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Behavioral Biases in Economic and Financial Knowledge: Are They the Same for Men and Women?

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Abstract

Contemporary research documents various psychological aspects of economic thought and decision-making. The main goal of our study is to analyze the role of the *hindsight bias* (Fischhoff [20]) and the *anchoring bias* (Tversky and Kahneman [53]) in perceiving economic and financial information, and, in particular, the gender differences in the degree of these biases. Hindsight bias denotes people's tendency to overestimate, in hindsight, how predictable an outcome was in foresight, while anchoring bias refers to people's tendency to form their estimates for different categories, starting from a particular available, and often irrelevant, value and insufficiently adjusting their final judgments from this starting value. We carry out an experiment involving a group of MBA students, asking them to recall a number of recent economic and financial indicators (stock and bond market index returns, rates of inflation, currency exchange rates, etc.).

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We for document that significant hindsight and anchoring bias are exhibited, on average, each of our experimental questions and by vast majority of the participants. Furthermore, we document that women are more strongly affected by both behavioral biases. Possible reasons for this difference and potential implications are discussed.

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1 Introduction

Human judgments fall prey to a variety of systematic biases and distortions (for an overview, see, for example, Kahneman, et al. [35], Stracca [51]). In this study we wish to shed light on the effect of two well-documented behavioral biases, namely, the *hindsight bias* and the *anchoring*, in perceiving economic and financial data.

The hindsight bias, also referred to as the knew-it-all-along-effect, occurs when people overestimate, in hindsight, how predictable an outcome was in foresight. Since first proposed by Fischhoff [20], this phenomenon has been studied extensively in various fields of knowledge, environments, and settings.

Anchoring (or anchoring bias - Tversky and Kahneman [53]) refers to people's tendency to make estimates about the likelihood of uncertain events or to predict or recall certain values or outcomes by considering an initial value and adjusting it upwards or downwards to yield a final estimate. Such adjustments are often insufficient, leaving judgments biased in the direction of the initial "anchor" value. Similarly to the hindsight bias, anchoring has proved to be a ubiquitous and robust phenomenon.

We carry out an experiment involving a group of MBA students, asking them

to recall a number of recent economic and financial indicators for Israeli economy, in general (rates of inflation, interest rate of the Bank of Israel, currency exchange rates), and Tel Aviv Stock Exchange, in particular (stock and bond market index values and returns, yield to maturity rates on government bonds). To detect and analyze the hindsight and the anchoring bias, we adopt the experimental design consistent with Camerer et al. [7] and Jacowitz and Kahneman [34]. We randomly attribute our participants to one of the three groups: (i) "Control" group (Group C): participants in this group are given no additional information and asked to provide their best estimates for each of the questions, (ii) "Hindsight" group (Group H): participants in this group receive *correct* answers for each of the questions, and are then asked to estimate average expectation of Group C's answers for each of the questions (knowing that Group C has no information), and (iii) "Anchoring" group (Group A): participants in this group are asked the *same* questions, yet, before each question they receive *unrelated* economic or financial indicators ("anchor indicators"), of the same order of magnitude and expressed at the same scale.

Since hindsight bias is supposed "to draw people's posterior estimates closer to correct answer", we expect that the answers given by participants in Group H should be closer to correct ones than those given by participants in Group C, and therefore, in order to measure the degree of hindsight bias, for each person and for each question, we compare the deviations of both group's answers from the correct ones. Similarly, since anchoring bias is supposed "to draw people's estimates closer to the anchor", we expect that the answers given by participants in Group A should be closer to anchor indicators than those given by participants in Group C, and therefore, in order to measure the degree of anchoring bias, for each person and for each question, we compare the deviations of both group's answers from the anchor indicators.

We find that significant hindsight and anchoring bias are exhibited, on average, for each of our experimental questions and by vast majority of the

participants. Furthermore, we document that women are more strongly affected by both behavioral biases. This result may be potentially explained in the framework of psychological literature, showing that women are, on average, more willing to cooperate and follow the ideas suggested by others, while men are more assertive and independent in their thoughts and actions, and that women tend to focus more on details and subtleties and to select the most valuable knowledge, while men tend to think more globally and to take risks and experiment when they create or build (see for example, Feingold [19], Helgeson [28, 29], Fritz and Helgeson [23]).

The rest of the paper is structured as follows. In Section 2, we review the literature on hindsight and anchoring bias, featuring both psychological aspects and economic applications. In Section 3, we describe our experimental design and research approach. Section 4 defines our hypotheses and provides the empirical tests and the results. Section 5 concludes and provides a brief discussion.

2 Literature review

2.1 Hindsight bias

The term *hindsight bias* describes the observation that people are often wise only after the event. In the broadest sense, it refers to a biased representation of events or facts once they are viewed in hindsight, with knowledge about the outcome. In other words, hindsight bias represents the tendency to overestimate ex-post the predictability of event outcomes. Making the past appear less uncertain than it was, hindsight bias has important implications for everyday and professional decision-making.

The phenomenon of hindsight bias has been studied extensively[3] since

[3] See, for example, reviews of studies in Stahlberg and Maass [48], Pohl [45], Blank et al. [5, 6], Erdfelder et al. [18].

first proposed by Fischhoff [20]. Using historical, political, and clinical diagnosis case scenarios, he establishes that people judge event outcomes as more probable from a hindsight perspective if they are presented as the factual outcomes, as compared to judging the same outcomes as possibilities in foresight without actual outcome knowledge. He also shows that exaggerated hindsight probabilities persist (i) when participants are instructed to ignore the factual outcome and make their judgments as they would have done in foresight, and (ii) when they are asked to put themselves in the shoes of others who do not possess outcome knowledge.

Another core manifestation of hindsight bias is first demonstrated by Fischhoff and Beyth [21] who compare people's foresight predictions of possible outcomes of President Nixon's 1972 visit to China and the Soviet Union to *their* recollections of these predictions in hindsight. People appear to exhibit *memory distortions* – that is, they think that the predictions they made were closer to the actual outcomes than they in fact had been. A further study by Fischhoff [22] shows similar memory distortions for newly acquired factual knowledge. After having learned, for example, that the story of Aladdin originated in Persia (as opposed to China), participants remember having been more confident about this correct answer than they had been when asked to choose between the two alternatives. Later studies establish that the effect also occurs for memories of numerical estimates. For example, after having learned that the Eiffel Tower is 300 meters high, participants remember their original estimates as being closer to this solution than they in fact have been (Hell et al. [30]).

Increased attention paid by the existing literature to the phenomenon of hindsight bias may be explained by its importance in the following respects:

a) It is ubiquitous: Hindsight bias is demonstrated in a variety of quite different domains, ranging from almanac questions to historical and political settings, medical diagnoses, judicial and everyday decision-making (see, for example, Harley [27], and Louie et al. [38]).

b) It is hard to avoid: From early on, attempts at reducing the bias using

warnings and additional instructions meet with almost no success (Fischhoff [20]), Wood [55], Pohl and Hell [44]).

c) It has potentially detrimental consequences in applied settings: Hindsight bias is considered potentially dangerous in two aspects: (i) It affects our perceptions of other people's responsibility for the outcomes of their decisions, because the bias makes these consequences appear more foreseeable than they probably were. This may have serious implications when it comes to negative outcomes that are put to trial in court. Consequently, some of the earliest investigations of hindsight bias concentrate on legal settings (Arkes et al. [1], Casper et al. [10], Harley [27]). (ii) A more general practical consequence of the hindsight bias discussed in the literature is that it may limit our ability to learn from experience (Blank et al. [5]). If we think that we knew it all along, we may not find anything wrong with our foregoing analyses and decisions. Why should we change our ways of thinking then, even in contexts where it would be appropriate and adaptive to do so?

Additional issue raised by the literature dealing with hindsight bias refers to the effect of various personal features and characteristics on the degree of the bias. Campbell and Tesser [9] are the first to argue and demonstrate that hindsight bias may be influenced by individual traits, needs, and motives, and that these factors should be taken into account as an important supplement to cognitive accounts of the phenomenon. Subsequently, Stanovich and West [50] find that the degree of hindsight bias is negatively correlated with people's intelligence and cognitive ability. They also argue that hindsight bias is associated with other types of cognitive biases across a variety of tasks. For example, they observe that people showing larger hindsight effects also display a greater degree of overconfidence and more errors in statistical reasoning, interpreting this finding as evidence for stable individual differences in rational thought. Hertwig et al. [31] document that people's expertise, as defined based on the amount and accuracy of pre-existing knowledge, also decreases the degree of hindsight bias. They explain this effect by

nothing that the more a person already knows, the less likely it is that learning about the outcome leads to a considerable change of his or her knowledge base.

Quite surprisingly, in contrast with the universe of psychological studies dealing with hindsight bias, its characteristics and implications, economic applications of this effect in the existing literature are rather scarce.

In an influential work, Camerer et al. [7] coin the term "*the curse of knowledge*" to explain why sales agents, who are better informed about their products than other agents, are at a *disadvantage* when selling their products. They carry an experiment and find that participants who have privileged information about a company's earnings fail to fully ignore that privileged knowledge when estimating what uninformed participants would predict about the company's earnings. That is, the informed participants are biased – "cursed" by the knowledge they possess – and inaccurately judge what the uninformed participants know. Similarly, better informed sales agents may find it difficult to effectively communicate with people who know much less about their products.

Louie [36] examines hindsight bias in a simulated stock purchase, and documents that participants receiving an upsetting outcome (i.e. purchased stock that lost value or did not purchase stock that increased in value) show no significant hindsight bias, while those receiving a positive outcome did exhibit the bias. Furthermore, Louie et al. [37] find that MBA students involved in a stock trading game exhibit hindsight bias following the poor performance of a competing team or their own good performance, but no bias for their own failure or a competing team’s success. Stahlberg and Schwarz [49] provide similar evidence for negative (simulated) job interviews. Holzl et al. [32] argue that supporters of the Euro show less hindsight bias when its value falls than when it increases. Biais and Weber [3] carry an experiment involving a group of investment bankers, and document that more hindsight biased bankers have lower investment performance.

2.2 Anchoring

The term *anchoring* (or *anchoring bias*) is first employed by Tversky and Kahneman [53] and refers to people's tendency to make estimates about the likelihood of uncertain events or to predict or recall certain values or outcomes by considering an initial value and adjusting it upwards or downwards to yield a final estimate. Such adjustments are often insufficient, leaving judgments biased in the direction of the initial "anchor" value. In what is probably the best-known demonstration of this effect, Tversky and Kahneman [53] first ask their research participants whether the percentage of African nations in the United Nations (*target* number) is higher or lower than an *arbitrary* number (the anchor) which is randomly determined by spinning a wheel of fortune (e.g., 65% or 10%). Participants are then asked to give their best estimate of this percentage. Absolute judgments are assimilated to the provided anchor value so that the mean estimate of participants who received the high anchor was 45%, compared to 25% for participants who received the low anchor.

Anchoring effects have proved to be a truly ubiquitous phenomenon that has been observed in a broad array of different judgmental domains.[4] Jacowitz and Kahneman [34] ask students a number of general knowledge questions (like length of Mississippi or height of Everest), and report that participants who are given high anchors provide higher estimates than those who are given low anchors. Cervone and Peake [11] document that people receiving high anchors subsequently estimate their own capabilities higher than those who are given low anchors. Chapman and Johnson [13] ask people to evaluate a number of lotteries varying in their expected values and ranges, and find that the higher the anchor they are given, the higher the minimal sum for which they would sell the lottery. Ehrbeck and Waldman [15] concentrate on the existing evidence that professional forecasters in various domains make predictable forecast errors persisting over

[4] For review, see, for example, Mussweiler and Strack [40], English [17].

time, and construct a formal behavioral model implying that making repeated forecasts, the forecasters may be anchored towards their own previous forecasts and the prediction patterns typical of able forecasters. English [17] asks a group of students to estimate the average price of a German midsize car, after providing them both a standard anchoring and some additional, relevant or irrelevant, information, and finds that the estimates are biased towards the anchor and that relevant knowledge decreases the effect of anchoring. Bowman and Bastedo [7] analyze the anchoring effects in assessments of institutional reputation, and document that world university rankings published by Times Higher Education Supplement influence peer assessments of reputation in subsequent surveys.

Anchoring may play an especially important role in legal judgment. Markovsky [39] reports that subjects exposed to large monetary anchors suggest higher rewards for a witness who comes forward to testify about a crime. Chapman and Bornstein [12] ask their experiment participants to act as jurors and to decide on the amount of personal injury compensation for a specific case, and find that the higher the requested compensation, serving as a random anchor, the higher the compensation actually awarded by the "jurors". This may constitute a really interesting result, implying that the more people ask for, the more they get. In the same spirit, English and Mussweiler [16] carry an experiment involving a group of professional judges, and conclude that sentencing decisions are anchored towards the sentences demanded by prosecutors. The magnitude of this influence proves to be dramatic, as judges who consider a high demand of 34 months give final sentences (for the same crimes) that are almost 8 months longer than judges who consider low demand of 12 months.

Not only is the anchoring effect influential in a plethora of laboratory and real-world settings, this influence is also remarkably robust. In particular, anchoring is independent of many potentially moderating variables. For one thing, anchoring occurs even if the anchor values are clearly uninformative for the critical estimate, for example, because they were randomly selected (Mussweiler

and Strack [41], Tversky and Kahneman [53]). Moreover, anchoring remains uninfluenced by the extremity of the anchor (Chapman and Johnson [13], Strack and Mussweiler [52]) so that even implausibly extreme values yield an effect. For example, in the study by Strack and Mussweiler [52], estimates for Mahatma Gandhi's age are assimilated to an unreasonably high anchor value of 140 years. Furthermore, anchoring effects appear to be independent of participants' motivation (Wilson, et al. [54]). Specifically, the attempts to improve accuracy by awarding a prize for the best estimate prove unsuccessful. In addition, it has been demonstrated that anchoring occurs independently of participants' expertise (Englich and Mussweiler [16]). In addition, anchoring effects are characterized by an exceptional temporal robustness and persist over fairly long periods of time. For example, in a study by Mussweiler [42]), anchoring effects are still apparent a week after the anchor value had been considered. Probably the most striking demonstration of the robustness of the phenomenon, however, stems from research demonstrating that even explicit instructions to correct for a potential influence of an anchor do not mitigate the effect (Wilson et al. [54]).

The vast research on anchoring originates from psychology, and takes roots in a number of fields and domains. Still, by the present moment, the applications of the effect of anchoring that may be classified as "economic" are relatively scarce.

Northcraft and Neale [43] demonstrate that real-estate pricing decisions depend on the listing price for the property. They have real-estate agents and non-professionals estimate the value of a property. Participants are given a ten-page booklet including all the information that is important for real-estate pricing and the listing price of the house, either above or below the actual appraisal value of the property. Replicating the typical anchoring finding, the authors document that participants' estimates for the value of the property are assimilated towards the provided anchors. Similar results are obtained both for experts and amateur subjects.

Gruen and Gizycki [26] use anchoring to explain the widely-observed anomaly that forward discounts do not properly explain subsequent exchange rate movements. The anchoring phenomenon may be relevant to the "sticky prices" that are so talked about by macroeconomists. So long as past prices are taken as suggestions of new prices, the new prices will tend to be close to the past prices. The more ambiguous the value of a commodity, the more important a suggestion is likely to be, and the more important anchoring is likely to be for price determination.

Galinsky and Mussweiler [25] explore the role of anchoring in buyers' and sellers' behavior and their subsequent profits. They show that first offers may influence the final negotiation outcomes, because they serve as judgmental anchors to which the final outcomes are assimilated. They also demonstrate that whichever party, the buyer or the seller, makes the first offer obtains a better outcome from her viewpoint. Biswas and Burton [4] suggest that price claims in advertisements influence consumer behavior, because they function as anchors in product evaluation. Simonson and Drolet [47] report the effect of anchoring on consumers' willingness-to-pay and willingness-to-accept. Beggs and Graddy [2] document anchoring effect in art auctions by showing that art works may be sold at much higher prices in "hot" markets when the auction buyers may be anchored by high prices that were previously set.

3 Experimental design and research approach

3.1 Sample description

We run an experiment which allows us to control for both behavioral biases. The design of the experiment is consistent with the research methods proposed by Camerer et al. [7] (for measuring the hindsight bias) and Jacowitz and Kahneman [34] (for measuring the anchoring bias). Our experiment involves 102 MBA

students from the Technion, Israel Institute of Technology, and the University of Haifa[5]. We ask our participants to recall a number of recent economic and financial indicators for Israeli economy, in general, and Tel Aviv Stock Exchange, in particular. For this kind of questions, MBA students may serve a competent audience. To control for the effects of hindsight bias and anchoring, we randomly attribute our participants to one of the three groups[6]:

- "Control" group (Group C): Participants in this group are given no additional information and asked to provide their best estimate for each of the respective indicators.
- "Hindsight" group (Group H): Participants in this group receive *correct* answers for each of the questions, and are then asked to estimate average expectation of Group C's answers for each of the questions (knowing that Group C has no information).
- "Anchoring" group (Group A): Participants in this group are asked the *same* questions, yet, before each question they receive unrelated economic or financial indicators ("anchor indicators"), of the same order of magnitude and expressed at the same scale. For example, we provide the current value of S&P 500 Index and ask the participants to provide their best estimate for the current value of TA-25 Index[7] - clearly, unrelated figure.

In Appendix B, we present the experimental questionnaires for Groups H and

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[5] 60 men and 42 women with mean age of 33.7 took part in the experiment, 41 of them at the Technion and 61 at the University of Haifa.

[6] There were 32 participants in Group C (21 men and 11 women, with mean age of 33.3), 35 participants in Group H (20 men and 15 women, with mean age of 33.6), and 35 participants in Group A (19 males and 16 females, with mean age of 34.2).

[7] Index that tracks the prices of the shares of the 25 companies with the highest market capitalization on the Tel Aviv Stock Exchange.

A, as provided to the participants at the Technion[8].

3.2 Hindsight measures

Three main different empirical designs have been used to demonstrate the hindsight bias:

1. In a *within person* design, subjects are first asked to report their ex-ante expectations. Then, they learn the realization of the variable. Then they are asked to report their ex-post recollection of their ex-ante expectations. Fischhoff and Beyth [21] provide evidence of hindsight bias in this context.
2. In a *between subjects* design, subjects each have to report their ex-ante expectation of an event. Two groups are formed. In group one, participants receive no information. In group two, participants are told the true outcome of the event, and yet are asked to report their ex-ante expectation. Fischhoff [20] offers evidence of hindsight bias in this context.
3. In a *predictory* design also two groups are formed. In group two, subjects are told the true outcome of the event and asked to estimate the average expectation of group one (knowing that group one has no information). This approach is first employed by Camerer et al. [7].

Bias in design (1) could reflect memory effects. In design (1) and in (2), bias could arise from a person's desire to maintain high levels of public esteem (see e.g., Campbell and Tesser [23]). In our study, we use design (3) where these effects should not arise. In addition, as Rabin [46] points out, as economists, we

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[8] The experiment was run on May 13, 2010 at the Technion, and on May 21, 2010 at the University of Haifa. Since a part of the actual answers (questions 1, 4, 7, 9, 11, 12, 18, 20) and "anchor indicators" (questions 1, 4, 9, 18, 20) are updated on daily basis, the correct answers / "anchor indicators" given to the participants in Group H / Group A at the Technion and at the University of Haifa were different. Group C questionnaires, of course, included the same questions without correct answers and "anchor indicators". In all questionnaires, we asked for participants' personal details (sex, age, previous education).

care mostly about a person's belief about other people, not about herself. Design (3) captures this aspect.

Since hindsight bias is supposed "to draw people's posterior estimates closer to correct answers", the general intuition says that the answers given by participants in Group H should be closer to correct ones than the answers given by participants in Group C. That is, when people know what the correct answer is, they should probably find it difficult to ignore that knowledge and to estimate correctly what other people (without that knowledge) would answer.

First of all, we calculate the measure of hindsight bias for each answer given by each participant in group H in the following way:

$$H_n^i = 1 - \frac{\left\| RH_n^i - T_n \right\|}{DC_n} \tag{1}$$

where: H_n^i - Hindsight (bias) measure for question *n* and person *i*, RH_n^i - actual answer (Response) to question *n* given by participant *i* from Croup H, T_n - correct (True) answer to question *n*, DC_n - mean Deviation from Correct answer to question *n*, in Group C, which, in its turn, is calculated as:

$$DC_n = \frac{\sum_{j=1}^{NC} \left\| RC_n^j - T_n \right\|}{NC} \tag{2}$$

where: RC_n^j - actual answer (Response) to question *n* given by participant *j* from Group C, NC - Number of participants in group C (32 participants).

Participant *i* from Group H who does not exhibit hindsight bias should provide the same value of RH_n^i that she would have provided without knowing the correct answer, i.e. probably, the same value as her RC_n^i would have been if she were by herself a part of Group C. That is, in terms of Equations 1 and 2, *without hindsight bias*, the deviations of RH_n^i and RC_n^i from T_n should not be

different[9], and therefore, the value of H_n^i should be equal to zero. The maximal value of the hindsight measure is equal to one and is obtained for a participant in Group H that, having received the correct answer to question *n*, suggests that participants in Group C will, on average, answer correctly. H_n^i may be in fact negative (inverse hindsight bias) if participant *i* from Group H expects that the average answer to question *n* by Group C deviates from the correct one farther than it actually does.

As follows from Equations 1 and 2, we employ absolute *individual*, rather than average, deviations of actual answers from the correct ones. This approach is in accordance with an influential work on ways of measuring hindsight bias by Pohl [45], who shows that, since both RH_n^i and RC_n^j may *on average* equal the correct answer, the use of averages may produce meaningless results. In contrast, employing the absolute individual deviations represents a correct approach to measuring the hindsight bias, which allows us to detect, for each participant in Group H, if her (knowledge-affected) answer is closer to the correct one than it would probably have been without that knowledge. In other words, in order to arrive at mean hindsight measures, one should start from the individual measures, and that is what we do.

Furthermore, we do calculate the mean hindsight measures:

- for each question:

$$HQ_n = \frac{\sum_{i=1}^{NH} H_i^n}{NH} \tag{3}$$

where: HQ_n - mean Hindsight measure for Question *n*, NH - Number of participants in group H (35 participants), and

[9] On average, given that Groups C and H are similar by their participants' characteristics, which is ensured by randomly attributing students from the same class to one of the two groups.

- for each participant *i* in Group H:

$$HP^i = \frac{\sum_{n=1}^{NQ} H_i^n}{NQ} \quad (4)$$

where: HP^i - Personal Hindsight measure for participant *i*, NQ - Number of Questions in the questionnaire (21 questions).

3.3 Anchoring measures

Since anchoring bias is supposed "to draw people's estimates closer to the anchor", the general intuition says that the answers given by participants in Group A should be closer to anchor indicators than those given by participants in Group C[10].

To calculate the measures of anchoring, we employ a procedure which is similar to that we have used to calculate the hindsight measures. This procedure is consistent with that proposed by Jacowitz and Kahneman [34]. First of all, we calculate the anchoring measure for each answer given by each participant in group A in the following way:

$$A_n^i = 1 - \frac{\left\| RA_n^i - I_n \right\|}{DA_n} \quad (5)$$

where: A_n^i - Anchoring (bias) measure for question *n* and person *i*, RA_n^i - actual answer (Response) to question *n* given by participant *i* from Croup A, I_n - anchor Indicator (anchor) for question *n*, DA_n - mean Deviation from the Anchor for

[10] A number of previous studies provide different anchors to two different groups, and subsequently suggest that each group's answers should be closer to the respective anchor. We employ a design with a Control group and let the answers of its participants be "independent" of any anchors, and therefore, suggest that the answers in the Anchoring group should be closer to the anchor.

question *n*, in Group C, which, in its turn, is calculated as:

$$DA_n = \frac{\sum_{j=1}^{NC} \left\| RC_n^j - I_n \right\|}{NC} \quad (6)$$

Participant *i* from Group A who does not exhibit anchoring bias should provide the same value of RA_n^i that she would have provided without being exposed to the anchor, i.e. probably, the same value as her RC_n^i would have been if she were by herself a part of Group C. That is, in terms of Equations 1 and 2, *without anchoring bias*, the deviations of RA_n^i and RC_n^i from I_n should not be different[11], and therefore, the value of A_n^i should be equal to zero. The maximal value of the anchoring measure is equal to one and is obtained for a participant in Group A that, having received an anchor, provides the answer to question *n* that is exactly equal to the anchor. A_n^i may get any value. For example, it may be negative if participant *i* from Group A provides an answer to question *n* that deviates from the anchor farther than do, on average, the answers in Group C.

Once again, we employ absolute *individual*, rather than average, deviations of actual answers from the anchors. This approach arises from the fact that both RA_n^i and RC_n^j may be *on average* equal, and in this case, the use of averages may produce meaningless results. In contrast, employing the absolute individual deviations allows us to detect, for each participant in Group A, if her (anchor-affected) answer is closer to the anchor than it would probably have been without it. In other words, in order to arrive at mean anchoring measures, we start from the individual measures.

Furthermore, we calculate mean anchoring measures:

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[11] On average, given that Groups C and A are similar by their participants' characteristics, which is ensured by randomly attributing students from the same class to one of the two groups.

- for each question:

$$AQ_n = \frac{\sum_{i=1}^{NH} A_i^n}{NA} \tag{7}$$

where: AQ_n - mean Anchoring measure for Question *n*, NA - Number of participants in group A (35 participants), and

- for each participant *i* in Group A:

$$AP^i = \frac{\sum_{n=1}^{NQ} A_i^n}{NQ} \tag{8}$$

where: AP^i - Personal Anchoring measure for participant *i*.

4. Testable hypotheses and results

The major goal of our paper is to analyze if the behavioral biases in economic and financial knowledge are more pronounced for men or for women. In this context, in the following two Subsections, we calculate mean hindsight and anchoring measures for each of the questions and for each of the participants, and then compare the mean and median personal measures for men and women.

4.1 Hindsight measures

At the first stage, we calculate the hindsight measures (H_n^i) for each question and for each participant, and subsequently, the mean (over 35 participants from Group H) hindsight measures (HQ_n) for each of the experimental questions. We expect that participants who receive correct answers to the questions (Group H) will, on average, estimate the answers by the participants in Group C to be closer to correct ones than they actually are. Therefore, for each of the 21 experimental questions, we hypothesize the following:

Hypothesis 1H:

H0: $HQ_n = 0$ (no hindsight bias for question *n*)

H1: $HQ_n > 0$ (positive hindsight bias for question *n*)

Table 1 comprises summary statistics of H_n^i separately for each of the experimental questions, and the tests of Hypothesis 1H. The results strongly indicate the existence of hindsight bias for *all* the questions. All the mean hindsight measures are significantly positive, ranging from 0.288 to 0.817. Moreover, for all the questions, vast majority of the participants (for a part of the questions, even all of them) exhibit the bias.

Furthermore, we analyze gender differences in hindsight measures. We calculate the mean (over 21 questions) personal hindsight measures (HP^i) for each of the participants in Group H, including 20 men and 15 women.

Previous psychological literature concludes that men are more assertive and independent in their thoughts and actions, while women are more willing to follow the ideas suggested by others (Feingold [19], Helgeson [28, 29], Fritz and Helgeson [23]). In the same spirit, Cross and Madson [14] argue that women are more likely than men to develop an interdependent or relational self-construal, reflecting the importance of social connections and relationships, whereas men are more likely than women to develop an independent or agentic self-construal, reflecting a concern for social dominance and assertiveness (see also, Gabriel and Gardner [24], Hyde [33]). In addition, women tend to select the most valuable knowledge and pass it over, while men tend to take risks and experiment when they create or build. Therefore, we expect that women should exhibit stronger hindsight bias. In other words, we expect that having found the correct answer, women should find it more difficult to ignore it when estimating other people's mean answer.

That is, we hypothesize as follows:

Hypothesis 2H:

H_0: $Mean/Median\ HP^i(women) = Mean/Median\ HP^i(men)$ (similar degree of hindsight bias for women and men)

H_1: $Mean/Median\ HP^i(women) > Mean/Median\ HP^i(men)$ (stronger hindsight bias for women than for men)

Table 2 presents summary statistics of HP^i for the total sample and separately, for men and women. First of all, we should note that *all* the participants in our experiment exhibit hindsight bias, their personal hindsight measures ranging from 0.177 to 0.915 (with the general mean of 0.581). Furthermore, Hypothesis 2H is strongly supported. The mean and the median of HP^i are significantly higher for women (0.707 and 0.770, respectively) than for men (0.486 and 0.479, respectively). That is, as we have expected, women appear to be more affected by the hindsight bias when recalling economic and financial data.

4.2 Anchoring measures

First of all, similarly to the previous Subsection, we calculate the anchoring measures (A_n^i) for each question and for each participant, and subsequently, the mean (over 35 participants from Group A) anchoring measures (AQ_n) for each of the experimental questions. We expect that participants in Group A will, on average, provide answers that will be closer to the respective anchor indicators than those by participants in Group C. Therefore, for each of the 21 experimental questions, we hypothesize the following:

Hypothesis 1A:

H_0: $AQ_n = 0$ (no anchoring bias for question *n*)

H_1: $AQ_n > 0$ (positive anchoring bias for question *n*)

Table 3 comprises summary statistics of A_n^i separately for each of the experimental questions, and the tests of Hypothesis 1A. The results strongly indicate the existence of anchoring bias for all the questions. *All* the 21 mean anchoring measures are positive, majority of them significantly (18 at 5% level, including 16 at 1% level), ranging from 0.042 to 0.744. Moreover, for all the questions, vast majority of the participants (for one question, even all of them) exhibit the bias.

Furthermore, we analyze gender differences in anchoring measures. We calculate the mean (over 21 questions) personal anchoring measures (AP^i) for each of the participants in Group A, including 19 men and 16 women. Once again, we take into consideration the conclusion of previous psychological literature that men tend to think more independently, whereas women are more willing to cooperate and follow the ideas suggested by others. Moreover, we consider men's tendency to think more globally, as opposed to women's tendency to focus more on details and subtleties. Therefore, we expect that women should exhibit stronger anchoring bias. In other words, we expect that women should pay more attention to anchor indicators (representing unrelated details) they receive, and respectively, should (subconsciously) provide answers that are closer to the anchor indicators. That is, we hypothesize as follows:

Hypothesis 2A:

H_0: $Mean/Median\ AP^i(women) = Mean/Median\ AP^i(men)$ (similar degree of anchoring bias for women and men)

H_1: $Mean/Median\ AP^i(women) > Mean/Median\ AP^i(men)$ (stronger anchoring bias for women than for men)

Table 4 presents summary statistics of AP^i for the total sample and separately, for men and women. First of all, we should note that, on average, 33 out of 35 participants in our experiment exhibit anchoring bias, their personal anchoring measures ranging from -0.178 to 0.830, with the general mean of 0.450,

which is significantly greater than zero. Furthermore, Hypothesis 2A is strongly supported. The mean and the median of AP^i are significantly higher for women (0.645 and 0.646, respectively) than for men (0.285 and 0.345, respectively). That is, as we have expected, women appear to be more affected by the anchoring bias when recalling economic and financial data.

5. Conclusions and Discussion

Our paper explores the role of hindsight and anchoring bias in perceiving economic and financial information, and, in particular, the gender differences in the degree of both biases.

Employing an extensive experimental questionnaire and an audience which is sufficiently competent in economic and financial matters, we reveal the effects of hindsight and anchoring bias on recalling real-world outcomes. We find that significant biases are exhibited, on average, for each of our experimental questions and by vast majority of the participants. Furthermore, we hypothesize that women are more strongly affected by both behavioral biases, and get supporting evidence for this hypothesis.

Our findings may have a number of interesting implications. Since women appear to be more affected by hindsight bias, they probably learn less from experience. That is, for example, female investors and financial analysts should probably find it easier to explain "why stock X's price fell by 10% last month". They might, on average, regard (in hindsight) this outcome as being more predictable in foresight and consequently, its surprise component will serve a less useful "lesson" for their future decision-making.

In what regards the anchoring bias, our results may suggest that female audience, in general, may be more susceptible to some arbitrary anchors being provided. This implies, for example, that everyone who is willing to sell an asset and has some potential of manipulating the buyers' knowledge about the asset

(stock issuers, product manufacturers) may consider providing relatively little relevant information about the asset, but instead integrating some, not really relevant, high figures in the product description, in order to increase the buyers' estimates for the product price, this "line" of behavior working better with female buyers.

Of course, our findings do not imply that women are "less rational" than men. They are just different. After all, who may argue that concentrating on the most valuable knowledge and paying more attention to details is "worse" than taking risks and experiment and thinking globally? Women should simply realize that in the world where their thoughts and decisions may be affected by some irrelevant information and even manipulated by some "interested parties", they should make an extra-effort to view and treat things independently and to learn from experience.

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Appendix A: Tables

Table 1

Hindsight measure statistics, by questions

The table reports, by questions, summary statistics of the hindsight measures (H_n^i) calculated for each of the participants in Group H as follows:

$$H_n^i = 1 - \frac{\left\| RH_n^i - T_n \right\|}{DC_n} \qquad \text{with} \qquad DC_n = \frac{\sum_{j=1}^{NC} \left\| RC_n^i - T_n \right\|}{NC}$$

Where: H_n^i - Hindsight (bias) measure for question *n* and person *i*, RH_n^i - actual answer (Response) to question *n* given by participant *i* from Croup H, T_n - correct

(True) answer to question *n*, DC_n - mean Deviation from Correct answer to question *n*, in Group C, RC_n^j - actual answer (Response) to question *n* given by participant *j* from Group C, NC - Number of participants in group C (32 participants).

The last column presents, for each question, the statistics for the hypothesis that the mean hindsight measure is greater than zero, which is consistent with Group H participants on average exhibiting hindsight bias, for the respective question.

Question No.	Hindsight measure (H_n^i)						$HQ_n > 0$: t-statistic (p-value, %)
	Mean HQ_n	Median	Standard Deviation	Maximum	Minimum	No. (percent) of positive	
1	0.687	0.840	0.334	0.982	-0.438	34 (97.14)	12.15 (0.00)
2	0.413	0.481	0.423	0.997	-0.353	26 (74.29)	5.77 (0.00)
3	0.658	0.750	0.292	0.964	-0.316	34 (97.14)	13.33 (0.00)
4	0.726	0.772	0.239	0.981	-0.009	34 (97.14)	18.01 (0.00)
5	0.487	0.545	0.355	0.981	-0.246	28 (80.00)	8.11 (0.00)
6	0.703	0.689	0.261	0.977	-0.090	34 (97.14)	15.92 (0.00)
7	0.750	0.816	0.189	0.934	0.246	35 (100.00)	23.44 (0.00)
8	0.388	0.437	0.290	0.975	-0.152	30 (85.71)	7.91 (0.00)
9	0.538	0.686	0.407	0.971	-0.535	29 (82.86)	7.82 (0.00)
10	0.521	0.555	0.338	0.989	-0.185	32 (91.43)	9.13 (0.00)
11	0.619	0.831	0.838	1.000	-3.876	33 (94.29)	4.37 (0.01)
12	0.688	0.779	0.416	1.000	-0.975	33 (94.29)	9.78 (0.00)
13	0.421	0.489	0.578	1.000	-1.553	28 (80.00)	4.31 (0.01)
14	0.288	0.416	0.636	0.935	-1.659	26 (74.29)	2.68 (1.12)
15	0.516	0.587	0.386	0.941	-0.593	29 (82.86)	7.92 (0.00)
16	0.434	0.456	1.016	1.000	-3.898	32 (91.43)	2.53 (1.63)
17	0.469	0.776	0.650	1.000	-0.793	29 (82.86)	4.26 (0.02)
18	0.737	0.914	0.332	0.997	-0.407	34 (97.14)	13.14 (0.00)
19	0.817	0.908	0.214	0.971	0.212	35 (100.00)	22.64 (0.00)
20	0.637	0.650	0.260	0.975	0.100	35 (100.00)	14.48 (0.00)
21	0.704	0.717	0.269	0.966	0.037	35 (100.00)	15.47 (0.00)

Table 2

Personal hindsight measure statistics, for men and women

The table reports, for the total sample and separately, for men and women, summary statistics of the personal hindsight measures (HP^i) calculated for each of the participants in Group H as follows:

$$HP^i = \frac{\sum_{n=1}^{NQ} H_i^n}{NQ} \quad \text{with} \quad H_n^i = 1 - \frac{\left\| RH_n^i - T_n \right\|}{DC_n} \quad \text{and} \quad DC_n = \frac{\sum_{j=1}^{NC} \left\| RC_n^i - T_n \right\|}{NC}$$

where: HP^i - Personal Hindsight measure for participant *i*, NQ - Number of Questions in the questionnaire (21 questions) , H_n^i - Hindsight (bias) measure for question *n* and person *i*, RH_n^i - actual answer (Response) to question *n* given by participant *i* from Croup H, T_n - correct (True) answer to question *n*, DC_n - mean Deviation from Correct answer to question *n*, in Group C, RC_n^j - actual answer (Response) to question *n* given by participant *j* from Group C, NC - Number of participants in group C (32 participants).

The last column presents, for the total sample and separately, for men and women, the statistics for the hypothesis that the mean of the personal hindsight measure is greater than zero, which is consistent with the respective category of participants on average exhibiting hindsight bias.

The last row reports statistics for the tests of equality of means and medians of personal hindsight measures for men and women.

Category of participants (No. of participants)	Personal hindsight measure (HP^i)						Mean $HP^i > 0$: t-statistic (p-value, %)
	Mean	Median	Standard Deviation	Maximum	Minimum	No. (percent) of positive	
Total Sample (35)	**0.581**	**0.575**	**0.189**	**0.915**	**0.177**	**35 (100.00)**	**18.22 (0.00)**
Sex:							
Men (20)	0.486	0.479	0.145	0.833	0.177	20 (100.00)	14.96 (0.00)
Women (15)	0.707	0.770	0.167	0.915	0.393	15 (100.00)	16.38 (0.00)
Tests of equality[a*]: Stat. value (p-value, %)	**4.17 (0.02)**	**3.40 (0.07)**					

[a*]We employ t-test for the equality of means between series, and Wilcoxon/Mann-Whitney test for the equality of medians between series.

Table 3

Anchoring measure statistics, by questions

The table reports, by questions, summary statistics of the anchoring measures (A_n^i) calculated for each of the participants in Group A as follows:

$$A_n^i = 1 - \frac{\left\| RA_n^i - I_n \right\|}{DA_n} \quad \text{with} \quad DA_n = \frac{\sum_{j=1}^{NC} \left\| RC_n^j - I_n \right\|}{NC}$$

Where: A_n^i - Anchoring (bias) measure for question *n* and person *i*, RA_n^i - actual answer (Response) to question *n* given by participant *i* from Croup A, I_n - anchor Indicator (anchor) for question *n*, DA_n - mean Deviation from the Anchor for question *n*, in Group C, RC_n^j - actual answer (Response) to question *n* given by participant *j* from Group C, NC - Number of participants in group C (32 participants).

The last column presents, for each question, the statistics for the hypothesis that

the mean anchoring measure is greater than zero, which is consistent with Group A participants on average exhibiting anchoring bias, for the respective question.

Question No.	Anchoring measure (A_n^i)						$AQ_n > 0$: t-statistic (p-value, %)
	Mean (AQ_n)	Median	Standard Deviation	Maximum	Minimum	No. (percent) of positive	
1	0.641	0.678	0.353	0.971	-0.465	34 (97.14)	10.75 (0.00)
2	0.396	0.675	0.912	0.978	-2.800	31 (88.57)	2.57 (1.48)
3	0.704	0.843	0.370	0.980	-0.343	32 (91.43)	11.26 (0.00)
4	0.718	0.855	0.300	0.991	-0.252	34 (97.14)	14.17 (0.00)
5	0.042	0.348	1.224	0.980	-3.788	26 (74.29)	0.20 (83.92)
6	0.421	0.654	0.552	0.994	-0.868	29 (82.86)	4.51 (0.01)
7	0.422	0.696	0.636	0.993	-1.382	25 (71.43)	3.92 (0.04)
8	0.173	0.654	1.141	0.992	-3.850	27 (77.14)	0.90 (37.52)
9	0.744	0.729	0.212	0.995	0.174	35(100.00)	20.72 (0.00)
10	0.378	0.596	0.592	0.954	-1.613	26 (74.29)	3.78 (0.06)
11	0.396	0.425	0.419	0.934	-0.308	25 (71.43)	5.60 (0.00)
12	0.440	0.496	0.456	0.976	-0.416	27 (77.14)	5.70 (0.00)
13	0.292	0.665	0.656	0.888	-1.851	25 (71.43)	2.64 (1.25)
14	0.544	0.737	0.576	0.934	-2.480	34 (97.14)	5.58 (0.00)
15	0.701	0.828	0.259	0.994	-0.015	34 (97.14)	15.99 (0.00)
16	0.276	0.270	0.561	0.948	-1.919	27 (77.14)	2.92 (0.62)
17	0.044	0.091	0.942	0.921	-4.215	19 (54.29)	0.28 (78.39)
18	0.573	0.832	0.609	0.993	-1.961	29 (82.86)	5.57 (0.00)
19	0.712	0.836	0.322	0.983	-0.224	33 (94.29)	13.09 (0.00)
20	0.389	0.384	0.459	0.997	-0.982	30 (85.71)	5.01 (0.00)
21	0.434	0.640	0.391	0.924	-0.406	28 (80.00)	6.58 (0.00)

Table 4

Personal anchoring measure statistics, for men and women

The table reports, for the total sample and separately, for men and women, summary statistics of the personal anchoring measures (AP^i) calculated for each of the participants in Group A as follows:

$$AP^i = \frac{\sum_{n=1}^{NQ} A_i^n}{NQ} \quad \text{with} \quad A_n^i = 1 - \frac{\left\| RA_n^i - I_n \right\|}{DA_n} \quad \text{and} \quad DA_n = \frac{\sum_{j=1}^{NC} \left\| RC_n^j - I_n \right\|}{NC}$$

where: AP^i - Personal Anchoring measure for participant *i*, NQ - Number of Questions in the questionnaire (21 questions) , A_n^i - Anchoring (bias) measure for question *n* and person *i*, RA_n^i - actual answer (Response) to question *n* given by participant *i* from Croup A, I_n - anchor Indicator (anchor) for question *n*, DA_n - mean Deviation from the Anchor for question *n*, in Group C, RC_n^j - actual answer (Response) to question *n* given by participant *j* from Group C, NC - Number of participants in group C (32 participants).

The last column presents, for the total sample and separately, for men and women, the statistics for the hypothesis that the mean of the personal anchoring measures is greater than zero, which is consistent with the respective category of participants on average exhibiting anchoring bias.

The last row reports statistics for the tests of equality of means and medians of personal anchoring measures for men and women.

Category of participants (No. of participants)	Personal anchoring measure (AP^i)						Mean $AP^i > 0$ t-statistic (p-value, %)
	Mean	Median	Standard Deviation	Maximum	Minimum	No. (percent) of positive	
Total Sample (35)	**0.450**	**0.502**	**0.263**	**0.830**	**-0.178**	**33 (94.29)**	**10.13 (0.00)**
Sex:							
Men (19)	0.285	0.345	0.244	0.650	-0.178	17 (89.47)	5.08 (0.01)
Women (16)	0.645	0.646	0.098	0.830	0.442	16 (100.00)	26.39 (0.00)
Tests of equality[a]: Stat. value (p-value, %)	**5.53 (0.00)**	**4.47 (0.00)**					

[a] We employ t-test for the equality of means between series, and Wilcoxon/Mann-Whitney test for the equality of medians between series.

Appendix B:

Research questionnaire (Group H)

Thank you for taking part in the experiment!

Please, don't consult your colleagues while answering the questions. The questionnaire is anonymous and is intended for research purposes only.

Below you will find a number of questions with correct answers. A part of Participants will not be given the answers. Please write down what will be, in your opinion, the average answers of these Participants for each of the questions.

1. The current value of TA-25[12] Index is 1164 points.
   I expect that Participants that will not be given the correct answer will answer on average: _____.
2. The TA-25 Index annual return at 2009 was 74.86%.
   I expect that Participants that will not be given the correct answer will answer on average: _____%.
3. The average annual return of TA25 Index over the years 2007-2009 was 7.66%.
   I expect that Participants that will not be given the correct answer will answer on average: _____%.
4. The current value of TA25 Index differs from the Index's historical high by 5.44%.
   I expect that Participants that will not be given the correct answer will answer on average: _____%.
5. The TA-100 Index[13] annual return at 2009 was 88.8%.
   I expect that Participants that will not be given the correct answer will answer on average: _____%.
6. The average annual return of TA-100 Index over the years 2007-2009 was 5.21%.
   I expect that Participants that will not be given the correct answer will answer on average: _____%.

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[12] Index that tracks the prices of the shares of the 25 companies with the highest market capitalization on the Tel Aviv Stock Exchange.

[13] Index that consists of the 100 stocks with the highest market capitalization on the Tel Aviv Stock Exchange.

7. The current value of TA-100 Index differs from the Index's historical high by 7.94%.
   I expect that Participants that will not be given the correct answer will answer on average: _____%.
8. The Mid-Cap-50 (Yeter 50) Index[14] annual return at 2009 was 146.98%.
   I expect that Participants that will not be given the correct answer will answer on average: _____%.
9. The current value of Mid-Cap-50 (Yeter 50) Index differs from the Index's historical high by 44.66%.
   I expect that Participants that will not be given the correct answer will answer on average: _____%.
10. The Tel-Bond 20 Index[15] annual return at 2009 was 21.83%.
    I expect that Participants that will not be given the correct answer will answer on average: _____%.
11. The current before taxes 5-years yield to maturity on Galil (CPI-linked fixed rate) government bonds is equal to 1.00%.
    I expect that Participants that will not be given the correct answer will answer on average: _____%.
12. The current before taxes 5-years yield to maturity on Shahar (non-linked fixed rate) government bonds is equal to 4.07%.
    I expect that Participants that will not be given the correct answer will answer on average: _____%.
13. The inflation rate in Israel from the beginning of this year is -0.9%.
    I expect that Participants that will not be given the correct answer will answer on average: _____%.
14. The inflation rate in Israel in 2009 was 3.9%.
    I expect that Participants that will not be given the correct answer will answer on average: _____%.
15. The average annual inflation rate in Israel over the years 2007-2009 was 3.7%.
    I expect that Participants that will not be given the correct answer will answer on average: _____%.
16. The current Interest Rate of Bank of Israel is equal to 1.50%.
    I expect that Participants that will not be given the correct answer will answer on average: _____%.

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[14] Index that includes 50 stocks with the highest market capitalization that are not included in the TA-100 Index.

[15] Index that consists of the 20 corporate bonds, fixed-interest and CPI-linked, with the highest market capitalization among all the bonds traded on the Tel-Aviv Stock Exchange.

17. The current Prime Interest Rate[16] is equal to 3.00%.
    I expect that Participants that will not be given the correct answer will answer on average: _____%.
18. The Dollar/Shekel exchange rate changed from the beginning of this year by -0.48%.
    I expect that Participants that will not be given the correct answer will answer on average: _____%.
19. The Dollar/Shekel exchange rate changed over the year 2009 by -0.73%.
    I expect that Participants that will not be given the correct answer will answer on average: _____%.
20. The Euro/Shekel exchange rate changed from the beginning of this year by -12.48%.
    I expect that Participants that will not be given the correct answer will answer on average: _____%.
21. The Euro/Shekel exchange rate changed over the year 2009 by 2.73%.
    I expect that Participants that will not be given the correct answer will answer on average: _____%.

Research questionnaire (Group A)

Thank you for taking part in the experiment!

Please, don't consult your colleagues while answering the questions. The questionnaire is anonymous and is intended for research purposes only.

Below you will find a number of real financial data. Please fill in the missing numbers, according to your best estimation.

1. The current value of S&P 500 Index is 1172 points.
   I suppose that the current value of TA-25 Index is _____.
2. The S&P 500 Index annual return at 2009 was 23.45%.
   I suppose that the TA-25 Index annual return at 2009 was _____%.
3. The average annual return of S&P 500 Index over the years 2007-2009 was-7.70%.
   I suppose that the average annual return of TA25 Index over the years

[16] Quoted basic interest rate fixed by large commercial banks. In the last years, in Israel, it is actually equal to the Interest Rate of the Bank of Israel plus 1.5%.

2007-2009 was _____%.

4. The current value of S&P 500 Index differs from the Index's historical high by 25.11%.
   I suppose that the current value of TA25 Index differs from the Index's historical high by _____%.
5. The manufacturing production in Israel increased in 2008 relatively to 2007 by 7.39%.
   I suppose that the TA-100 Index annual return at 2009 was _____%.
6. The average annual rate of increase in the manufacturing production in Israel over the years 1998-2008 was 3.55%.
   I suppose that the average annual return of TA-100 Index over the years 2007-2009 was _____%.
7. The major increase in the manufacturing production in Israel in the last decade took place in 2000. The manufacturing production increased by 9.88%.
   I suppose that the current value of TA-100 Index differs from the Index's historical high by _____%.
8. The DAX Index annual return at 2009 was 23.85%.
   I suppose that the Mid-Cap-50 (Yeter 50) Index annual return at 2009 was _____%.
9. The current value of DAX Index differs from the Index's historical high by 23.71%.
   I suppose that the current value of Mid-Cap-50 (Yeter 50) Index differs from the Index's historical high by _____%.
10. The agricultural output in Israel increased in 2008 relatively to 2007 by 7.45%.
    I suppose that the Tel-Bond 20 Index annual return at 2009 was _____%.
11. The agricultural output in Israel increased in 2008 relatively to 1998 by 16.28%.
    I suppose that the current before taxes 5-years yield to maturity on Galil (CPI-linked fixed rate) government bonds is equal to _____%.
12. The major increase in the agricultural output in Israel in the last decade took place in 2004. The agricultural output increased by 10.1%.
    I suppose that the current before taxes 5-years yield to maturity on Shahar (non-linked fixed rate) government bonds is equal to _____%.
13. The inflation rate in the US in from the beginning of this year is 1.8%.
    I suppose that the inflation rate in Israel from the beginning of this year is _____%.
14. The inflation rate in the US in 2009 was 2.7%.
    I suppose that the inflation rate in Israel in 2009 was _____%.
15. The average annual inflation rate in the US over the years 2007-2009 was 2.29%.
    I suppose that the average annual inflation rate in Israel over the years 2007-2009 was _____%.
16. The gross domestic product of Israel increased in 2008 relatively to 2007 by 2.2%.

I suppose that the current Interest Rate of Bank of Israel is equal to _____%.

17. The gross domestic product of Israel increased in 2006 relatively to 2005 by 3.4%.
    I suppose that the current Prime Interest Rate is equal to _____%.
18. The Yen/Shekel exchange rate changed from the beginning of this year by -0.45%.
    I suppose that the Dollar/Shekel exchange rate changed from the beginning of this year by _____%.
19. The Yen/Shekel exchange rate changed over the year 2009 by -3.66%.
    I suppose that the Dollar/Shekel exchange rate changed over the year 2009 by _____%.
20. The Dollar-to-British Pound exchange rate (Dollars for 1 Pound) changed from the beginning of this year by -6.67%.
    I suppose that the Euro/Shekel exchange rate changed from the beginning of this year by _____%.
21. The Dollar-to-British Pound exchange rate (Dollars for 1 Pound) changed over the year 2009 by -9.13%.
    I suppose that the Euro/Shekel exchange rate changed over the year 2009 by ____%.