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Potential Effect of Elimination of Tax Discrimination between Israeli and Foreign Securities on the Composition of the Public's Portfolio of Financial Assets

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Potential Effect of Elimination of Tax Discrimination between Israeli and Foreign Securities on the Composition of the Public's Portfolio of Financial Assets

Abstract

This article examines, by means of an investment-portfolio model, how a tax reform - the elimination of tax discrimination between Israeli and foreign securities - may affect the composition of the public's portfolio of financial assets and, in particular, the proportion of the portfolio that is invested in foreign securities. The purpose of the analysis is to examine how severely the tax reform may threaten the stability of Israel's capital and forex markets. The effect of the reform is tested from the points of view of institutional and private investors separately.

First we examined the actual investment patterns of investors in Israel and found a strong predisposition, among both private and institutional investors, to invest in domestic stocks even though external investment is highly advantageous. A similar predisposition in the composition of the investors' bond portfolio was not found. Before we tested the effect of the tax reform on the public's investment patterns, we estimated, using the Tobin and Markowitz portfolio-selection model, the effect of the predisposition to domestic investment ("home bias") on the composition of the securities portfolio. By applying the model, we were able to isolate the effect of the tax reform from other factors unrelated to tax discrimination.

The findings show that the main effect of the tax reform will probably be an increase in institutional and private investments in foreign bonds. The difference in the intensity of the effect of the reform will be related to investors' strong predisposition to invest in domestic stocks and a significant increase in the relative advantageousness of investing in foreign bonds after the reform. The findings also show that the reform should have a more significant effect (in both relative and financial terms) on institutional investors than on private ones, mainly because the current tax discrimination is more significant for institutional investors.

1. Introduction

According to the income-tax reform that went into effect in January 2003, the 35 percent tax rate on capital gains, dividend income, and interest income from foreign securities is to be equalized in January 2007 to the rates that apply to corresponding domestic gains and income. For pension funds, advanced-training funds, and provident funds, the equalization of the tax rates means that earnings from foreign securities will be *tax-exempt*. The reform will not affect insurance companies, which are exempt from tax on earnings from foreign securities,¹ and firms that pay a standard tax rate on earnings from domestic and foreign securities. At the present writing, legislation to move up the reform to January 2005 is being prepared.² Table 1 summarizes the tax rates on earnings from foreign securities before and after the introduction of the form as foreseen.

Table 1: Tax Rates on Capital Gains, Dividend Income, and Foreign-Securities Income before and after the Reform

		Domestic securities (%)		Foreign securities****			
				Pre-reform tax rates (%)		Post-reform tax rates (%)	
		Capital gains	Dividend/ interest income	Capital gains	Dividend / interest income	Capital gains	Dividend/ interest income
Pension and provident funds		0	0	35	35	0	0
Insurance companies		0	0	0	0	0	0
Private investors*	Stocks	15**	25	35	35	15	25
	CPI- Indexed bonds	15	15	35	35	15	15
	Unindexed bonds	10	10				

* Investors that are neither institutions nor firms, i.e., households and mutual funds.

** The tax is applied to real capital gain when inflation is positive and to nominal capital gain when inflation is negative.

*** The tax rates apply to earnings in foreign exchange. Additional earnings occasioned by depreciation of the domestic currency, for example, are not taxed.

¹ Insurance companies are exempt from tax only on their defined-contribution and defined-benefit portfolios. On the Nostro and general-insurance portfolios they pay corporate tax plus a financial-institution tax.

² The Knesset (parliament) already approved the lowering of the tax rate to 15 percent on the ETF starting in January 2004.

The elimination of tax discrimination between foreign and domestic securities may have two opposing effects. On the one hand, domestic investors will be better off because they will pay a lower tax rate on their investments in foreign securities. On the other hand, due to the increase in relative advantageousness of investing in foreign securities, sources may be diverted from the domestic capital market to destinations abroad, possibility resulting, at least in the short term, in rapid currency depreciation, falling prices in the domestic capital market, and an inclination among firms to raise capital abroad in view of difficulty that they may encounter in doing so domestically.

This study examines, by means of an investment-portfolio model developed by Markowitz, how the tax reform may affect the composition of the public's portfolio of financial assets and bring about changes in investors' welfare and, in particular, the proportions of their foreign-securities investments. In view of the change in investment patterns occasioned by the reform, we will examine how severely the tax reform may threaten the stability of the capital and forex markets.

Many empirical studies, some more than thirty years old, have documented the great benefit of internationally diversifying the investment portfolio. (See, for example, Grubel [1968], Levy and Sarnat [1970], Solnik [1974], and De Santis and Gerard [1997].) Theoretical findings also show that international diversification is very useful. Just the same, empirical findings from various periods and markets around the world attest to a relatively low rate of investment in foreign stocks relative to the optimum diversification derived from standard investment-portfolio models (e.g., French and Poterba [1991] and Lewis [1999]). This indicates that investors clearly prefer to invest in domestic assets (despite the implicit gain to be made by diversifying), in what the literature calls "home bias."

How can one explain the discrepancy between the benefit of international diversification of investments and the diversification actually observed? Do investors not make their investment decisions rationally? Since it does not stand to reason that most investors in so many markets behave irrationally for a lengthy period of time, the literature attempts in various ways to reconcile the home-bias phenomenon with the premise of investor rationality. The first explanations that were offered focused on constraints that obviate or diminish the advantages of international diversification of investments, such as limitations on capital flows, differences in taxation, and high commission expenses for investment in foreign

stocks. (See, for example, Black [1974] and Stulz [1981].) During the past decade, capital-flow restrictions have been lifted in most developed countries. Furthermore, due to technological developments, the commission expenses related to investing in foreign securities have come down considerably. Nevertheless, as Table 2 shows by presenting the trend in rates of investment in domestic stocks in several countries in 1989–2001, the proportion of investment in foreign stocks has increased by only a few percent. The other explanations of home bias pertain to various uncertainty factors that are associated with investment in foreign countries, such as exchange-rate risk³ and differences in culture, regulation, and taxation.⁴ Recent studies also link the home bias to an information asymmetry between domestic and foreign investors, since domestic investors have better access to information about domestic firms (Coval and Moskowitz [1998], Brennan and Cao [1997], and Coval [1996]).

Table 2: Rate of Investment in Domestic Stocks, 1989–2001, and Domestic Market Value as Proportion of Global Market Value

Country	Rate of investment in domestic stocks (%)		Proportion of domestic market in global market (%)
	1989*	2001**	2001
US	92.9	89	48
UK	82	78	8
Japan	95.7	91	13
Germany	79	80	4
France	89.4	83	4

* Source of data: French and Poterba (1991).

** Source of data: Jaske (2001).

Another group of explanations links home bias with a preference among investors that, for various reasons, prompts them to invest in firms that are geographically nearby.

³ Notably, the aforementioned studies show that international diversification of the investment portfolio is useful even when exchange-rate changes are taken into account.

⁴ A recent study (Dahlquist, Pinkowitz, Stulz, and Williamson [2003]) expresses the view that the high proportion of domestic investment is due partly to principals' stakes, which are usually of low tradability.

Huberman (1998) and Coval and Moskowitz (1999), for example, found that American investors often tend to invest in companies that operate in the state or even in the town where they live, even though other American cities or states have profitable firms that operate in the same regulatory environment and, of course, present no exchange-rate risk. If we apply this approach to international diversification of investments, we may explain the home bias. The question of why geographic proximity creates preference, however, still remains. Below in this study, we translate geographic proximity into a stronger sense of certainty about the capital market. Although this sense of certainty is subjective and not necessarily related to real uncertainty, it ultimately determines investors' investment policies.

Table 3: Negotiable Securities Portfolio, Institutional Investors (Excluding Insurance Companies) and Private Investors, December 2003*

		Israeli stocks	Foreign stocks	Israeli bonds	Foreign bonds	Total
Institutional investors — provident funds and new pension funds⁵	\$ bln	6.7	0.6	21.4	0.14	28.84
	Pct.	23.2	2.1	74.2	0.5	100
Private investors — mutual funds and households⁶	\$ bln	16	1.4	10.7	2.6	30.7
	Pct.	52	4.6	35	8.4	100

* Sources of data: domestic investment—Bank of Israel Monetary Department; foreign investment—Bank of Israel Foreign Exchange Activity Department.

⁵ Old pension funds are irrelevant in this study because their portfolios contain a negligible proportion of negotiable assets and because their external investments are restricted. The study does not deal with insurance companies because their earnings from foreign securities are already tax-exempt.

⁶ Since both households and firms must report their external investments to the Bank of Israel, there are detailed data about these sectors' external portfolio investments. However, households and firms are not required to report their investments in domestic securities, while this requirement does apply to institutional investors. Therefore, we have only aggregate data about these sectors' investments in domestic securities. Since the tax reform does not affect firms, it is necessary to isolate households' investments in domestic securities from the aggregate investment of both sectors. Household investments in domestic securities were estimated on the assumption that their share in both sectors' investments is identical to their share in principals' holdings (which account for about 50 percent of total investments by firms and households in domestic shares). The data on principals' holdings were culled from the Securities Authority database.

Table 3 shows the composition of the securities portfolio of private investors (households and mutual funds) and institutional investors (excluding insurance companies) in December 2003. As we indicate below, the rates of foreign stock investment shown in Table 3 fall far short of the optimal investment rate derived from a standard investment-portfolio model. By inference, then, investors in Israel, like those in many other countries, have a strong home bias. Thus, to isolate the effect of the reform we must first estimate the effect of the home bias on the way investors in Israel select their investment portfolios. This study proposes an empirical model that was developed as part of an investment-portfolio model in order to estimate the impact of home bias on portfolio selection. We assume that domestic investors perceive geographical and cultural distance and information asymmetry as additional factors of uncertainty that exist when they consider investing in foreign assets and that are not counted in the historical standard deviation of returns. The model applies this premise by assigning a higher value to the risk of investing in foreign securities than the objective risk of the return. To estimate investors' predisposition to invest in domestic assets, we first derive, from the point of view of an Israeli investor who does business in real NIS (domestic currency) terms at the current tax rates (Table 1), the optimum composition of an international investment portfolio in terms of domestic and foreign securities. In the second phase, we compare the optimum rate of investment in domestic securities with the actual rate. The riskiness of foreign securities is multiplied by an Implied Home Bias Factor (IHBF) that artificially elevates the riskiness of the securities. The higher the factor is, the more investors are predisposed to keep their investments at home. The IHBF is the implicit component of risk in investing in foreign assets, as reflected in the makeup of domestic investors' portfolio. Accordingly, the IHBF in the composition of Israeli investors' portfolios is set at the point where the optimum investment rate in domestic securities is equal to the actual investment rate.

In the first phase, we assume that the implicit subjective uncertainty factor in the foreign security markets—the IHBF—will not change after the tax reform goes into effect.⁷ Accordingly, at a given IHBF that reflects investors' behavior, we re-derive the optimum portfolio at the post-reform tax rates (Table 1) and compare the optimum rate of investment

⁷ Later on, we perform a sensitivity analysis of the results for various IHBF values that reflect a change in investors' home bias.

in domestic securities with the current rate. The result of this inquiry may indicate the potential capital flight from Israel in the aftermath of the reform.

The behavioral-economics literature reports a predisposition among investors to "mental department" assets by types as they select their investment portfolios (e.g., Thaler (1985) and (1999) and Tversky and Kahneman (1981). For example, investors decide first how to divide their portfolios between stocks and bonds and only afterwards decide how to diversify within each type of asset separately. They tend to do this even though, according to the theoretical models, the portfolio resulting from staggered selection is usually inferior to that selected "in one go." Obviously, staggered selection is indicative of irrationality in investors' behavior. In view of this finding, we believe that to reflect investors' behavior more accurately, the effect of the tax reform on stock portfolio and the bond portfolio should be tested separately.

The impact of the reform is also examined separately for institutional investors (provident and pension funds, but not insurance companies) and private investors (households and mutual funds).⁸ We made this distinction for two main reasons. First, as stated above, the elimination of tax discrimination affects each type of investor differently. After the reform, institutional investors will be exempt from tax on earnings from foreign securities whereas private investors will be taxed at 15 percent. Furthermore, the tax discrimination is more significant for institutional investors, whose earnings on domestic securities are currently tax-exempt, than for private investors, who pay a domestic tax of 15 percent. Moreover, since the two types of investors operate in different ways, they may have different home biases, as our study indeed finds.

Our findings show that in Israel, as in many countries, both private and institutional investors are strongly predisposed to invest in domestic stocks—the rate of investment in domestic stocks exceeds the optimum rate by far—but do not display a similar predisposition in selecting their bond portfolios. Thus, the rate of investment in domestic bonds approximates the optimum rate.

⁸ The classification is based on taxation definitions. Thus, we categorize mutual funds as private investors even though some define them as institutional.

Table 4: Results of the Model (Condensed Findings)—Expected Increases in Private and Institutional Investors’ Investments in Foreign Securities after the Tax Reform (percent and \$ billion)*

		Private investors	Institutional investors	Total, \$ billion
Foreign stocks	Pct. of stock portfolio	5	7	1.5
	\$ billion	0.9	0.6	
Foreign bonds	Pct. of bond portfolio	16	36.4	9.9
	\$ billion	2.1	7.8	
Total	\$ billion	3	8.4	11.4

* Based on December 2003 balances in the stock and bond portfolios of institutional and private investors.

Table 4 presents the main results of the analysis of the effect of the reform on the composition of institutional and private investors’ securities portfolios. The results of the model show that the reform will probably have its greatest effect on the bond portfolios of both types of investors. This will occur for two main reasons. (a) As we explain below, the elimination of tax discrimination will have a more significant upward effect on the relative advantageousness of investing in foreign bonds. (b) Investors’ strong predisposition to invest in domestic stocks—a phenomenon that, as stated, does not exist in regard to bonds—perceptibly attenuates the effect of the reform on investment in foreign stocks.

The findings also show that the reform will probably have a more significant effect (in both relative and in financial terms) on institutional investors than on private ones. The main reason is that the current tax discrimination is more significant for institutional investors. Furthermore, the bond portfolio (in which, as stated, the reform is expected to have most of its effect) of institutional investors is almost twice as large as that of private investors.

Insurance companies, unlike other investors, do not face tax discrimination. As stated, their earnings on foreign securities are already tax-exempt. Accordingly, the behavior of insurance companies after the gradual deregulation of institutional investors’ activity in foreign assets⁹ may be another indicator of the expected effect of the tax reform on the rate of

⁹ In January 2001, the maximum allowable rate of investment in foreign assets by institutional investors was raised from 5 percent to 20 percent, and in January 2003 the limit was abolished altogether.

investment in foreign securities by the provident and pension funds, which display similar investment patterns. Table 5 presents the proportion of foreign securities in the negotiable-securities portfolio of defined-contribution life-insurance plans¹⁰ in 2000 and 2003.

Table 5: Proportion of Foreign Securities in the Negotiable-Securities Portfolio of Defined-Contribution Life-Insurance Plans, 2000–2003

Year*	Investment in foreign securities (pct.)
2000	5.8
2003	17

* End-of-year data, Bank of Israel Monetary Department.

As Table 5 shows, insurance companies have been investing much more of the negotiable-securities portfolio of defined-contribution insurance plans in foreign securities in recent years, the stock of such securities climbing to 17 percent in 2003. Notably, the main adjustment of the portfolio was made between 2001 and 2002. Provident and pension funds, in contrast, did not adjust their rates of investment in foreign securities in any significant way after the restriction on investing in foreign assets was abolished. Table 3 shows that provident and pension funds invest 2.6 percent of their portfolios in foreign securities today. The main reason for the difference in the sectors' rates of investment in foreign securities is related to the absence of tax discrimination in the activities of insurance companies. Accordingly, if provident and pension funds increase their rates of investment in foreign securities to levels resembling those of insurance companies after the tax reform, we would, according to this approach, expect them to adjust their portfolios in the sum of \$4.2 billion due to the reform. This estimate reinforces the findings of our analysis, which indicate that the reform will induce a large capital outflow by institutional investors.

¹⁰ The securities portfolio of defined-benefit life-insurance plans is irrelevant in our analysis because it is made up largely (70 percent) of non-negotiable earmarked bonds and the rate of external investment in this portfolio is negligible.

How might Israel's financial and forex markets be affected by an outflow of investment as large as that indicated in our findings?

One of the main factors to consider when predicting developments in the financial and forex markets after the reform is the pace of the portfolio adjustment. Since the tax reform is expected to affect institutional investors in the main, the way such investors operate after the reform will probably be of central importance in the development of the financial and forex markets. Experience shows that institutional investors respond to regulatory changes gradually and slowly. A salient example is the way insurance companies adjusted their portfolios after the deregulation of their external investment. In this case, the portfolio adjustment took place gradually over a period of several years.

Another factor that may attenuate the capital outflow occasioned by the reform is the directive that instructs insurance companies and provident funds to advertise their returns on a monthly basis (without noting the related standard deviation). The directive is expected to diminish institutional investors' motivation to diversify their portfolios internationally by prompting portfolio managers to act partly in response to short-term considerations, as against the long-term considerations that usually motivate international diversification. A temporary currency appreciation, for example, may delay the acceleration of external investment after the introduction of the reform, even though long-term considerations would advise in favor of a portfolio adjustment of this kind.

The pace of portfolio adjustment is also affected by developments in market prices. A rapid capital flight may cause domestic securities to become overpriced and, therefore, attractive to both domestic and foreign investors. The adjustment process may continue until a new equilibrium is attained. Such a development may slow the portfolio adjustment by causing investment policy to be driven by short-term considerations, such as the relative attractiveness of asset prices, beyond the long-term considerations that favor international diversification of the portfolio.

This study is structured as follows: Part 2 describes the empirical model, Part 3 describes the data and analyzes the foreseen effect of the reform within the framework of the model, and Part 4 presents a summary and conclusions.

2. The Model

This study examines, by means of the portfolio-selection model of Markowitz (1952) and Tobin (1958), how the Israeli tax reform that is expected to go into effect in 2005 may affect the composition of the portfolio of investors in Israel and, in particular, the rate of investing in foreign assets. As the foregoing discussion shows and as we demonstrate below, investors in Israel, as in many other countries, are strongly predisposed to invest in domestic assets. To isolate the effect of the reform, we must first estimate the effect of this predisposition on the composition of the portfolio. This part of the study presents an empirical model that estimates investors' predisposition to invest in domestic assets. The premise in the model is that this home bias, as it is known in the literature, occurs because investing in foreign countries involves additional uncertainty factors beyond those of the risk of return on securities. In other words, the model assumes that foreign stocks, from the domestic investor's subjective point of view, are riskier than the standard deviation of their return. To apply this premise, the standard deviation of foreign stocks is multiplied by an Implied Home Bias Factor (IHBF) that artificially inflates the riskiness of foreign securities. In this construct, the IHBF-adjusted standard deviation measures the subjective standard deviation. To estimate the IHBF in the composition of the investor's portfolio, we derive the optimum composition of an international securities portfolio from the point of view of an Israeli investor who operates in real NIS (domestic currency) terms at current tax rates¹¹ and compare the optimum rate of investment in domestic securities with the actual rate. By gradually raising the IHBF, we make the investment in foreign securities increasingly unattractive. The IHBF for investments by Israeli investors is obtained at the point where the optimum rate of investment (at the subjective risk) in domestic securities equals the actual investment rate.

The optimum portfolio is derived under the limitation of selling short. We chose to focus on this constraint because actual holders of international portfolios rarely tend to sell short, least of all at the rates obtained by deriving the optimum portfolio with no restriction on selling short. Furthermore, some institutional entities are not allowed to invest short.

¹¹ 15 percent on real gains from domestic securities for private investors, a tax exemption on gains from domestic securities for an institutional investor, and 35 percent taxation of (forex) earnings from foreign securities for both. See Table 1.

Given the short-selling restriction, we derive the optimum portfolio by solving the following maximization problem:

$$\max \left\{ \frac{E(R_p) - r_f}{\sigma_p} \right\} \quad (1)$$

a) s.t.

b) $\sum_{i=1}^n x_i = 1$

where x_i is the proportion of investment in asset i , n is the number of assets in the portfolio, $E(R_p)$ and σ_p are, respectively, the average and standard deviation of the portfolio return (where the subscript P denotes the investment portfolio). These are calculated in the following way:

$$E(R_p) = \sum_{i=1}^n x_i E(R_i) \quad (2)$$

$$\sigma_p = \sqrt{\sum_{i=1}^n x_i^2 \sigma_i^2 + \sum_{i=1}^n \sum_{\substack{j=1 \\ j \neq i}}^n x_i x_j \sigma_{ij}}, \quad (3)$$

where $E(R_i)$ and σ_i^2 are, respectively, the average and variance of the return on asset i and σ_{ij} is the covariance of the returns of assets i and j .

There are various ways of applying the IHBF for analysis of a domestic investor's investment policy. The simplest and most reasonable way is to assume that the domestic investor experiences more uncertainty about investing in foreign assets than in domestic assets, i.e., that the standard deviation of rates of return as perceived by the domestic investor (the subjective S.D.) exceeds the standard deviation as measured on the basis of the historical return. We assume, however, that the correlation between the returns on the assets, ρ , is unaffected by the subjective estimate of the risk.

In view of these premises, the standard deviation of foreign asset i and the covariance of two foreign assets i and j are calculated as follows:

$$\sigma_i^F = \text{IHBF} \sigma_i \quad \text{and} \quad \sigma_{ij}^{FF} = \rho \sigma_i^F \sigma_j^F = \text{IHBF}^2 \sigma_{ij} \quad (4)$$

The covariance of domestic asset i and foreign asset j is obtained by solving:

$$\sigma_{ij}^{LF} = \rho \sigma_i^F \sigma_i^L = \rho \sigma_i^F \sigma_i = \text{IHBF} \sigma_{ij}, \quad (5)$$

where the superscript F denotes a foreign asset, the superscript L denotes a domestic asset, and the IHBF reflects investors' home bias.

The risk may be raised by various arbitrary extents. However, the IHBF that explains the composition of Israeli investors' portfolio sustains the following equation:

$$\sum_{i=1}^{n_L} x_i^L = \sum_{i=1}^{n_L} x_i^{AL}, \quad (6)$$

where n_L is the number of domestic assets in the international investment portfolio, $\sum_{i=1}^{n_L} x_i^{AL}$ is the sum of the actual proportions of investment in domestic stocks (AL is an abbreviation for Actual Local), and $\sum_{i=1}^{n_L} x_i^L$ is the sum of the proportions of investment in domestic assets in the optimum portfolio.

Accepting as a given the IHBF computed on the basis of the composition of the Israeli investors' portfolio, we re-derive the optimum portfolio at the post-reform tax rates and compare the optimum investment rate in domestic assets with the actual rate.

3. Effect of the Reform on the Composition of Israelis' Investments – Data and Results

As stated, on the basis of recent empirical findings in behavioral economics that point to mental department of assets in the portfolio-selection process, we assume that investors select their portfolios in two phases: diversification between bonds and stocks and diversification within each type of asset separately. In view of this premise, we examine the effect of the tax reform on the stock portfolio and the bond portfolio separately.¹²

3.1.1 Optimum Composition of International Stock Portfolio before the Tax Reform

Following the convention in studies on international diversification of investments, we examine the optimum composition of an international stock portfolio made up of stock indices that represent investments in the domestic stock market and foreign stock markets

(see, for example, Lewis [1999]). The stock portfolio examined here is made up of the General Stock Index on the Tel Aviv Stock Exchange, representing an investment in the Israeli capital market, and a sample of stock indices that represent investments in the capital markets of main economic blocs (US, Europe, and Eastern Asia). The following indices are included in the portfolio:

Country	Representative Index
US	S&P 500
UK	FTSE 100
Israel	General Stock Index
Germany	DAX
Japan	Nikkei 225
Hong Kong	HSI

To derive the optimum composition of the stock portfolio, we must first estimate several parameters of the future distribution of the index returns—average, standard deviation, and matrix of correlation coefficients. The choice of sample period has a direct effect on the return distribution estimates, of course. The longer the sample period is, the better the estimates are in statistical terms since there are more observations. However, the longer the sample period is, the less indicative the distant observations are of the future distribution of returns because the economic environment changes and, in its aftermath, so do the distributions of returns. Accordingly, we decided to estimate the future distribution of returns on the basis of annual and monthly index returns¹³ between 1993 and 2003.

The rates of return on the foreign stock indices were culled from the Bloomberg database and those on the General Stock Index were extracted from the database of the Bank of Israel Research Department. All indices were adjusted for distribution of bonus stocks, stock splitting, and rights, but only the General Stock Index and DAX were adjusted for the distribution of cash dividends. For indices in which this adjustment was not made, the periodic rate of return was calculated in the following way:

¹² We also examined the effect of the reform on the total portfolio, i.e., bonds and shares together. Notably, the findings elicited by this analysis resemble those obtained from analysis of the effect of the reform on the two portfolios separately.

¹³ The effect of the reform is examined in view of monthly and annual data, but the discussion focuses on analysis of the reform on the basis of annual data.

$$R_t = \frac{P_t + D_t}{P_{t-1}} - 1,$$

where R_t is the periodic rate of return, P_t is the index level at time t , and D_t is the dividend distributed at time t . Table 6 presents concisely the estimation of the main parameters of the distribution of annual returns on the stock indices in index-currency terms. Table 6.a shows the average and standard deviation of the returns; Table 6.b gives the matrix of correlation coefficients.¹⁴

Table 6: Distribution of Annual Stock Index Returns in Index Currency Terms, 1993–2003

6.a: Average and Standard Deviation

	Average (%)	S.D. (%)
Germany	13.1	28.6
Hong Kong	18.7	45.3
Israel	13.5	30.8
Japan	-1.5	19.8
US	12.8	19.4
UK	9.2	17.4

6.b: Correlation Coefficient Matrix

	German y	Hong Kong	Israel	Japan	US	UK
Germany	1					
Hong Kong	0.65	1				
Israel	0.79	0.69	1			
Japan	0.48	0.56	0.52	1		
US	0.78	0.33	0.57	0.42	1	
UK	0.91	0.59	0.73	0.42	0.93	1

¹⁴ For most of the stock indices, the average return also reflects returns to longer terms. Japan is exceptional in this respect because its average foreseen return is undoubtedly greater than (-1.5%). Thus, in the case of Japan, the return distribution during the sample period probably does not reflect the future distribution.

The parameters in Table 6 are based on nominal returns in index-currency terms before tax on gains. This study, as stated, examines the effect of the reform from the point of view of an Israeli investor who operates in real NIS terms.

We compute the rate of return in real NIS terms in the following way:

$$R_{it}^R = \frac{(1 + R_{it})(1 + d_{it})}{(1 + \pi_t)} - 1, \quad (7)$$

where R_{it} is the rate of return on index i at time t , R_{it}^R is the rate of return of index i at time t in real NIS terms, d_{it} is the rate of change of the NIS exchange rate against the currency of index i at time t , and π_t is the inflation rate during period t . Obviously, if $d_{it} = \pi_t$, i.e., if the depreciation rate and the inflation rate are identical, $R_{it}^R = R_{it}$.

Table 7 presents the parameters of the distribution of annual returns on the indices in real NIS terms. Table 7.a shows the average and the standard deviation of the returns and Table 7.b gives the correlation coefficient matrix.

Table 7: Distribution of Annual Stock Index Returns in real NIS Terms, 1993–2003

**7.a: Average and S.D. of Index Returns and Pace of Exchange-Rate Change,
NIS against Index Currency**

	Avg. (%)	S.D. (%)	Avg. (%) change in NIS exchange rate against index currency	S.D. (%) of NIS exchange-rate change	Correlation between exchange- rate change and inflation rate
Germany	10.8	27.1	5.1	12.9	0.30
Hong Kong	16.4	45.4	4.4	6.5	0.46
Israel	7.8	33.5	—	—	—
Japan	-0.4	27.1	4.3	13.8	0.41
US	11.0	20.8	4.5	6.5	0.46
UK	9.1	18.2	6.2	8.3	0.53

7.b: Correlation Matrix

	Germany	Hong Kong	Israel	Japan	US	UK
Germany	1					
Hong Kong	0.54	1				
Israel	0.68	0.64	1			
Japan	0.51	0.53	0.50	1		
US	0.80	0.28	0.51	0.26	1	
UK	0.88	0.52	0.59	0.37	0.92	1

By comparing the data in Tables 6.a and 7.a, we find that the transition from nominal returns in index currency terms to real NIS returns lowered the average and usually widened the standard deviation of the index returns. The average return declined because the average inflation rate in Israel during the sample period¹⁵ exceeded the change in the NIS exchange rate against most index currencies. This fact is consistent with the PPP model, according to which the equilibrium exchange rate varies commensurate with the inflation spread. Since the average inflation rate in all countries participating in the sample was positive during the sample period, the average rate of exchange-rate change in Israel should be lower than the average inflation rate, following the PPP model.¹⁶

We also see that, in most cases, the transition to real NIS returns had no significant effect on the standard deviation of the indices even though the changeover to real NIS returns added two risk factors—exchange-rate risk and inflation risk. The reason for the absence of major change in the standard deviation is the positive correlation that exists between the inflation rate and the pace of change in the NIS exchange rate against the index currencies (Table 7a). Due to this positive correlation, the inflation risk offsets some of the exchange-rate risk. Thus, the exchange-rate risk should not be an important factor in the portfolio-selection behavior of investors who operate in real NIS terms.

To examine the effect of the reform, we compared the optimum composition of the stock portfolio at the pre-reform tax rates with that at the post-reform rates. As stated above, tax on capital gains from investment in Israeli securities is computed on real gain when inflation is

¹⁵ The average and S.D. of Israel's inflation rate in during the sample period were 6.2 percent and 5 percent, respectively.

positive and on nominal gain when inflation is negative. Accordingly, the real after-tax rate of return¹⁷ on an investment in Israeli stocks is calculated in the following way:

$$\text{Where } \pi \geq 0 \rightarrow, R_{it}^{AT} = \left[\frac{(1 + R_{it})}{(1 + \pi_t)} - 1 \right] (1 - T) \quad (8)$$

$$\text{Where } \pi < 0 \rightarrow, R_{it}^{AT} = \frac{[1 + R_{it}(1 - T)]}{(1 + \pi_t)} - 1$$

where R_{it}^{AT} is the real NIS after-tax rate of return on index i at time t and T is the relevant tax rate as shown in Table 1 and assuming that the investor offsets losses.

The tax on gains from investments in foreign securities is calculated on the foreign-exchange gain. Accordingly, the real after-tax NIS rate of return on investments in foreign stocks is as follows:

$$R_{it}^R = \frac{[1 + R_{it}(1 - T)](1 + d_{it})}{(1 + \pi_t)} - 1, \quad (9)$$

where R_{it} is the rate of return in Forex on index i at time t .

Table 8 and Figures 1.a–c present the average and standard deviation of returns on the stock indices in real after-tax NIS terms at the tax rates preceding and following the reform, from private investors' and institutional investor' points of view.

¹⁶ Except for the average rate of change of the exchange rate of the British pound against the NIS, which approximates Israel's inflation rate.

¹⁷ Due to the difficulty in separating the yield in some indices into dividend income and capital gains, we assume that the rate of capital-gains tax is applied to the total yield. This assumption does not change the results significantly because the dividend component in the total yield is usually negligible.

Table 8: Distribution of Returns on Stock Indices in Real After-Tax NIS Terms, before and after Tax Reform, 1993–2003

8.a: Average and Standard Deviation

	Before reform				After reform			
	Private investor		Institutional investor		Private investor		Institutional investor	
	Avg. (%)	S.D.(%)	Avg. (%)	S.D.(%)	Avg. (%)	S.D.(%)	Avg. (%)	S.D.(%)
Germany	6.8	17.9	6.8	17.9	9.1	23.0	10.8	27.1
Hong Kong	10.1	29.4	10.1	29.4	13.7	38.5	16.4	45.4
Israel	6.7	28.5	7.8	33.5	6.7	28.5	7.8	33.5
Japan	-0.1	20.7	-0.1	20.7	-0.3	24.2	-0.4	27.1
US	6.6	14.1	6.6	14.1	9.1	17.9	11.0	20.8
UK	5.9	12.5	5.9	12.5	7.7	15.7	9.1	18.2

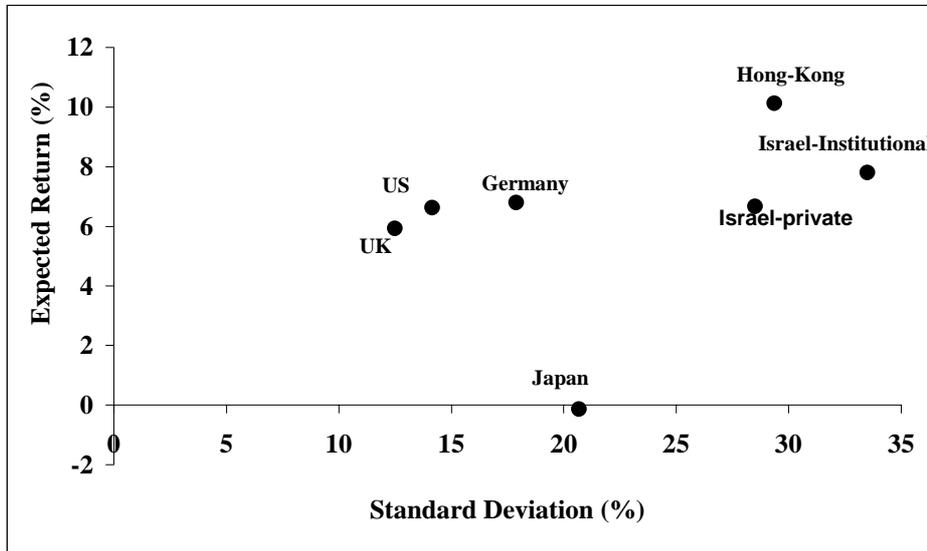
8.b: Matrix of Correlation from Private Investor's Point of View, before Reform¹⁸

	Germany	Hong Kong	Israel	Japan	US
Germany	1				
Hong Kong	0.847	1			
Israel	0.877	0.956	1		
Japan	0.696	0.795	0.792	1	
US	0.373	0.497	0.528	0.598	1

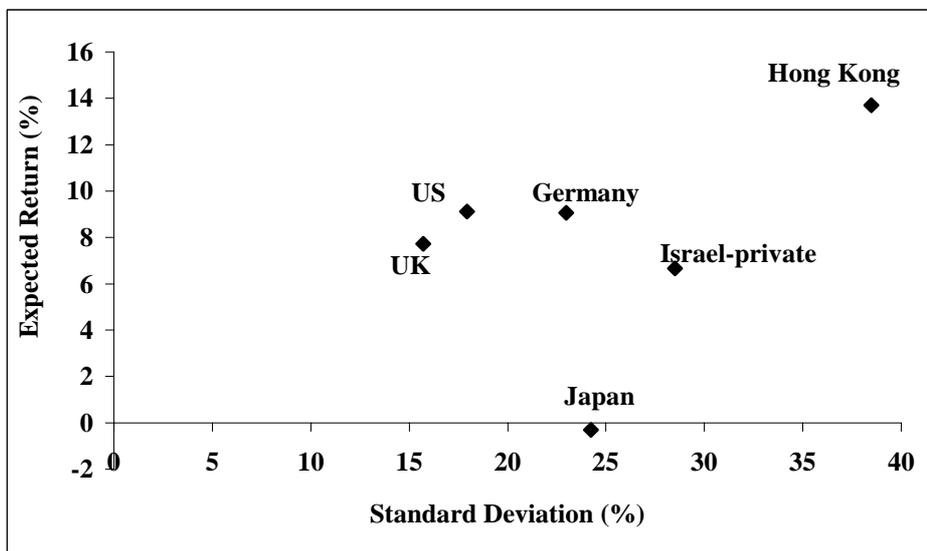
¹⁸ The matrix of correlation coefficients from institutional investors' point of view and from that of private and institutional investors after the reform resembles that of the correlation coefficients of a private investor before the reform.

**Figure 1: Mean and Standard Deviation of Returns on Stock Indices in Real After-Tax
NIS Terms, before and after Reform**

1.a: From Private and Institutional Investors' Point of View, before Reform



1.b: From Private Investors' Point of View, after Reform



1.c: From Institutional Investors' Point of View, after Reform

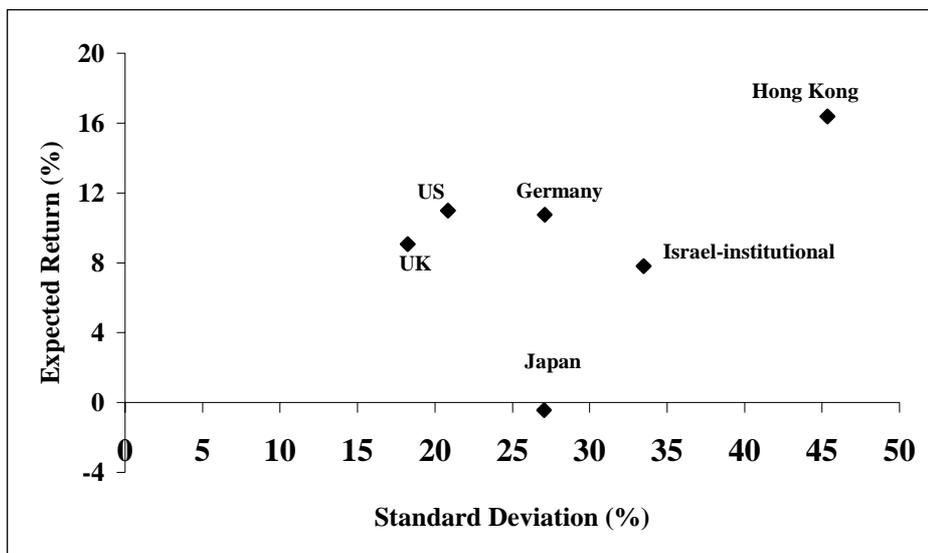


Figure 1.a and Table 8 show that for a private investor, an investment in the Israeli stock market before the tax reform is inferior—in terms of lower average and higher standard deviation—only to an investment in the German stock market.¹⁹ However, the average return on the Israeli stock market is only slightly higher (by 0.1 percent) than the average for the American market, whereas Israel's standard deviation is twice as large. From the standpoint of an institutional investor, an investment in the Israeli capital market before the tax reform is inferior only to an investment in Hong Kong's stock market. For both types of investors (private and institutional), the Israeli stock market is a better choice than the Japanese.

We now examine the effect of the tax reform on the various parameters. By comparing the parameters of the index return distribution before and after the tax reform (Table 8), we see that the reform increases both the average and the standard deviation of the returns on the foreign indices. It is evident, however, that the Israeli stock index is inferior, in terms of average and standard deviation, to several indices in the sample (Figures 1.b and 1.c). To examine how the tax reform will affect the welfare of the Israeli investor, the efficient frontier before and after the reform should be examined.

We perform this analysis now. We derive the efficient frontier from a given vector of average returns and a variance-covariance matrix of the stock indices, and we derive the

¹⁹ This statement, of course, should also be examined in view of the correlation coefficients of the returns. This is done below.

optimum portfolio (according to Equation 1) in view of a given real risk-free interest rate.²⁰ Figure 2 presents the efficient frontier and the optimum portfolio from the point of view of private and institutional investors who operate in real NIS terms, at the tax rates preceding and following the tax reform.

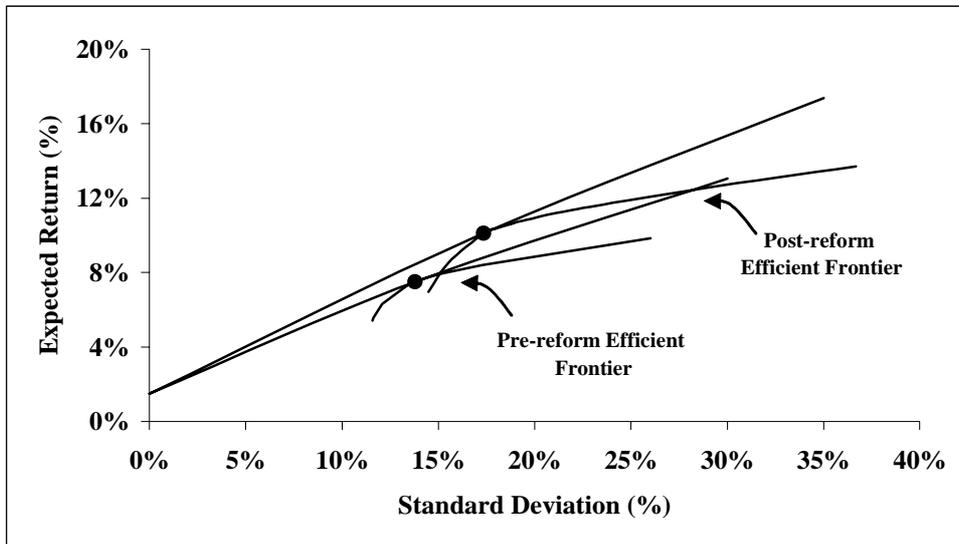
As Figures 2.a and 2.b show, the tax reform usually shifts the efficient frontier for both types of investors (private and institutional) upward and rightward. The reason is related to the fact that lowering the tax rate on gains from foreign stocks raises both the mode and the standard deviation of the return. Furthermore, the efficient frontier obtained at the post-reform tax rates crosses the efficient frontier obtained at current tax rates, for both types of investors.

Comparison of Figures 2.a and 2.b shows that the reform is more significant for institutional investors than for private ones. After the reform goes into effect, the mode and standard deviation of portfolios that are situated on the efficient frontier from an institutional investor's point of view increase at faster rates than at the efficient frontier from a private investor's standpoint. This result is consistent with the fact that the elimination of tax discrimination is more meaningful for institutional investors. The meaning of the reform for institutional investors is a changeover from 35 percent tax to an exemption from tax on earnings from foreign securities, as against a changeover from 35 percent to 15 percent tax for private investors. Another point of interest is the strong similarity between the efficiency curves derived from the current tax rates for private and institutional investors. The basic reason for the similarity is that most portfolios on the efficient frontier, as derived from the points of view of both types of investors, *do not* include investments in the domestic market. In this respect, the differences in taxation (of private and institutional investors) of earnings from domestic stocks are not manifested in optimum portfolio selection. Indeed, the same optimum portfolio is obtained for both investor types, as Table 9 shows.

²⁰ The risk-free interest rate is estimated by taking the average annual rate of net yield on CPI-indexed government bonds in December 2003.

Figure 2: Optimum Portfolio and Efficient Frontier before and after Reform

2.a: From Private Investors Point of View



2.b: From Institutional Investor's Point of View

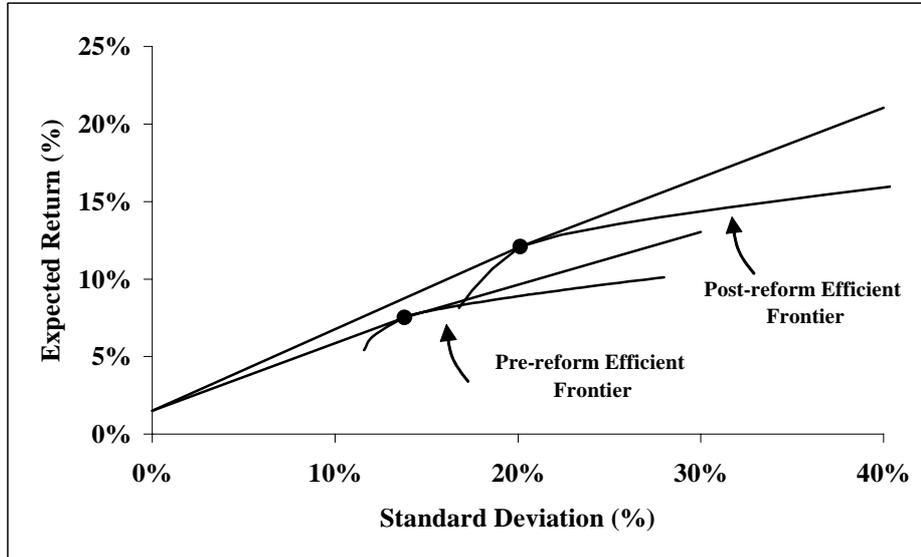


Table 9: Optimum Composition (Pct.) of International Stock Portfolio before Tax Reform, for Private and Institutional Investors

Germany	Hong Kong	Israel	Japan	US	UK	Total	Avg. (pct.)	S.D. (pct.)
0	25	0	0	75	0	100	7.5	13.8

As Table 9 shows, the optimum portfolio includes no investment in the Israeli capital market. The reason is related to the fact that even at current tax rates, which discriminate against investing in foreign securities, an investment in the domestic stock market is inferior to an investment in some foreign stock markets, as discussed above. The use of monthly data and different sample periods elicited similar results.

Even though the optimum portfolio composition, shown above, indicates that the Israeli investor is ill-advised to invest in the domestic market, the data on balances in the stock portfolios of private and institutional investors (Table 10) indicate that 92 percent of the stock portfolio is invested in domestic stocks. This attests to a strong home bias on the part of both private and institutional investors, since the rate of investment in domestic stocks should be much lower even if one takes into account sampling error, an unrepresentative sampling period, or the wrong choice of optimum investment diversification model. To estimate the effect of the home bias on the composition of the stock portfolio, we apply the model presented above, i.e., the standard deviation of the foreign stock indices multiplied by an IHBF that is raised until the rate of investment in domestic stocks in the optimum portfolio equals the actual rate of investment—92 percent.

Table 10: Actual Composition of Private and Institutional Investors' Stock Portfolio, December 2003

		Israeli stocks	Foreign stocks	Total
Institutional investors (excl. insurance companies)	\$ bln	6.7	0.6	7.3
	Pct.	92	8.0	100
Private investors	\$ bln	16	1.4	17.4
	Pct.	91.9	8.1	100

Table 11 shows the IHBFs of institutional and private investors' stock portfolios and the optimum composition of an international stock portfolio.

Table 11: Implicit IHBF of Stock Portfolio and Optimum Composition (Percent) of International Stock Portfolio Given the IHBF

	IHBF	Ger- many	Hong Kong	Israel	Japan	US	UK	Total
Private Investor	3.34	0	0	92	0	8	0	100
Institutional Investor	3.30	0	0	85	0	15	0	100

As Table 11 indicates, both types of investors can optimize their distribution by investing the entire foreign component (8 percent) in the American stock market. This result, consistent with the high proportion (75 percent) of investment in the index obtained in the optimum portfolio even without an IHBF, shows that it is more advantageous to invest in the American stock market than in other stock markets.

3.1.2 Effect of the Tax Reform on Stock Portfolio Selection

After having estimated the subjective risk factor at the pre-reform tax rates, we now estimate the effect of the tax reform on the composition of the Israeli investor's stock portfolio in consideration of the IHBF. Accepting as a given the IHBF in the current composition of the stock portfolios of institutional and private investors, we re-derive the optimum portfolio at the post-reform tax rates. The derivation is based on the parameters shown in Table 8 and the corresponding IHBFs in Table 10. Table 12 shows the optimum composition of the stock portfolio at the post-reform tax rates.

Table 12: Optimum Composition (Percent) of Stock Portfolio at Post-Reform Tax Rates

	IHBF	Ger- many	Hong Kong	Israel	Japan	US	UK	Total
Private investor	3.34	0	0	87	0	13	0	100
Institutional investor	3.3	0	0	85	0	15	0	100

By comparing the optimum stock portfolios of private and institutional investors with the current portfolios, one may infer that the tax reform will lead to a capital outflow. The foregoing findings indicate that private investors should be expected to increase their investments in foreign stocks by 5 percentage points (from 8 percent today to 13 percent) due

to the reform and that institutional investors would increase their investments in foreign stocks by 7 percentage points (from 8 percent to 15 percent). Thus, the reform will probably have a stronger effect on institutional investors than on private investors because the elimination of tax discrimination will be more meaningful for them. The data on balances in the stock portfolios of private and institutional investors (Table 10) show that \$1.5 billion will flow from Israel to the US due to stock-portfolio adjustments following the reform.

This result is surprising in view of the significant tax relief that the reform will offer (decreases from 35 percent to 15 percent or to total exemption). This is the place to stress, however, that the moderate outflow noted above will take place only if Israeli investors' investment patterns and the IHBF remain where they are. Many social and economic phenomena, however, are typified by sudden and sometimes inexplicable and often unforeseen "phase transitions."²¹ The meaning of the phase-transition concept in economic models is that investors' behavior changes abruptly and, usually, unexpectedly when some critical value is reached. For example, if the media or the financial institutions speak about an investment outflow at the time of the tax reform, investors may be inspired to change their investment patterns in a way that will attenuate their natural home bias. Such a process, known in the literature as the "herd effect," may significantly amplify the effect of the reform on the capital market and the stability of the forex market.

To examine how a possible change in investors' behavior patterns may affect the level of capital outflow occasioned by the reform, below we analyze the optimum composition of the stock portfolio at lower IHBF values that reflect a weaker home bias than that existing today.

²¹ "Phase transition," a concept borrowed from physics, refers to discontinuous processes, e.g., the change that occurs in the state of water that is heated to 100 degrees Celsius. Similarly, investors change their behavior patterns when the capital market attains a critical value. For economic models of phase transition, see Levy (2004), and Levy, Levy, and Solomon (1999).

Table 13: Expected Increase in Foreign-Stock Investment Due to Reform, as a Function of the Rate of Decrease in IHBF

Pct. decrease in IHBF	Expected increase in foreign stock investment due to reform				
	Institutional investors		Private investors		Total, \$ billions
	In pct. points	In \$ billions	In pct. points	In \$ billions	
0	5	0.9	7	0.6	1.5
10	12	2.1	16	1.2	3.3
20	23	4	32	2.3	6.3
30	44	7.7	52	3.8	11.4

Table 13 shows the expected increase (in \$ billions) in private and institutional investors' investments in foreign stocks due to the reform as a function of the percent decrease in the IHBF. As the table indicates, the expected adjustment of the stock portfolio due to the reform is very sensitive to the intensity of the investors' predisposition to invest in domestic stocks. For example, a mere 10 percent decrease in the IHBF would bring the stock portfolio adjustment of investors in Israel due to the reform to \$3.3 billion, as against only \$1.5 billion if the home bias does not change.

Importantly, the test of the impact of the reform rested on the assumption that investors offset losses. Institutional investors and quite a few private investors, especially those who transact by means of mutual funds, do exercise this right. Some private investors, however, do not do this because they operate in the capital market briefly and allow much time to pass between investments or, in a few cases, never return to the capital market at all. The distinction between investors who offset losses and those who do not may affect the change in the relative advantageousness of investing in foreign stocks after tax discrimination is abolished. Appendix A examines the expected effect of the tax reform on the composition of the stock portfolios of investors who do not exercise the right to offset losses. The findings of the analysis show that the tax reform will have a more significant effect on the rate of investment in foreign stocks by non-offsetting investors. Thus, the increase in resident investments in foreign securities will probably be greater than the estimate obtained under the assumption that all investors offset losses. The extent of this effect, however, cannot be

estimated, and we have no information about the proportion of investors who do not offset their losses.

3.2 Effect of the Tax Reform on the Bond Portfolio

After having analyzed the effect of the reform on the portfolio of stocks, we now analyze similarly the optimum composition of an international bond portfolio made up of bond indices that represent an investment in the domestic bond market and foreign bond markets. The bond portfolio examined in this study is composed of the index of Israel government bonds²² in the domestic market and government-bond indices in several countries in major blocs: US, Europe, and Eastern Asia.²³

Country	Representative Index
UK	GOLO
US	GOQO
Germany	GODO
Japan	GOYO
Israel	General Index of Government Bonds

The foreign-bond indices were culled from the Bloomberg database and the domestic-bond index from the database of the Tel Aviv Stock Exchange. The parameters of the distribution of returns on the bond index were computed on the basis of returns on one-year holdings during the 1993–2003 period.²⁴

The returns on the foreign-bond indices, in real after-tax NIS terms, were computed on the basis of Equation 9 and the tax rates shown in Table 1. The general index of Israel government bonds is calculated in nominal terms. Therefore, the tax on the index return is calculated on the nominal gain, commensurate with the 10 percent tax rate on earnings from nonindexed bonds.

²² It would be more correct, of course, to analyze a portfolio made up of general indices of government and corporate bonds, but most such indices have been available only since the late 1990s.

²³ There are various indices for foreign government bonds. This study uses that of Merrill Lynch.

²⁴ Our talks with several institutional entities indicate that they recompose their bond portfolios quite frequently and, for this reason, rarely hold bonds to maturity. We assume that institutional investors have a one-year investment horizon at the most.

Table 14 and Figures 3.a–c show the average and standard deviation of the real after-tax NIS returns on the bond indices, at pre-reform and post-reform tax rates, from the points of view of private and institutional investors.

Table 14: Distribution of Bond Index Returns in Real NIS Terms, before and after Tax Reform, 1993–2003

14.a: Mean and Standard Deviation

	Before reform				After reform			
	Private investor		Institutional investor		Private investor		Institutional investor	
	Avg. (%)	S.D. (%)	Avg. (%)	S.D. (%)	Avg. (%)	S.D. (%)	Avg. (%)	S.D. (%)
UK	0.1	6.2	0.1	6.2	1.9	7.4	3.2	8.5
US	-0.8	6.3	-0.8	6.3	0.6	7.3	1.7	8.1
Germany	-1.0	5.3	-1.0	5.3	0.4	5.9	1.5	6.5
Japan	-2.6	5.1	-2.6	5.1	-1.7	5.7	-1.0	6.2
Israel	2.2	6.2	3.1	6.5	2.2	6.2	3.1	6.5

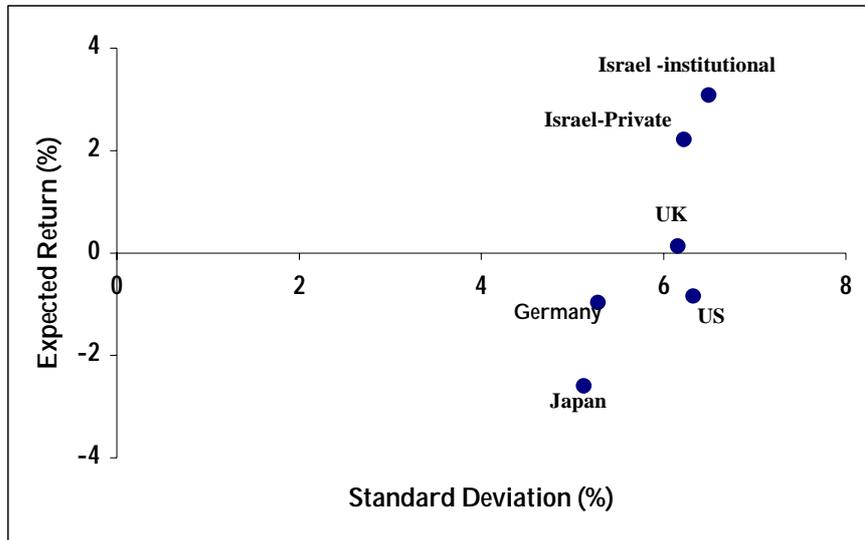
14.b: Correlation Coefficient Matrix for Private Investor, before Reform²⁵

	UK	US	Germany	Japan	Israel
UK	1				
US	0.847	1			
Germany	0.877	0.956	1		
Japan	0.696	0.795	0.792	1	
Israel	0.373	0.497	0.528	0.598	1

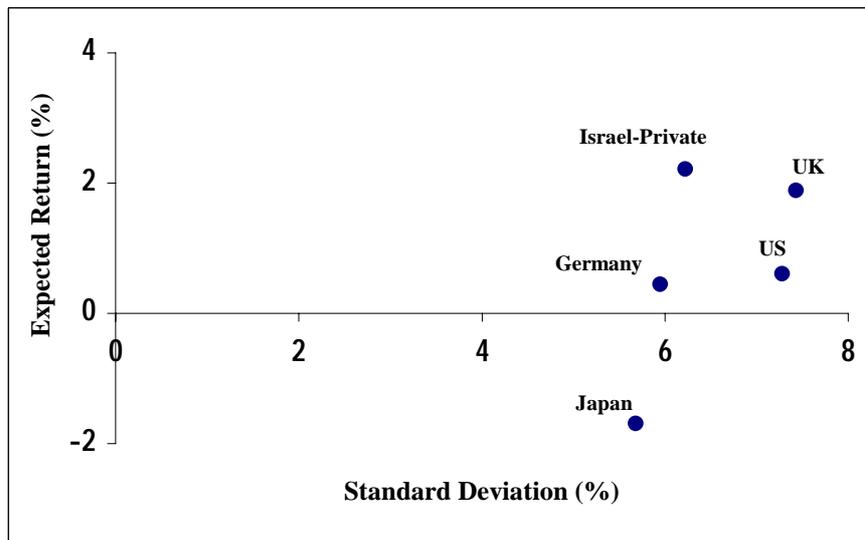
²⁵ The pre-reform matrix for institutional investors and the post-reform matrices private and institutional investors resemble the matrix of a private investor before the reform.

**Figure 3: Mean and Standard Deviation of Real NIS Returns on Bond Indices, 1993–
2003**

3.a: For Private and Institutional Investors, before Reform



3.b: For Private Investors, after Reform



3.c: From Institutional Investors' Point of View, after Reform

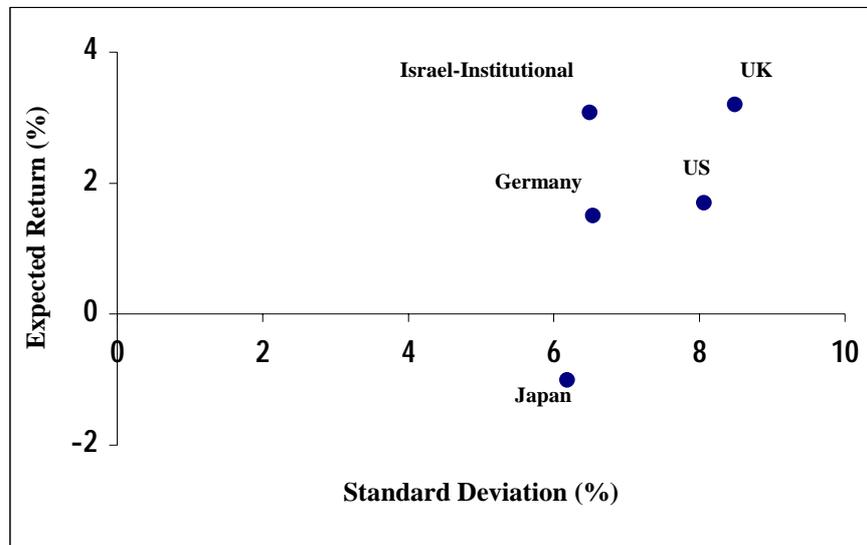


Figure 3.a and Table 14 show that for both private and institutional investors, the domestic-bond index delivers a substantially higher average return than the foreign-bond indices, whereas the standard deviations of both kinds of indices are similar. This suggests that investors, institutional and private alike, are better advised to invest in the domestic-bond market than in foreign-bond markets.

When we compared the parameters of the distribution of returns on the foreign bond indices before and after the reform, we found that investing in foreign bonds becomes much more advantageous after the reform for both private and institutional investors. After the reform, for example, the average return of the British bond index is expected to rise from 0.1 percent to 1.9 percent for private investors and to 3.2 percent for institutional investors. The standard deviation of the index returns, however, is not projected to increase significantly.

How does lowering the tax rate from gains on foreign securities (by 20 percentage points for private investors and by 35 percentage points for institutional investors) cause the mode of

the return on foreign bond indices increase so markedly? The explanation is that the foreign-bond indices generate low real NIS returns at the pre-reform tax rates.²⁶

Accordingly, the relatively strong effect of the reform on the return on foreign bonds indicates the potential of a capital outflow from the domestic bond market to foreign bond markets after the reform goes into effect. To examine this potential, we compared the optimum composition of an international bond portfolio at the post-reform tax rates with the current composition of the bond portfolio of private and institutional investors.

Figure 4 presents the efficient frontier and the mode and standard deviation of the optimum portfolio before and after the reform and for private and institutional investors. Figures 4.a and 4.b show that the reform shifts the efficient frontier upward and rightward. Figure 4.b, however, shows that for institutional investors the optimum portfolio after the reform is superior to the optimum portfolio before the reform; it has a higher mode and a smaller standard deviation. Thus, institutional investors' welfare will improve considerably once the reform goes into effect. The effect of the reform on the welfare of private investors, in contrast, is rather small; the straight lines before and after the reform nearly intersect (Figure 4.a). However, since private investors are also expected to recompose their portfolios after the reform, they, too, will be better off.

We now examine the optimum composition of an international bond portfolio before and after the reform. Table 15 shows the optimum portfolio at pre-reform tax rates; Table 16 shows the actual composition of the bond portfolio of private and institutional investors. As Table 15 indicates, the optimum selection for both types of investors is to invest the entire portfolio in the domestic bond market. This finding comes as no surprise, considering the relative advantageousness of investing in the domestic bond portfolio at current tax rates.

²⁶ We illustrate the point with the following numerical example. Say that in a given year a foreign bond index delivers a 5 percent yield, the depreciation rate of the NIS against the index currency is 2 percent, and the inflation rate is 6 percent. On this basis we may calculate the index yield in real after-tax NIS terms from institutional investor's standpoint of before and after the tax reform.

$$\text{Before the reform: } R_{it}^R = \frac{[1 + .05 \cdot (1 - 0.35)](1 + .02)}{(1 + .06)} - 1 = -0.6\%$$

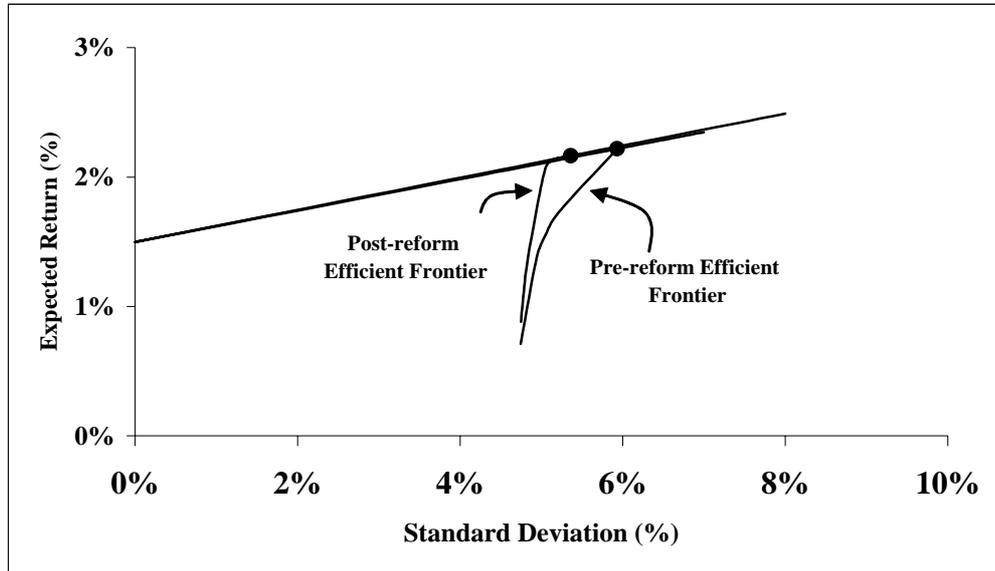
$$\text{After the reform: } R_{it}^R = \frac{(1 + .05)(1 + .02)}{(1 + .06)} - 1 \approx 1.04\%$$

Accordingly, lowering the tax rate by 35 percentage points raises the index yield from -0.6 percent to + 1.04 percent.

Figure 4: Efficient Frontier of International Bond Portfolio before and after Tax

Reform

4.a: For Private Investors



4.b: For Institutional Investors

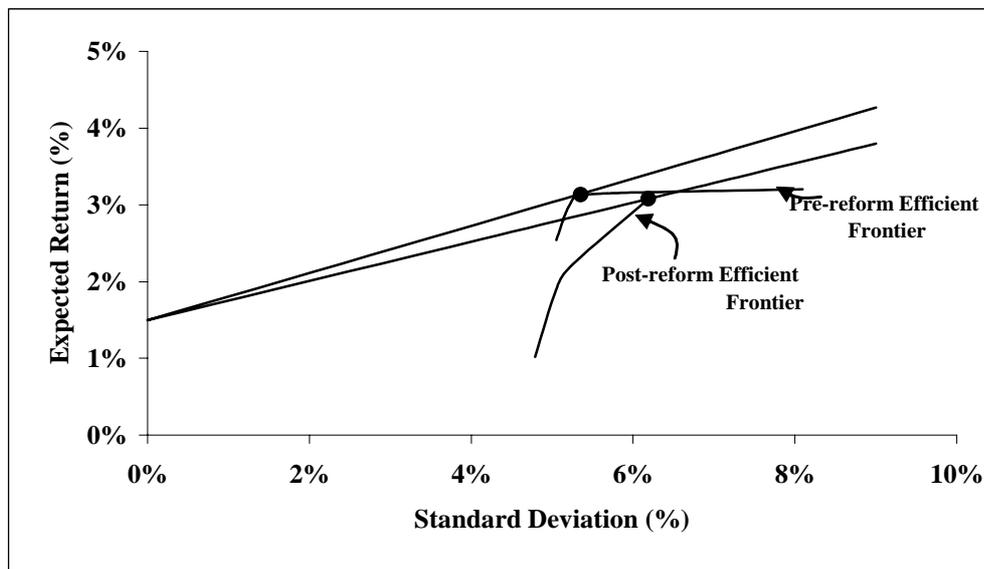


Table 15: Optimum Composition of Private and Institutional Investors' International Bond Portfolio at Pre-Reform Tax Rates

	UK	US	Germany	Japan	Israel	Total
Private investor	0	0	0	0	100	100
Institutional investor	0	0	0	0	100	100

Table 16: Actual Composition of Private and Institutional Investors' Bond Portfolio, December 2003

		Israeli bonds	Foreign bonds	Total
Institutional investors (excl. insurance companies)	\$ bln	21.4	0.14	21.54
	Pct.	99.4	0.6	100
Private investors	\$ bln	10.7	2.6	13.3
	Pct.	80	20	100

The data on the bond portfolio of institutional investors, shown in Table 16, indicates that almost the entire portfolio (99.4 percent) is invested in the domestic bond market. Thus, one may say that institutional investors distribute their portfolio in nearly total accordance with the optimum. Private investors, in contrast, invest 20 percent of their portfolio in foreign bonds, even though the optimum portfolio would be invested entirely in the domestic market. Consequently, private investors seem predisposed to invest in foreign assets. This behavior clashes with the findings of many empirical studies that attest to a clear home bias on the part of most investors around the world (as discussed at length in the Introduction).

One possible way of explaining the contradiction is by arguing that the distribution of returns during the sample period was not representative of the distribution expected by investors. To examine this possibility, we derived the optimum portfolio on the basis of historical distributions estimated in different sampling periods (shorter and longer than the period in this study). The findings of the sensitivity analysis show that investment in the domestic market remained dominant even when the sample period is extended or abbreviated.

Notwithstanding these findings, it does not stand to reason that Israeli private investors behave so differently from most investors around the world. It is also unreasonable to assume

that Israeli investors are strongly predisposed to invest in domestic stocks and, simultaneously, in foreign bonds. The factors behind the result include a temporary surplus demand for foreign bonds that traced, among other things, to the cessation of issues of Gilboa dollar-indexed government bonds and aberrant accumulation by households in forex mutual funds in 2002 due to lack of confidence in the Government's macroeconomic policy. Thus, we believe that the effects of the reform should be examined in this specific case by comparing the optimum rates of investment in foreign bonds at pre- and post-reform tax rates, irrespective of the actual proportion of foreign bonds in the private investors' portfolio.²⁷

Table 17 shows the optimum composition of an international bond portfolio at the post-reform tax rates. By comparing the optimum composition with the current portfolio of institutional investors, we find that these investors are expected to increase their investment in foreign bonds by 36.4 percentage points (from 0.6 percent to 37 percent) in the aftermath of the reform. By comparing the optimum composition of a private investor's portfolio before the reform with the optimal composition after the reform, we find that private investors will probably raise their rate of investment on foreign bonds by 16 percentage points (from 20 percent today to 36 percent).

**Table 17: Optimum Composition of International Bond Portfolio at
Post-Reform Tax Rates**

	UK	US	Germany	Japan	Israel	Total
Private investors	16	0	0	0	84	100
Institutional investors	37	0	0	0	63	100

The data on the bond portfolios of private and institutional investors (Table 16) show that the post-reform portfolio adjustment would add up to \$10 billion. This is surprising, considering that the adjustment of the stocks portfolio due to the reform, as derived from the model, would come to only \$1.5 billion. Thus, the results of the model indicate that the reform will have its main expected effect on the composition of bond portfolio. There are two

²⁷ Another approach examined in this study assumes that the subjective mode of foreign bond yields surpasses the mode as measured on the basis of the historical distributions of yields during the sample period. Pursuant to this premise, we raise the mode of the yield on foreign bonds by the Implied Foreign Buyers Factor (IFBF) until the point where the rate of investment in foreign bond indices is equal to the actual rate. Since this approach

main reasons for this: (a) as explained above, the elimination of tax discrimination will have a greater effect on enhancing the relative advantageousness of an investment in foreign bonds and (b) the investors' strong and theoretically unjustified home bias in regard to domestic stocks does not exist in respect to bonds, as stated. Consequently, the reform will have a less intensive effect on investing in foreign stocks than in investing in bonds. However (as discussed in Section 3.1.2 above), the reform itself may affect investment patterns in such a way as to diminish investors' natural predisposition to invest in domestic stocks. This, in turn, may amplify the effect of the reform on investing in foreign stocks.

The findings also show that the reform may have a more meaningful effect (in relative terms, i.e., in the rate of investment in foreign securities, and in financial terms, i.e., the size of the capital outflow) on institutional investors than on private ones. Furthermore, the bond portfolio (in which most of the effect of the reform is expected, as stated) of institutional investors is almost twice as large as that of private investors.

3.3 Discussion and Results

The foregoing analysis shows that, assuming that all investors offset losses and that their predisposition to invest in domestic stocks will not change, the adjustment of the stock and bond portfolio due to the reform will result in an added capital outflow of \$11.5 billion. Notably, resident investments in foreign stocks were \$1.6 billion in 2003, \$2.8 billion in 2002, and \$1.5 billion in 2001.

How may an outflow of investment as large as this affect the domestic financial and forex markets? One of the main factors in predicting market developments after the reform is the pace of the portfolio adjustments. Since the reform is expected to have most of its effect on institutional investors, their behavior after the reform may be of cardinal importance in the development of the domestic financial and forex markets. Experience shows that institutional investors respond to regulatory changes gradually and slowly. A conspicuous example is the way insurance companies adjusted their portfolios after their external investments were deregulated—gradually and over a period of several years.

Another factor that may moderate size of the capital outflow occasioned by the reform is the directive that requires insurance companies and provident funds to publish their returns on

elicited an unreasonably large capital outflow following the reform, we did not accept this approach and reverted to that presented in this study.

a monthly basis (without noting the standard deviation). This directive will probably weaken the motivation of institutional investors to diversify their portfolios internationally by bringing short-term considerations into their calculus, as against the long-term considerations that usually motivate international diversification. Temporary appreciation of the currency, for example, may impede an increase in the rate of external investment due to the reform even though long-term considerations would advise in favor of the portfolio adjustment.

Apart from the pace of the portfolio adjustment, the intensity of the impact of the reform on the exchange rate also depends on the domestic and global macroeconomic fundamentals that will exist at the time the reform is introduced. Two of these factors are of prime importance in the expected developments due to the reform: (a) the level of nonresident investment generally and that of nonresident portfolio investment specifically, and (b) the profitability and financial strength of firms traded on the Tel Aviv Stock Exchange.

4. Summary and Conclusions

This study attempted to estimate, by means of an investment-portfolio model, how the elimination of tax discrimination between Israeli and foreign securities may affect the composition of public's portfolio of financial assets and, in particular, the rate of investment in foreign securities. The change in investment patterns occasioned by the reform points directly to the possibility of a threat to the stability of Israel's capital and forex markets. The effect of the reform was tested separately for institutional and private investors. The findings indicate a strong predisposition on the part of both investor types to invest in domestic stocks, i.e., their rate of investment in domestic stocks is much higher than the optimum. Notably, however, we did not find a similar home bias in bond portfolios; the rate of investment in domestic bonds, for private and institutional investors alike, is nearly identical to that of the optimum. We estimated the effect of this predisposition on the composition of the securities portfolio of investors in Israel by employing an empirical portfolio-selection model of the Tobin and Markowitz type. This allowed us to isolate the effect of the reform from other factors unrelated to tax discrimination.

The findings of the model show that Israel may expect to incur an \$11.5 billion capital outflow in the aftermath of the reform—\$10 billion due to an increase in investment in foreign bonds and the rest occasioned by larger investments in foreign stocks. The difference

in levels of intensity traces to investors' strong home bias in investing in stocks and a significant increase in the relative advantageousness of investing in foreign bonds after the reform. The findings also show that the reform will probably affect institutional investors more significantly (in both relative and financial terms) than private investors, mainly because the current tax discrimination, which the reform will abolish, is more significant for institutional investors. Accordingly, the post-reform behavior of institutional investors will have a major impact on foreseen developments in the financial and forex markets. Experience shows that institutional investors respond to regulatory changes gradually and slowly. Furthermore, the directive that instructs insurance companies and provident funds to publish returns on a monthly basis (without noting the standard deviation) may diminish these institutions' motivation to diversify their portfolios internationally because such diversification is usually driven by long-term considerations.

Finally, it is important to stress that all the calculations in this study assume, among other things, that the reform will not affect the investment patterns of Israeli investors, including their salient home bias in regard to domestic stocks. The reform itself, however, may well trigger a "phase transition" in investment habits that will erode the home bias. Such a process may generate the kind of momentum in residents' external investment that will include the behavior that the economic literature calls the herd phenomenon. This is especially likely if the banks accompany the reform with aggressive marketing campaigns, as they have done on several previous occasions. Such a phenomenon, if it occurs, will increase the capital outflow considerably—which, according to experience, may lead to rapid currency depreciation and destabilization of financial markets.

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Appendix A: Effect of the Reform on Private Investors Who Do Not Exercise the Right to Offset Losses

The effect of the reform was examined on the assumption that all investors exercise their right to offset losses. Institutional investors and quite a few private investors, especially those who invest by means of mutual funds, do exercise this right. Some private investors, however, operate in the stock market for short periods only and sometimes let much time lapse before they return; a few never come back. These investors do not exercise the right to offset losses. This Appendix analyzes the effect of the reform on the composition of the portfolio of non-offsetting investors. As we show below, the distinction between investors who do and do not exercise the right to offset losses may have an effect on the change in the relative advantageousness of investing in foreign securities after the tax discrimination is abolished. For both types of investors, the lowering of tax rates raises both the average and the standard deviation of the return. However, the lowering of tax rates for an investor who offsets losses also reduces government participation in the event of losses. The following numerical example shows how this may affect the change in the relative advantageousness of investing in foreign stocks after the tax rates are cut.

Table A.1 shows a hypothetical distribution of the return on a stock before and after tax rates of 35 percent and 15 percent, with and without loss offsetting.

Table A.1: Effect of Tax-Rate Cut on Average and Standard Deviation of Return

Probability	Pre-tax return (%)	Return after 35% tax		Return after 15% tax	
		With offsetting	Without offsetting	With offsetting	Without offsetting
1/2	-10	-6.5	-10	-8.5	-10
1/2	20	13	13	17	17
Avg.	5	3.25	1.5	4.25	3.5
S.D.	15	9.75	11.5	12.75	13.5

As Table A.1 shows, the lowering of tax rates raises both the average and the standard deviation of the return whether losses are offset or not. For non-offsetting investors, however,

the reduction in tax rate elevates the average to a greater extent (from 1.5 percent to 3.5 percent), and the standard deviation by less (from 11.5 percent to 13.5 percent).

The empirical data give evidence of behavior similar to that shown in the example in Table A.1. These findings also suggest that the reform may have a more significant effect on the rate of investment in foreign securities for investors who do not offset losses. To test this hypothesis, we now apply the model to the stock portfolio of a non-offsetting investor. First, we estimate the IHBF on the assumption that such investors' actual rate of investment in foreign stocks is identical to that of private investors at large, i.e., 8 percent. Taking this IHBF as a given, we re-derive the optimum portfolio at the post-reform tax rates. Table A.2 shows the IHBF and the optimum composition of the stock portfolio at the post-reform tax rates for investors who do not offset losses.

By comparing the optimum rates of investment in domestic stocks in Tables A.1 and A.2, we see that the effect of the reform on the rate of investment in foreign stocks is more significant for non-offsetting investors than for others. According to the model, such investors would be expected to increase their rate of investment in foreign stocks by 32 percentage points after the reform whereas loss-offsetting investors would increase theirs by only 5 percentage points.

This finding shows that the increase in resident investments in foreign stocks would be greater than the estimate obtained under the assumption of offsetting of losses. However, we cannot estimate the extent of the effect of this factor for lack of information about the proportion of investors who do not offset losses.

Table A.2: Optimum Composition (Percent) of Stock Portfolio at Post-Reform Tax Rates for Investors Who Do Not Offset Losses*

IHBF	Germany	Hong Kong	Israel	Japan	US	UK	Total
3	0	4.4	60	0	35.6	0	100

* The IHBF is estimated on the basis of the distribution of returns without loss offsetting and at the pre-reform tax rates.