to other time periods. However, the years we investigate are interesting, and include many major economic and political events that could have affected Israel's risk premium. These include terrorist attacks, advances (and declines) in the peace process, important political upheavals, and watershed events in the area of economic liberalization.<sup>2</sup> However, as will become clear later on in our analysis, prior to 2000, virtually no major domestic events had any impact on the cost of Israel's foreign debt.

Our sovereign bond data set includes weekly market yields on a 1995 Israeli sovereign bond with maturity of ten years, covering the period between 1996 and 1999.<sup>3</sup> We have similar information for a large number of emerging markets, as well as an emerging market bond index provided by J.P. Morgan.<sup>4</sup> In the analysis that follows, the risk premium is defined as the 'spread,' that is, the difference between a country's bond yield and the yield on similar US Treasury Notes and Bonds. All bonds in our data set are payable in US dollars and traded in New York, so that there is no exchange rate risk involved. For 2000, we have data starting only in March, and including weekly market yields on an Israeli sovereign bond with maturity of ten years, issued on March 2000.<sup>5</sup>

We supplement the statistical information by examining front-page articles about Israel in the *New York Times*. These data are then used to evaluate the nature of events that affect the perception of Israel's country risk in the eyes of foreign investors.

<sup>2</sup> Although, with hindsight, many of the events in this period did not turn out to be of historical importance, they were considered dramatic at the time.

<sup>3</sup> Data are incomplete for May through December 1996.

<sup>4</sup> The index is based mostly on 'Brady Bonds;' see Mauro, Sussman, and Yafeh (2002).

<sup>5</sup> Because our objective is to evaluate the determinants of Israel's creditworthiness in the eyes of *foreign* investors, we focus on bonds traded in New York rather than on domestic, dollar denominated government bonds that are typically acquired by domestic investors. Similarly, as noted above, our analysis of stock price responses to events focuses on Israeli companies traded in the US rather than on stocks traded on the Tel Aviv Stock Exchange or on other proxies for the impact of events on domestic investors (e.g., the exchange rate).

## Empirical approach

A number of (imperfect) methods may be used to identify the dates in which a dramatic change in a time series takes place. The methods we use here reflect two approaches. The first approach (reflected in the search for ‘structural breaks’ and the listing of good and bad days, described below) is based on the identification of dates of sharp changes in the data series, followed by an attempt to find important events that occurred on those dates. The second approach has the opposite starting point, i.e., it is based on forming hypotheses *a priori* about the kind of events that should have an impact on the cost of capital, and then using the data to test the validity of these hypotheses.

### Searching for breaks

This method assumes no prior knowledge of potential break dates. Instead, it is based on using all the available data for repeated estimations of the following equation:

$$(1) \quad \log(\text{Risk Premium})_t = \beta_0 + \beta_1 \log(\text{Risk Premium})_{t-1} + \beta_2 \Delta \log(\text{Risk Premium})_{t-1} + \beta_3 \text{EVENT}_{long} + \beta_4 \text{EVENT}_{short},$$

where  $\text{EVENT}_{long}$  is a dummy variable that takes the value zero at all times prior to the proposed break and the value one from the time of the break onwards, and  $\text{EVENT}_{short}$  takes the value one at the time of the event, and zero at all other times. If an event had a long-term impact on yields then the ‘long’ dummy variable will differ zero (assuming the series is not unit root). A significant ‘short’ dummy implies that an event created only a short-term ‘blip’.<sup>6</sup>

This method of searching for breaks involves repeated estimation of Equation (1) while moving the break date and the corresponding  $\text{EVENT}$  dummy variables one observation at a time and recording their statistical significance. The sample is then split in two at the point where the statistical significance of the  $\text{EVENT}_{long}$  dummy is highest, and the process is repeated within each half of the sample until no statistically significant break points are detected in any sub-sample. As will become evident later, in practice there are no major breaks in the Israeli risk premium series (1996–99) besides the outbreak of the Russian debt crisis in summer 1998 (and, to a lesser extent, the onset of the Asian financial crisis in fall 1997).

### ‘Good’ and ‘bad’ days

This method is based on identifying the ‘worst days,’ defined as days when the risk premium increased by more than ten percent, and the ‘best days,’ when the risk premium declined by more than ten percent. This approach resembles the iterative search for breaks in that it assumes no prior knowledge about the nature of events that may have been important. Instead, it is an attempt to identify dates at which major changes in the risk premium took place, and to examine what events took place on these dates and how they may have caused the observed market response. This is done by searching the *New York Times* on or around these days for important events either in Israel or abroad. Thus, we can evaluate the nature of events that affected Israel’s risk premium, as well as the influence of events in foreign economies. Naturally, this

<sup>6</sup> See Perron (1989) and Sussman and Yafeh (2000) for further discussion of this methodology.

approach also raises several problems, most notably because it does not evaluate the statistical significance of the identified dates, and may tend to emphasize short-term 'jitters.'

### **Estimating the effect of major events**

This approach is based on defining *a priori* dates in which events of a particular kind took place (e.g., major developments in the peace process) and estimating their impact by replacing the *long* and *short* dummy variables in Equation (1) with dummy variables that equal one on these dates. The disadvantage of this approach is that it is not always clear when an event should make an impact; some events are expected in advance; others are understood only with some delay. It is also based on a somewhat arbitrary choice of the most important events of each type.

### **A word of caution**

All the three methods listed here are less than perfect. The iterative search does not make use of any institutional knowledge about the events that take place. The listing of 'good' and 'bad' days does not enable an evaluation of their statistical significance or of the duration of their impact. Moreover, none of the methods can measure cumulative effects of a sequence of events. Nevertheless, in spite of the shortcomings of all the available techniques, we attempt to use all the available methods to draw some basic conclusions about the nature of the events that affected Israel's creditworthiness. Our main findings seem clear enough regardless of the statistical approach used.

## **3. SOVEREIGN DEBT: RESULTS AND DISCUSSION**

### **a. The 1996–99 period**

#### *A first look at the data*

Table 1 presents Israel's bond issues abroad. The government of Israel first issued 'Yankee' bonds in late 1995. Previous bond issues were either non-tradable, so that prices and 'spreads' are unavailable, or backed by US loan guarantees and therefore almost risk free, so that the 'spreads' are not meaningful estimates of sovereign risk.<sup>7</sup> In subsequent bond issues the amount of capital raised never exceeded half a billion dollars in any individual flotation. Although the amounts are not particularly large, the observed cost of capital can be viewed as a suitable benchmark for the much larger amounts of private borrowing. In fact, the cost of government debt is allegedly a lower bound for the cost of debt raised by the corporate sector. Thus, fluctuations of the magnitude observed in the data can, if permanent, have a substantial cost on the cost of foreign capital of both the government and the private sector (see below).<sup>8</sup>

<sup>7</sup> In fact, the large-scale issuance of Israeli sovereign debt through the 'Yankee' market began in earnest only after Israel had exhausted the US loan guarantees. This is probably a result of the preceding decade of reforms, starting in 1985.

<sup>8</sup> On the importance of the cost of government bonds traded abroad, see a comment made by senior Ministry of Finance officials following Moody's upgrading of Israel's sovereign credit rating, *Ha'aretz*, July 13, 2000.

**Table 1**  
**Israeli Bond Issues, 1996–2000**

Month/Year	Issue	Coupon interest rate	Maturity (years)	Spread
12/95	\$ 250 million	6.375	10	USA + 76 points
12/96	\$ 200 million	6.375	5	Euro + 50 points
8/97	20 billion yen	3	10	Japan + 76 points
12/98	\$ 250 million	7.25	30	USA + 225 points
7/99	FFr400 million	4.75	7	France + 97 points
10/99	£ 100 million	6.875	35	UK + 205 points
3/00	\$ 500 million	7.75	10	USA + 144 points

SOURCE: Bank of Israel and Ministry of Finance.

**Figure 1**  
**Risk Premium on Israeli Sovereign Debt and Bank of Israel Interest Rate, 1996–99**

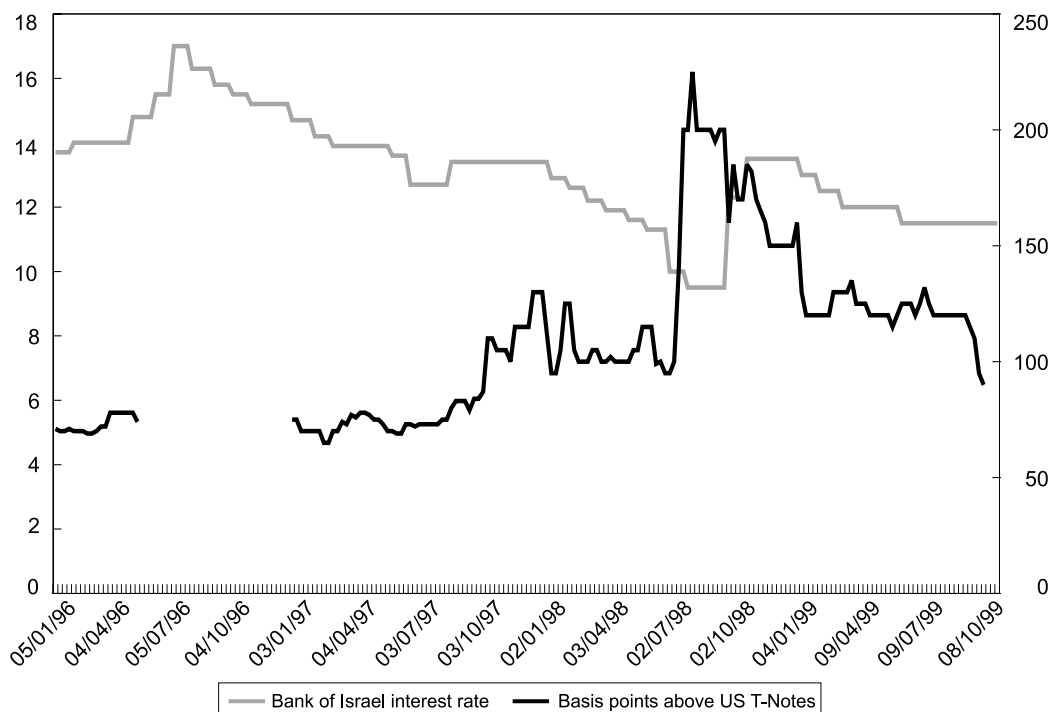


Figure 1 displays the risk premium on Israel's foreign debt between 1996 and 1999, together with the Bank of Israel's discount rate. As is evident from the figure, the two most important periods of fluctuations in Israel's risk premium were the Asian crisis in the fall of 1997 and the Russian debt crisis in the summer of 1998. Domestic and regional events seem to have had little impact, if any, on Israel's cost of capital, at least in the short run. Although Israel's country risk is occasionally cited as a factor in the Bank of Israel's monetary policy, the two series do not appear to co-move closely. In some cases, e.g., the fall of 1998, domestic monetary policy seems to have followed developments abroad rather than triggering changes in bond spreads.

*Co-movement of sovereign debt yields: Israel and emerging markets*

Table 2 presents correlation coefficients between the risk premium on Israel's sovereign debt and sovereign debt of a number of emerging markets. The correlation coefficients are high,

**Table 2**  
**Correlation of Risk Premia on Sovereign Debt: Israel and Selected Countries (in descending order)**

Country	1996–99	1998	1999
Hungary	0.88	0.89	0.66
Turkey	0.87	0.92	0.79
Malaysia	0.87	0.90	0.79
Philippines	0.86	0.89	0.75
Morocco	0.82	0.86	0.63
South Africa	0.82	0.89	0.79
Brazil	0.77	0.93	0.72
Colombia	0.76	0.94	0.15
Nigeria	0.74	0.90	-0.08
Russia	0.74	0.93	0.60
China	0.74	0.77	0.68
J.P. Morgan's EMBI index	0.71	0.93	0.56
J.P. Morgan's Latin America index	0.69	0.92	0.59
Venezuela	0.69	0.86	0.62
Mexico	0.65	0.93	0.63
Croatia	0.65	0.92	-0.14
South Korea	0.59	0.75	0.81
Greece	0.59	0.80	-0.17
Thailand	0.59	0.65	0.72
Argentina	0.58	0.87	0.10
Ecuador	0.41	0.91	-0.40
Poland	0.41	0.89	-0.04
Bulgaria	0.08	0.80	0.23

**Table 2 (continued)**  
**Correlation of Risk Premia, by Geographical Region**

	Country	1996–99	1998	1999
Africa	Morocco	0.82	0.86	0.63
	South Africa	0.82	0.89	0.79
	Nigeria	0.74	0.90	-0.08
Latin America	Mexico	0.65	0.93	0.63
	Brazil	0.77	0.93	0.72
	Colombia	0.76	0.94	0.15
	Venezuela	0.69	0.86	0.62
	Argentina	0.58	0.87	0.10
	Ecuador	0.41	0.91	-0.40
Asia	Turkey	0.87	0.92	0.79
	Malaysia	0.87	0.90	0.79
	Philippines	0.86	0.89	0.75
	China	0.74	0.77	0.68
	South Korea	0.59	0.75	0.81
	Thailand	0.59	0.65	0.72
Europe	Hungary	0.88	0.89	0.66
	Russia	0.74	0.93	0.60
	Croatia	0.65	0.92	-0.14
	Greece	0.59	0.80	-0.17
	Poland	0.41	0.89	-0.04
	Bulgaria	0.08	0.80	0.23
J.P. Morgan's EMBI index		0.71	0.93	0.56

especially when data for 1999 (when there was little trade in Israeli bonds and prices may have been less informative), are excluded.<sup>9</sup> In general, one can predict movements in Israel's debt yields fairly well by observing movements in the yields of, for example, Turkish bonds, or even the bonds of faraway countries such as Malaysia or the Philippines. An important observation is that the co-movement of yields between Israel and foreign countries seems to increase in periods of crisis; e.g., the correlation with the EMBI index as well as with individual countries in 1998 relative to the full sample correlation.

#### *Search for breaks*

Using the search for breaks methods described above, we first identify the most significant break in the risk premium series as summer 1998, coinciding with the onset of the Russian debt crisis. This is in line with the results of Mauro, Sussman, and Yafeh (2002), where the Russian crisis is identified as the most important break in a sample of emerging markets. We

<sup>9</sup> It is not clear if the lower correlation in 'spreads' between Israel and other countries in 1999 (and 2000, see below) is because of lack of trade in Israeli bonds, or because of changes that made Israel appear to investors as separate from other emerging markets.



measure the duration of the impact of the Russian crisis by examining alternative specifications of Equation (1) with break dummy variables of varying lengths. For example, we define an *EVENT* dummy that equals one for up to 30 weeks after the onset of crisis and find it to be positive and statistically significant. This means that Israel's risk premium remained significantly higher than it had been prior to the Russian debt crisis for over half a year. A less significant (and short-term) break is identified in October 1997 around the time the Asian crisis hit Korea. None of the domestic events (within Israel) during this period constitutes a significant break. In order to get a feeling for the magnitude of the Russia-related break, we note that Israel's sovereign spread increased in August 1998 from around 100 basis points to about 200 basis points, a change of one full percentage point. A permanent change of this magnitude would constitute a significant increase in the financing costs described in Table 1 (where coupon interest rates vary between 6 and close to 8 percent). Although large, this change is not exceptionally high in comparison with other emerging markets, many of which experienced larger absolute changes in their spreads. What is striking is the importance of the Russian crisis relative to Israel-specific domestic events.

#### *Listing the good and bad days*

The impression that domestic events had little impact on Israel's risk premium in this period is also reflected in Table 3, where we list the weeks in which the most significant changes in

**Table 3**  
**Largest Increases in Israeli Risk Premium (the worst weeks)**

Date	Event	% increase in premium	Effect on other countries
02/11/97	Asian crisis	26.4	Yes
14/12/97	Asian crisis	15.0	Yes
11/01/98	Asian crisis (Indonesia)	13.0	Yes
22/02/98	Tension US-Iraq	10.5	No
01/03/98	Tension continued	19.0	No
23/08/98	Russian crisis	40.0	Yes
30/08/98	Russian crisis	42.9	Yes
13/09/98	Russian crisis	12.5	Yes
15/11/98	Debt restructuring, Russia	15.6	Yes

**Table 3b**  
**Largest Decreases in Israeli Risk Premium (the best weeks)**

Date	Event	% decrease in premium	Effect on other countries
01/02/98	IMF loan to Korea	13.8	Yes
08/02/98	Asian markets rebound	15.2	Yes
15/03/98	End of Iraqi crisis	16.0	No
19/07/98	IMF aid to Russia	13.9	Yes
20/09/98	Unclear	11.1	Yes
08/11/98	Rumors of IMF aid to Brazil	20.0	Yes
05/03/99	Unclear	18.8	Latin America

**Table 4**  
**Impact of Events, by Type, 1996–99**

Date	Event	Type of event	% change in Israel's risk premium in week of event
19/06/97	Finance Minister Meridor's resignation	Economic change	0
06/09/97	Privatization of Bank Hapoalim	Economic change	6.7
10/08/97	Inflation target for 1998 set at 7–10%	Economic policy	0
07/08/98	Inflation target for 1999 set at 4%. Interest rate lowered by 1.5 percentage points.	Economic policy	0
10/08/99	Inflation target for 2000 set at 3–4%	Economic policy	0
23/04/96	PNC convenes to change charter	Peace process	0
13/01/97	Hebron Agreement	Peace process	–6.7
17/10/98	Wye Accord	Peace process	2.6
05/09/99	Sharm-el-Sheikh Accord	Peace process	5.6
06/03/96	Two buses explode in Tel-Aviv and Jerusalem	Terror	1.4
22/03/97	Bomb in Tel-Aviv cafe	Terror	5.7
31/07/97	Bomb in Jerusalem market	Terror	0
22/12/98	Netanyahu's government falls	Domestic politics	–2.9
18/05/99	Barak wins elections	Domestic politics	3.8

the risk premium took place. The table displays all the events that caused a change of at least 10 percent in the 'spread.' We find that, with the exception of the March 1998 crisis between the US and Iraq, none of the dates in the table coincides with events in Israel or in the region. By contrast, the largest fluctuations in Israel's risk premium were caused by events in faraway countries such as Korea, Russia, or Brazil.

*Estimating the effects of events by type*

Table 4 displays the immediate impact of events of various types. These include advances in the peace process, terrorist attacks, major political changes, and some economic reforms. Clearly, none of the various event types can explain much of the movement in Israel's risk premium: economic changes typically elicit no change at all in the risk premium, except for one *increase* which was probably due to other factors. Responses to advances in the peace process, to terrorist attacks, or to political shifts toward the political left are also mixed, if any. Table 5 displays regression results where the dependent variable is the rate of change in the risk premium, and explanatory variables are dummies for event categories. For example, the

dummy variable 'Terror' equals one on weeks when a terrorist attack listed in Table 4 took place, and zero otherwise, the dummy variable 'Russian crisis' equals one between August and November 1998, and so on. The regression also includes the rate of change in J.P. Morgan's EMBI index as an explanatory variable. The results suggest that domestic events contribute little to the explanation of movements in Israel's risk premium (they are small and statistically insignificant).<sup>10</sup> Running the regression in levels rather than rates of change produces very similar results, suggesting that the elasticity of the 'spread' with respect to domestic events is close to zero (the elasticity with respect to the EMBI index is much smaller than in the rate of change regression, but still statistically significant).

**Table 5**  
**Regression Estimates of the Determinants of the Risk Premium, 1996–99**

Variable	Coefficient	Std. Error	t-Statistic
C	-0.000810	0.004843	-0.167149
Rate of change in EMBI index	0.484311	0.049266	9.830449
Russian crisis <sup>a</sup>	0.037750	0.017401	2.169361
Asian crisis <sup>b</sup>	0.005799	0.018038	0.321460
Domestic politics <sup>c</sup>	-0.021419	0.040511	-0.528721
Peace <sup>d</sup>	0.020719	0.029088	0.712272
Terror <sup>e</sup>	-0.032451	0.028955	-1.120729
Inflation target <sup>f</sup>	-0.012215	0.028913	-0.422474
Adjusted R-squared	0.410770		

<sup>a</sup> Russian crisis is a dummy variable that takes the value 1 for observations in the period August–November 1998 and zero otherwise.

<sup>b</sup> Asian crisis is a dummy variable that takes the value 1 for observations in the period October–December 1997 and zero otherwise.

<sup>c</sup> Domestic politics is a dummy variable that takes the value 1 for December 22, 1998 (fall of the Netanyahu government) and for May 18, 1999 (Barak wins the elections).

<sup>d</sup> Peace is a dummy variable that takes the value 1 for April 23, 1996 (PNC conveys to change the charter), for January 13, 1997 (Hebron agreement), for October 17, 1998 (Why Accord) and for September 5, 1999 (Sharm Accord).

<sup>e</sup> Terror is a dummy variable that takes the value 1 for March 3–6, 1996 (two buses explode in Tel-Aviv and Jerusalem), for March 22, 1997 (Bomb in Apropos cafe), for July 31, 1997 (Bomb in Jerusalem market) and for November 7, 1998 (explosion of car in Jerusalem).

<sup>f</sup> Inflation target is a dummy variable that takes the value 1 for August 10, 1997 (inflation target for 1998 is set at 7–10%), and for August 7, 1998 (inflation target for 1999 is set at 4%; interest rate is lowered by 1.5 points).

<sup>10</sup> This is consistent with comments by Moody's explaining the upgrading of Israel's credit rating, suggesting that (at the time) political and regional factors have a relatively small impact on the state of the Israeli economy (*Ha'aretz*, July 7, 2000).

### b. Sovereign debt in 2000

We separate the results for the year 2000 from the rest of our analysis for several reasons. First, our sovereign bond series is discontinued in December 1999, and renewed, using a different bond, only in March 2000, so that there is discontinuity in the series, preventing us from searching for breaks during the entire period. In addition, looking at 2000 separately enables an easy comparison between this year, with its unexpected and dramatic political events, and 1996–99.

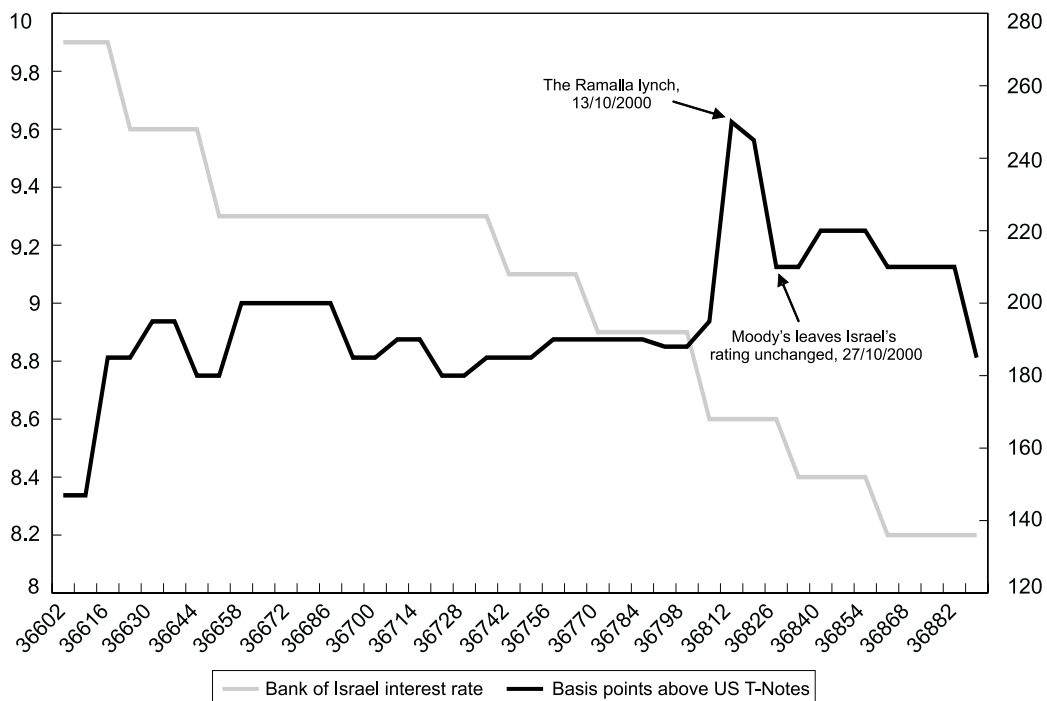
Our findings for sovereign debt in 2000 (Figure 2 and Tables 6–9, which correspond to Figure 1 and Tables 2–5 for the 1996–99 period) suggest that this year was indeed different from the earlier period. Table 6 clearly indicates that in 2000 the co-movement between Israel's risk premium and sovereign spreads of emerging markets around the world was substantially lower than in 1996–99 (Table 2). Table 7 suggests that, unlike earlier years, in 2000 the events that caused the largest fluctuations in Israel's sovereign risk premium were Israel-specific, not global, events. Tables 8 and 9 indicate that some classes of events, particularly those related to the collapse of the peace process, which had no impact on the risk premium prior to 2000, became more important during this year. By contrast, movements in the EMBI index were not very useful predictors of movement in the Israeli risk premium in 2000. Nevertheless, even the largest increase in the risk premium in response to a domestic event (the 30 percent increase in the risk premium in mid-October 2000) was much smaller than the increase which followed the Russian debt crisis in summer 1998 (when the spread more than doubled within two weeks, see Table 3).<sup>11</sup>

**Table 6**  
**Correlation of Risk Premia on Sovereign Debt:**  
**Israel and Selected Countries in 2000**

Continent	Country	2000
Africa	Morocco	-0.01
	Nigeria	0.16
Latin America	Mexico	0.32
	Brazil	0.18
	Colombia	0.05
	Venezuela	0.29
	Argentina	-0.37
	Ecuador	0.49
Asia	Turkey	-0.37
	Philippines	-0.67
	South Korea	0.40
Europe	Russia	0.08
	Poland	0.45
	Bulgaria	-0.32
J.P. Morgan's EMBI+ index		0.11

<sup>11</sup> Again, regressions using levels rather than rates of change produce qualitatively similar results.

**Figure 2**  
**Risk Premium on Israeli Sovereign Debt and Bank of Israel Interest Rate, 2000**



**Table 7**  
**Largest Changes in Israeli Risk Premium in 2000**

Date	Event	% change in premium	Effect on other countries
31/03/00	Clinton's efforts fail to convince Syria to resume talks (beginning of yields series)	25.9	No
12/05/00	Israel plans pullout from Lebanon	11.1	No
13/10/00	2 Israeli soldiers slain by Palestinian mob	28.2	Not clear
27/10/00	Rating agencies declare that Israel's credit rating will not be changed	-14.3	No
29/12/00	Clinton presents broad new plan for Middle East peace	-11.9	No

**Table 8**  
**Impact of Events, by Type, March–November 2000**

Date	Event	Type of event	% change in Israel's risk premium in t week of event
27/10/00	Rating agencies declare that Israel's credit rating will not be changed	Rating	-14.3
27/3/00	Clinton's efforts fail to get Syria to resume talks	Peace process	25.9
12/4/00	Barak's visit to US fails to attain breakthrough	Peace process	5.4
12–27/7/00	Camp David Summit	Peace process	-5.3, 2.8
18–24/5/00	Pullout from Lebanon	Lebanon	0
8/6/00	Vote in Knesset on new elections	Domestic politics	0
29/11/00	Barak declares early elections	Domestic politics	-4.5

**Table 9**  
**Regression Estimates of the Determinants of the Risk Premium, 2000**

Dependent variable: Rate of change of Israel's risk premium

Method: Least squares

Included observations: 38 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic
C	0.001789	0.015297	0.116943
Rate of change in EMBI index	-0.220687	0.927160	-0.238025
Lebanon <sup>1</sup>	0.004343	0.056873	0.076361
Domestic politics <sup>2</sup>	-0.037387	0.051544	-0.725340
Negative developments in peace process <sup>3</sup>	0.111910	0.041711	2.683012
Positive developments in peace process <sup>4</sup>	-0.001281	0.068913	-0.018594
Oct–Dec riots dummy	0.031847	0.026122	1.219164
Moody's increases Israel's rating	-0.051765	0.094974	-0.545043
Rating agencies leave Israel's rating unchanged <sup>5</sup>	-0.174673	0.071286	-2.450319
Adjusted R-squared	0.345450		

<sup>1</sup> Lebanon is a dummy variable that takes the value 1 for May 19–26, 2000 (pullout from Lebanon) and zero otherwise.

<sup>2</sup> Domestic politics is a dummy variable that takes the value 1 for June 9, 2000 (vote in Knesset on new elections) and for November 29, 2000 (Barak declares early elections).

<sup>3</sup> Negative developments in peace process is a dummy variable that takes the value 1 for March 27, 2000 (Clinton's efforts fail to get Syria to resume talks), for April 12, 2000 (Barak's visit to the US fails to attain a breakthrough) and for July 27, 2000 (failure of Camp David Summit).

<sup>4</sup> Positive developments in peace process is a dummy variable that takes the value 1 for July 14–21 (the Camp David Summit is opened) and zero otherwise.

<sup>5</sup> Agencies leaves Israel's rating unchanged is a dummy variable that takes the value 1 for October 27, 2000 and zero otherwise.

#### 4. EVIDENCE FROM STOCK PRICES: ISRAELI COMPANIES TRADED ON US STOCK EXCHANGES

##### a. The 1996–99 period

In this section we examine the fluctuations in the cost of equity capital raised by Israeli companies in the US, as most foreign institutional and passive equity investment in listed firms is channeled through those corporations. Since most of these firms are regarded as high-tech companies, the results allow us to gauge the impact of domestic Israeli events on the cost of equity finance to this sector. To address this issue, we collect data on stock returns of nearly 100 Israeli companies traded on US stock exchanges (mostly the NASDAQ). As in the analysis of sovereign bonds, we begin the analysis by identifying statistically significant movements in the equity prices of the sample firms, and then describe the events that took place on those days. Later, we measure the impact of events by type.

Before turning to the data, it is important to note some differences between the analyses of bond ‘spreads’ and stock prices. Unlike the fluctuations in bond yields, our investigation of stock prices is based on identifying dates of ‘excess returns,’ which are days when the stock prices move beyond what a standard, CAPM-based, economic model would predict. Thus, in contrast with the methodology used to analyze bond yields, which could easily display the comovement with foreign bond spreads (EMBI), the stock price results will display only changes that *exceed* changes in foreign stock indices.

In order to identify dates, around which significant shifts in equity prices took place from 1996 through 1999, we construct an equal-weighted total return index for Israeli equities trading in the United States (the AB index). We also construct a total return series for each Israeli firm listed in May 2000 from the day of its initial listing (or January 1, 1992 if listed before 1992). We then assume that equal amounts of funds are invested in each security. The assumption implies that investors rebalance their portfolios on a daily basis (as in Ritter, 1991). Figure 3 compares the total cumulative returns of the AB, the S&P and the NASDAQ indices. The dramatic appreciation of Israeli share prices suggests that, over time, growth expectations related to technological changes increased and were an important factor in explaining long-run returns. Nonetheless, it would be interesting to identify short periods (a week or less) of excess returns, in which stock price movements were abnormal (either positive or negative).

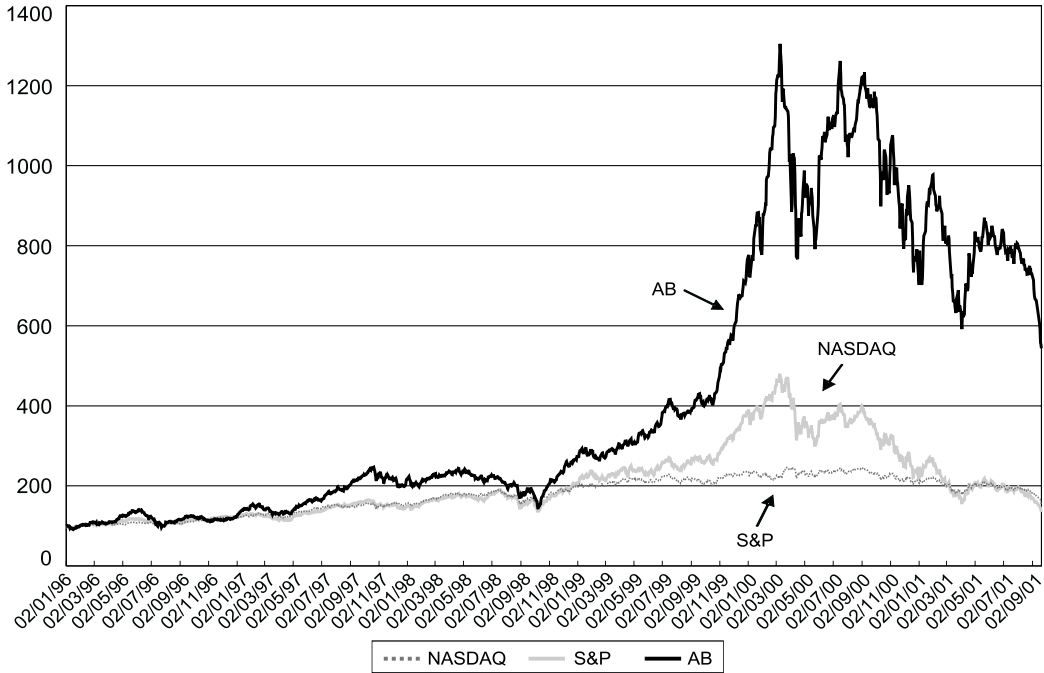
To evaluate when the AB index responds to ‘news’ and exhibits unusual returns, we calculate abnormal return as the actual ex post return *minus* the expected return, which is constructed in three stages. First, we assume a stable linear relation between the market return (i.e., the S&P return) and the AB index return. The relation takes the following form:

$$(2) \quad R_{AB} = \alpha_i + \beta_{AB} R_m + \varepsilon_{AB},$$

where  $R_{AB}$  is the return on AB index,  $R_m$  is the market (S&P) rate of return and  $\varepsilon_{AB}$  is a normally-distributed error term with mean zero.<sup>12</sup> However, Israeli securities traded abroad are mostly

<sup>12</sup>This linear model (often referred to as the ‘market model’), and its specification follow from the assumed joint normality of asset returns. For that reason we remove from the AB index stocks with prices below \$2, since the asymmetry in their daily returns precludes a normal distribution.

**Figure 3**  
**Total Cumulative Returns on Israeli Equities Traded in US (AB index) and S&P and NASDAQ Indices, 1996–2001 (1/1/1996 = 100)**



high-tech stock listed on the NASDAQ. It would therefore seem plausible that part of the AB excess return relative to the S&P index is attributable to industry effects captured by the NASDAQ index. We therefore estimate a linear relation similar to (2) between the NASDAQ and the S&P indexes, and identify the part of the NASDAQ return that is not attributable to the S&P. Finally, in the third stage, we estimate yet another linear relation between the excess return of the NASDAQ index (relative to the return predicted by the S&P) and the excess return of the AB index. This, in turn, allows us to calculate the abnormal return of the AB index as the return above and beyond that predicted by both the S&P and the NASDAQ.<sup>13</sup>

The parameters of the linear relationship between the AB return index and the S&P are estimated outside the sample period using daily observations from 1994. The estimated  $\beta$  between the AB index and the S&P is about 0.7, suggesting that events affecting US stock returns in general have a large impact on Israeli share prices, similar to the findings on bond spreads. Nevertheless, the S&P total return explains only 7 percent of the variance in AB daily returns.

<sup>13</sup> Although most Israeli companies are listed on the NASDAQ, we believe that the CAPM 'market returns' are better captured by the S&P index, and therefore follow the three-stage estimation strategy described in the text. The results are generally similar if excess returns are calculated relative to the S&P and NASDAQ index in one step.



The parameters of the linear relationship between the NASDAQ and the S&P are estimated using an estimation window including daily observations in 1992, and the estimated  $\beta$  is equal to 1.01. Finally, the parameters of the linear relationship between the AB *excess* return and the NASDAQ *excess* return (beyond the S&P) are estimated using an estimation window including daily observations in 1994.<sup>14</sup> Here the estimated  $\beta$  is approximately 0.85, again suggesting that excess movement in the NASDAQ index (beyond the S&P) has a very high impact on Israeli stock returns. At the same time, as might be expected, much of the variance in Israeli stock unexpected returns is not accounted for by these fluctuations in the NASDAQ index. Having established that share prices of Israeli companies are closely related to fluctuations in American stock prices, we now attempt to evaluate the extent to which Israel-related events account for the component of seemingly unexplained noise.

To estimate the effect of events on stock returns, we use two different methods, corresponding with those used in the first part of this paper. The first is based on identification of dates with statistically significant abnormal returns, followed by an attempt to find important events that occurred on those dates. The second method has the opposite starting-point, i.e., it is based on forming hypotheses a priori about the kind of events that should have an impact on the cost of capital, and then estimating their effects, by type of event.

#### *Identifying dates with abnormal returns*

Using the model's assumption that the error terms in predicted return regressions are distributed normally, we identify the daily abnormal returns that are statistically significant in 1996 through 1999. In order to provide a comparable analysis to the earlier part of the paper, we focus on five-day windows with statistically significant cumulative abnormal returns, this also enables us to ignore transitory and random 'blips' in the series. In these five-day windows, the unexplained excess return (in absolute terms) of the AB index is greater than 6 percent.<sup>15</sup>

The results are presented in Table 10 in chronological order (overlapping dates are ignored). Although it is not possible to account for all periods of abnormal returns (which may be affected by the industry affiliation of Israeli firms, and other factors), the table suggests that some political events may have had an impact on the cost of equity finance by Israeli high-tech companies. For example, the Hebron Agreement in January 1997, the Wye Agreement in 1998 and the Shepherdstown summit in December 1999 (which is at the very end of our 1996–99 sovereign bond series and therefore hard to evaluate there) did seem to elicit positive market responses. However, the Shepherdstown summit coincided with Moody's announcement of an anticipated improvement in Israel's credit rating as well as with positive IMF comments on the Israeli economy, so the actual reason for the increase is hard to distinguish. By contrast, the Wye and Hebron Accords did not coincide with other such announcements (and had no impact on Israel's sovereign bonds).

<sup>14</sup> The NASDAQ-S&P regression is estimated using earlier data from 1992 so as to be able to obtain a measure of the NASDAQ excess return above the S&P, which is then used in the AB excess return-NASDAQ excess return regression.

<sup>15</sup> Statistically significant abnormal returns in a five-day window should exceed two times the standard error of the five-day cumulative excess returns series, which equals 3 percent.

**Table 10**  
**Dates with Cumulative Five-Day Abnormal Stock Returns, 1996–99**

(Calculated using 1992–94 data; standard deviations according to full sample, 1995–2000)

5-day period ending:	AB total return	NASDAQ total return	S&P total return	Abnormal AB return	Events ( <i>New York Times</i> headlines)
27/06/1996	-6.89	-0.09	0.98	-6.21	23 U.S. troops die in truck bombing at Saudi base; guerrillas kill 3 Israeli soldiers; Secretary of State Christopher visits Israel.
16/07/1996	-14.23	-8.94	-4.07	-6.66	500,000 strike in Israel to protest Netanyahu's economic plans; Wall St. tremor reverberates overseas.
25/07/1996	-11.65	-4.28	-1.93	-7.79	
16/12/1996	2.80	-4.26	-3.89	6.32	
13/01/1997	6.84	1.10	1.58	6.58	Hebron agreement.
05/02/1997	6.30	-0.47	0.77	7.28	Netanyahu and Arafat meet for positive talks during encounter at global economic forum in Davos.
04/06/1997	3.99	-2.17	-0.84	6.19	Barak elected head of Labor party.
16/10/1997	5.55	-2.67	-1.59	8.05	
12/11/1997	-12.82	-5.96	-3.95	-7.83	
19/11/1997	9.02	3.83	4.21	6.82	US stocks surge.
05/01/1998	8.91	2.93	2.00	6.95	Foreign minister, David Levy, resigns in protest at 1998 budget.
12/01/1998	-11.20	-5.51	-3.89	-6.59	8 hurt in West Bank as protestors fight police.
15/01/1998	-7.42	-0.46	-0.49	-6.65	Israel announces stringent terms for withdrawal from West Bank.
30/09//1998	-9.72	-3.78	-4.64	-6.74	Palestinian unrest; 24 wounded in West Bank.
09/10/1998	-16.56	-7.53	-1.77	-9.86	Sharon is appointed Foreign Minister; Palestinian protestor shot dead by Israeli troops in West Bank.
16/10/1998	16.15	8.47	7.17	10.39	Wye Plantation negotiations initiated on positive note; recovery in emerging markets.
21/10/1998	15.79	8.47	6.30	9.89	Wye Plantation negotiations.
10/12/1998	8.48	3.17	1.33	6.38	
14/4/1999	6.29	-1.42	0.14	7.99	
19/4/1999	-2.02	-10.03	-5.18	6.32	
14/05/1999	7.51	1.02	-0.50	6.98	National elections: Barak wins.
02/11/1999	10.31	5.96	5.09	6.40	Palestinian–Israeli summit in Oslo; CityBank declares its intention to open a branch in Israel.

Table 10 (continued)

5-day period ending:	AB total return	NASDAQ total return	S&P total return	Abnormal AB return	Events ( <i>New York Times</i> headlines)
10/12/1999	9.12	2.80	-1.13	6.94	Sheperdstown summit; positive IMF comments; Moody's contemplates country credit upgrade.
14/12/1999	9.04	-0.39	-0.42	9.76	
31/12/1999	8.08	2.35	0.83	6.52	

To examine the robustness of these results, we verify that dates with excess returns are not driven by large first-day returns around IPOs or by outliers with extreme abnormal returns. Moreover, in all periods of positive (negative) abnormal returns (except 16/10/98) the *median* total return of stocks in the AB index exceeds (falls below) that of the NASDAQ, often by large margins. This suggests that the excess returns of the index were driven by broad gains (losses) across the sample of Israeli securities.

One might suspect that part of the excess return in December 1999 is due to the rapid increase in the value of the software and internet sectors (to which most of the Israeli firms belong, see Figure 3). We believe that this is unlikely to account for the fact that the actual date with the highest statistically significant five-day excess returns coincides with the Sheperdstown summit and with Moody's announcement. Moreover, the correlation between the general (composite) NASDAQ index and the NASDAQ index for the computer industry is very high (about 0.99), suggesting that the use of a narrower, computer-based index would probably not have changed the results. Finally, despite the dramatic cumulative rise of Israeli stock prices in the latter part of 1999, that period contains only two (one-week) periods in which excess returns were statistically significant, one of which appears unrelated to political events, suggesting that unusual behavior of stock prices during this period is not driving the results.

#### *Estimating the effects of events by type*

Tables 11–12 display the immediate impact of events by type (similar to Tables 4 and 5 in the sovereign debt section). Table 12 presents excess *daily* return of the AB index (relative to the S&P and the NASDAQ excess return) in 1996 through 1999 as a function of the events. Among the three types of political variables (terror, domestic, and peace), it appears that the peace moves are most important. They are jointly statistically significant, with a cumulative effect (including backward and forward lags) that is greater than 6 percent. The political events are insignificant as a group,<sup>16</sup> and so are terrorist attacks, which do not seem to have an effect on equity prices.

<sup>16</sup> The coefficient estimated for 'Domestic politics' with a two-day lag is statistically significant. However, the fact that these variables are not statistically significant as a group indicates that their impact, if it exists, is transitory.

**Table 11**  
**Impact of Events, by Type, 1996–99**

Date	Event	Type of event	AB abnormal return (percent)
19/06/97	Finance Minister Meridor resigns	Economic change	0.7
06/09/97	Privatization of Bank Hapoalim	Economic change	1.5
10/08/97	Inflation target for 1998 set at 7–10%	Economic policy	–0.4
07/08/98	Inflation target for 1999 set at 4%. Interest rate lowered by 1.5 percentage points.	Economic policy	2.2
10/8/99	Inflation target for 2000 set at 3–4%	Economic policy	–1.1
23/04/96	PNC convenes to change charter	Peace process	0.8
13/01/97	Hebron Agreement	Peace process	2.5
17/10/98	Wye Accord	Peace process	2.8
05/09/99	Sharm-el-Sheikh Accord	Peace process	1.3
06/03/96	Two buses explode in Tel–Aviv and Jerusalem	Terror	0.3
06/03/96		Terror	0.3
22/03/97	Bomb in Tel–Aviv cafe	Terror	0.6
31/07/97	Bomb in Jerusalem market	Terror	–0.7
30/05/96	Netanyahu wins elections	Domestic politics	–1.6
22/12/98	Netanyahu’s government falls	Domestic politics	–0.2
17/05/99	Barak wins elections	Domestic politics	–0.5

Despite the presence of some abnormal returns in response to domestic events, here, too, global events typically have a larger impact than many of the domestic political and geopolitical events. This is evident in the highly statistically significant impact of NASDAQ excess returns on Israeli stock prices discussed above, as well as in some specific examples. At the end of August 1998, with the onset of the Russian debt crisis, Israeli stocks declined by about 15 percent over five days (the NASDAQ index dropped by 16.6). The Korean crisis led to a cumulative 12.6 percent five-day fall in prices of Israeli stocks, whereas the Brazilian debt crisis in late 1998 led to an even larger fall.<sup>17</sup> This suggests that the cost of capital to Israel’s high-tech sector is influenced primarily by factors that affect the NASDAQ index as a whole, that is, by events in global financial markets as well as by industry-specific factors. As in the case of sovereign debt, Israel’s domestic economic policy did not seem to have an impact on share prices.

<sup>17</sup> These events do not appear in Table 10: they do not involve significant *excess* returns, that is, Israeli stocks were not affected more than the S&P or the NASDAQ indexes.

**Table 12**  
**Regression Estimates: Stock Excess Returns, 1996–99**

(Variable definitions are identical to those in Table 5. Numbers in parentheses refer to days before and after the event)

Dependent variable: Israeli stock index excess return over S&P Index and NASDAQ excess return.

Method: Least squares

Sample: 12/30/1994 12/31/1999

Number of observations: 1,222

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.002064	0.000365	5.649750	0.0000
ASIAN_CRISIS	-0.000345	0.001535	-0.224510	0.8224
RUSSIAN_CRISIS	-0.000449	0.001357	-0.331033	0.7407
TERROR	-0.004520	0.005121	-0.882783	0.3775
TERROR(-1)	-0.006908	0.005373	-1.285491	0.1989
TERROR(-2)	0.006295	0.005372	1.171909	0.2415
TERROR(-3)	0.002607	0.005427	0.480420	0.6310
TERROR(-4)	-0.008693	0.005686	-1.528803	0.1266
PEACE(2)	0.008481	0.005887	1.440635	0.1500
PEACE(1)	0.006911	0.005887	1.173895	0.2407
PEACE	0.014357	0.006798	2.111826	0.0349
PEACE(-1)	0.005112	0.006798	0.751887	0.4523
PEACE(-2)	0.005682	0.005887	0.965196	0.3346
DOMESTIC POLITICS(2)	0.004330	0.008311	0.521023	0.6024
DOMESTIC POLITICS (1)	-0.010117	0.008311	-1.217272	0.2237
DOMESTIC POLITICS	-0.005843	0.008311	-0.702996	0.4822
DOMESTIC POLITICS (-1)	-0.002219	0.008311	-0.267040	0.7895
DOMESTIC POLITICS (-2)	0.019249	0.008311	2.316115	0.0207
DOMESTIC POLITICS (-3)	0.006259	0.011748	0.532763	0.5943
RABIN <sup>1</sup>	-0.011110	0.011748	-0.945693	0.3445
RABIN(-1)	0.002458	0.011748	0.209201	0.8343
RABIN(-2)	-0.000543	0.011748	-0.046218	0.9631
RABIN(-3)	0.027012	0.011748	2.299298	0.0217
RABIN(-4)	0.006464	0.011748	0.550234	0.5823
INFLATION TARGET	0.000376	0.006798	0.055260	0.9559
MERIDOR <sup>2</sup>	0.005494	0.011748	0.467669	0.6401
MERIDOR(-1)	0.012297	0.011748	1.046733	0.2954
MERIDOR(-2)	-0.019805	0.011748	-1.685797	0.0921
PRIVATIZATION <sup>3</sup>	0.013141	0.011748	1.118584	0.2635
PRIVATIZATION(-1)	-0.005069	0.011748	-0.431476	0.6662
PRIVATIZATION(1)	0.001024	0.011748	0.087207	0.9305
R-squared	0.028752			

<sup>1</sup> Rabin is a dummy variable that takes the value 1 for November 4, 1995 (the assassination of Yitzchak Rabin) and zero otherwise.

<sup>2</sup> Meridor is a dummy variable that takes the value 1 on June 19, 1997 (Finance Minister Meridor's resignation) and zero otherwise.

<sup>3</sup> Privatization is a dummy variable that takes the value 1 on September 6, 1997 (Privatization of bank Hapoalim) and zero otherwise.

**Table 13****Dates with Cumulative Five-day Abnormal Stock Returns, 2000**( $\beta$  calculated using 1992–94 data; standard deviations according to full sample, 1995–2000)

5 day period ending:	AB total return	NASDAQ total return	S&P total return	Abnormal AB return	Events ( <i>New York Times</i> headlines)
03/01/2000	9.57	3.87	-0.12	6.62	Israel–Syria Summit.
14/01/2000	10.38	4.80	1.66	6.91	US draft of Israel–Syria treaty reported in Israeli newspaper.
31/01/2000	-12.34	-3.75	-0.43	-8.70	Barak visits Egypt.
07/02/2000	13.81	9.36	2.13	6.45	
11/02/2000	10.58	3.62	-2.60	7.45	
14/02/2000	9.23	2.32	-2.39	7.27	
21/02/2000	6.79	-0.07	-3.15	6.70	
02/03/2000	9.75	2.98	2.10	7.94	Barak declares July 7 as date for complete withdrawal from Lebanon.
24/03/2000	-4.35	3.55	4.26	-6.29	Assad meets with Clinton.
27/03/2000	-1.08	7.38	4.56	-6.31	Clinton fails to get Syria to resume talks.
05/04/2000	-17.10	-10.36	-1.39	-7.86	Cohen rebukes Israel on sale of radar systems to China.
12/04/2000	1.23	-9.47	-1.33	9.70	Barak visits Clinton.
17/04/2000	-27.02	-15.79	-6.82	-13.94	
24/04/2000	11.55	3.20	2.38	9.41	Jordan's king visits Israel.
01/05/2000	18.71	13.17	2.72	8.13	
04/05/2000	5.46	-1.26	-3.81	6.37	
24/05/2000	-16.15	-10.46	-3.36	-7.14	Pullout from Lebanon.
31/05/2000	5.73	-3.70	-1.64	8.95	Signs of life on stalled Israeli– Palestinian diplomatic front.
.000	8.97	3.64	1.60	6.33	UN says Syria agrees that Israel is out of Lebanon.
02/06/2000	16.02	10.09	3.82	8.12	Deal in Middle East is 'within view,' Clinton declares.
06/06/2000	14.97	8.60	2.50	8.33	Albright tries to push Israeli– Palestinian talks.
13/10/2000	-9.54	-0.90	-2.39	-8.70	2 Israeli soldiers slain by mob; helicopters hit back.
26/10/2000	-10.40	-4.18	-1.74	-6.60	Clinton almost blames Arafat for not controlling violence.
06/11/2000	14.84	7.01	2.40	9.57	Clinton's talks with Barak and Arafat.
08/11/2000	4.25	-2.90	-0.83	7.08	Mitchell Committee named.
06/12/2000	9.49	3.93	0.82	6.64	
22/12/2000	-10.71	-4.63	-0.38	-6.30	Peres loses bid to run for premiership.
25/12/2000	-9.82	-3.55	-1.19	-6.57	Clinton sends Middle East sides back home.

### b. Stock prices in 2000

Although the separation of 2000 from earlier years is dictated by the unavailability of sovereign debt data in the first three months of that year, stock prices of Israeli companies listed in the US are also likely to have behaved differently during 2000. The extreme volatility and downturn of US stock markets, especially the NASDAQ, suggest that it may be reasonable to separate the analysis of 2000 from the analysis of earlier years.

Table 13 shows more dates with abnormal excess returns for Israeli stock prices traded in the US in 2000 than in the entire preceding period. Of course, not all the dates correspond to Israel-specific events and may have more to do with the fluctuations and volatility of the NASDAQ and the concentration of Israeli companies in certain industries (e.g., IT and software), which experienced a particularly sharp downturn. Some of the events that are mentioned in the table would not necessarily be among our list of most significant events *a priori*, and hence are not part of the events included in Tables 14 and 15. Nevertheless, the conclusion we draw from the sovereign debt data, namely that 2000 was different from earlier years, seems to hold for stock prices as well, which responded more closely to a number of dramatic domestic events.

Before concluding the discussion of excess stock returns, we examine changes over time in the estimated 'betas' between the AB index and the NASDAQ. In general, the estimated co-movement between share prices of Israeli firms and the NASDAQ index remained fairly constant during most of the period observed.<sup>18</sup> The 'betas' of companies that went public in the US later in the 1990s do not appear to be systematically different from those of companies that went public earlier and there is no evidence of a change in the 'betas' of companies during

**Table 14**  
**Impact of Events, by Type, 2000**

Date	Event	Type of event	AB abnormal return percent
27/10/00	Rating agencies declare that Israel's credit rating will not be changed.	Rating	1.9
27/03/00	Clinton's efforts fail to get Syria to resume talks.	Peace process	0.34
12/04/00	Barak's visit to US fails to attain breakthrough.	Peace process	-1.9
12-27/7/00	Camp David summit.	Peace process	3.7 <sup>15</sup> , -2
18-24/5/00	Pullout from Lebanon.	Lebanon	-7.1
			(cumulative)
08/06/00	Vote in Knesset on new elections.	Domestic politics	1.5
29/11/00	Barak declares early elections.	Domestic politics	-2.3

<sup>18</sup> The rise in share prices of 'new economy' stocks relative to traditional sectors in 1999 is reflected mostly in an increased 'beta' between both the AB index and the NASDAQ relative to the S&P.

**Table 15****Regression Estimates: Stock Excess Returns, 2000**

(Variable definitions are identical to those in Table 9. Numbers in parentheses refer to days before and after the event)

Dependent variable: Israeli stock index excess return over S&P Index and NASDAQ excess return.

Method: Least squares

Sample: 12/31/1999 12/29/2000

Included observations: 245

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.004111	0.001505	2.732236	0.0068
Positive developments in peace process (2)	0.017339	0.014336	1.209459	0.2277
Positive developments in peace process(1)	-0.0198	0.019056	-1.03893	0.2999
Positive developments in peace process	-0.0084	0.019056	-0.44072	0.6598
Positive developments in peace process (-1)	0.031892	0.019056	1.673616	0.0956
Positive developments in peace process (-2)	-0.02714	0.014336	-1.89318	0.0596
Negative developments in peace process (2)	0.007402	0.013558	0.545975	0.5856
Negative developments in peace process (1)	-0.01118	0.013558	-0.82442	0.4106
Negative developments in peace process	-0.01533	0.013558	-1.13033	0.2595
Negative developments in peace process (-1)	0.000466	0.013558	0.034352	0.9726
Negative developments in peace process (-2)	-0.03209	0.013558	-2.36647	0.0188
Oct-Dec riots dummy	-0.00459	0.002843	-1.6151	0.1077
Domestic politics (2)	0.00811	0.013553	0.598401	0.5502
Domestic politics (1)	-0.00757	0.013553	-0.55855	0.577
Domestic politics	-0.00488	0.013553	-0.36027	0.719
Domestic politics (-1)	0.009908	0.013553	0.731094	0.4655
Domestic politics (-2)	0.007802	0.013553	0.57565	0.5654
R-squared	0.070867			

the sample period. There is also not much change in the variance of the estimated 'betas' between the AB index and the NASDAQ. For the purpose of this study, the most important point is that the identification of dates with excess returns is not very sensitive to the period in which the 'betas' are calculated. For example, 1999 'betas' identify the same dates with excess returns in 2000 as do 'betas' calculated using earlier years. Similarly, using 'betas' based on



other individual years does not appear to change the results much, so that our findings are therefore unlikely to reflect particular attributes of the estimated 'betas' of the early 1990s.

## 5. DISCUSSION AND CONCLUSION

Until 2000, global events determined the movements of the Israeli risk premium, as well as those of other emerging markets. Domestic events (be they political or economic) had little influence on the risk premium in the short run. This is probably because they are hard to evaluate and may not reflect a long-run change, at least until they are incorporated into a credible signal such as an improvement in Moody's credit rating. This suggests that today's extreme degree of capital market integration may facilitate international capital flows, but, at the same time, is accompanied by high volatility in financial markets, sometimes with no immediately apparent reason. One explanation for this is connected with the fact that much of the investment in foreign securities is handled through investment funds. Some of these funds operate in a way that requires them, once a crisis occurs in one emerging market, to liquidate tradable assets in other countries so as to provide liquidity to investors or in order to increase their holdings of safe assets and thus maintain a given risk profile. Investors may also demand a higher risk premium once a crisis occurs, possibly because they fear that emergency assistance by multilateral organizations to one country could limit the amount of funds available for assisting other countries. An implication of this may be that complete dependence on foreign capital could be risky, and local financial institutions still have a role as providers of funds even in today's global economy. This discussion also suggests that, because of the high co-movement of asset prices across countries, the cost of capital of countries whose economic fundamentals are not closely correlated with those of other emerging markets may be, in some sense, 'too high.'

In contrast with our findings for 1996–99, Israel's cost of capital seems to have been more sensitive to domestic events in 2000. One possible explanation is the dramatic events in Israel during 2000. Another is that in periods of relative calm in global emerging markets (although not in US equity markets) country-specific events affect sovereign bond prices more than in periods of turmoil. A final possibility is that the increased holdings of bonds by Israeli citizens, probably at the expense of foreign institutional investors (see note 1) increased the sensitivity of bond prices to events within Israel.

We are not sure why Israeli stocks traded abroad seem somewhat more sensitive to domestic political events than are sovereign bonds. One possibility is that these events affect growth expectations of traded companies but not the country risk of default. This could be related to the fact that, unlike growth prospects of individual firms, governments can make a conscious effort to avoid default even in the face of adverse news, and investors are aware of this behavior. Alternatively, the risk of default may be considered so remote, that domestic political events are not considered important. There is also a technical difference between sharp changes in bond 'spreads,' which can take place if there is a change in the risk premium on all emerging markets, and abnormal (or excess) stock returns, which identify changes in stock prices *above and beyond* market (or NASDAQ) fluctuations. Thus, events affecting international capital flows to all emerging markets, or changes affecting all risky assets, may be reflected in sharp changes in the cost of Israel's sovereign debt but are unlikely to be reflected in abnormal stock returns. This may also explain why the events that affect bond spreads differ from those that affect stock returns.

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