

Can Smoking Harm Your Long-Term Saving Decisions?

Abigail Hurwitz¹ & Orly Sade²

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ABSTRACT

Previous research suggests that cigarette smoking is considered to be a major preventable risk to human health. One explanation for smoking, provided by the literature, is that it could be explained by differences in time preferences; smokers are considered to have higher discount rates, implying that they will demand higher compensation in order to postpone any consumption from the present to the future. Concerns that are related to time preference and individual choices are also related to long-term saving decisions. One of the long standing puzzles, with regard to long-term saving choices, is the “Annuity Puzzle”. Theory suggests that annuities have substantial value, and that retirees should generally use annuities to increase their utility in retirement. However, empirical work finds little evidence of the purchase of annuities.

We extend this line of research, investigating annuitization decisions of smokers, by using data from an Israeli insurance corporation. We find that, surprisingly, smokers, as compared to non-smokers, do not prefer the lump-sum option. A possible explanation for this finding could be that even though literature finds a close relationship between smoking and medical condition, smokers do not perceive themselves as having a shorter lifespan, meaning that smokers experience self-illusions regarding life expectancy. We support this conjecture with a survey we conducted that investigated the life expectancy and health perception of smokers and non-smokers.

¹ Department of Finance, Jerusalem school of business, the Hebrew university of Jerusalem, Israel
abigail.hurwitz@mail.huji.ac.il

² Department of Finance, Jerusalem school of business, the Hebrew university of Jerusalem, Israel
orlysade@huji.ac.il

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1. Introduction

Cigarette smoking is a popular behavior in the western world, and is estimated to be responsible for roughly 20 percent of the total mortality in the United States since the 1990s (Mokdad, Marks, Stroup and Gerberding (2004)). Cigarette smoking is also considered to be the leading preventable cause of death in the western world (Wang (2014)). Thus, if smoking is clearly an unhealthy behavior and a significant determinant of early mortality, one should immediately ask: why do people smoke? In answering this question, the academic literature suggests that the three personal characteristics of time preference, risk preference and impulsivity differentiate smokers from one another, as well as causes them to smoke. According to the time preference theory, smokers are considered to have higher discount rates, implying that they will demand higher compensation (relative to a non-smoker) in order to postpone any consumption from the present to the future. Therefore, cigarette smokers are predictably reluctant to give up the pleasure of smoking in the present, in favor of health and longevity in the future. As a result of this theory, some empirical papers have used smoking as a proxy for present preferences in different contexts (e.g Munasinghe and Sicherman (2006), Huston and Finke (2003) and Scharff and Viscusi, (2011)). Nevertheless, there is ongoing academic debate regarding the exact relationship between smoking and time preference (e.g Fuchs (1982), Adams and Nettle (2009) and Harrison, Lau, and Rutström (2010)). Empirical papers (mostly based on surveys) have documented low relationship between smoking and different measures of time preference (some have found a relation for male participants only), or have found an opposite relation, showing that smokers actually have lower discount rates compared to non-smokers (e.g. Reynolds, Richards, Horn and Karraker (2004), Chabris, Laibson, Morris, Schuldt, and Taubinsky (2008) and others).³

Concerns that are related to time preference and individual choices are also related to long-term saving decisions. One of the long standing puzzles with regard to long-term saving choices

³ Time preference is not the only explanation suggested in the literature to explain smoking behavior. Lipkus, Barefoot, Williams and Siegler (1994), reviewed characteristics of smokers and demonstrated that smokers differ from the general population in features such as impulsiveness, rebelliousness, sensation seeking, gregariousness, self-presentational concerns, and hostility. Keough, K. A., Zimbardo, P. G., & Boyd, J. N. (1999) also reviewed many previous explanations for substance use such as anxiety, neuroticism, lower impulse control, novelty seeking, and others, and concluded that time preference is an important feature to be considered in relation with health-related behaviors, including cigarette smoking. Others, such as Ert, Yechiam, Arshavsky (2013) relate smoking behavior with a tendency to take risk. Moreover, some papers relates smoking and self-control (Thaler and Shefrin (1981)), yet the idea of self-control is embedded at the heart of time preferences theory (Lahav, Shavit, and Benzion (2015)).

is the “Annuity Puzzle” (for a survey see Benartzi, Previtro, and Thaler (2011)). Based on Yaari’s (1965) theoretical work, it has been suggested that annuities have substantial value and that, under a set of assumptions, retirees should generally use annuities to increase their consumption in retirement. However, empirical findings suggest that there is little evidence of the purchase of annuities.⁴ Why does this anomaly exist? The academic literature offers a wide range of arguments to explain this low demand for annuities. The various explanations generally relate to one of three aspects: market imperfections, product features, or customer features (either socio-economic or behavioral).

In this paper, we investigate the possibility of different time preferences of smokers in the context of long-term savings. Specifically, we will focus on the annuitization decision of smokers in Israel who are insured by pension insurance policies. In doing so, we will exploit a special feature of this product – its pricing—which only considers gender, actuarial life expectancy, and expected rate of return. Pension insurance policy pricing in Israel does not take any health conditions (or smoking status) into account (in particular, it means that all the rest equals a smoking and a non-smoking retirees will be offered the exact same amount of annuity), and therefore could serve as an interesting test case for smokers’ financial decisions. If the ‘smoking decision’ is explained by different time preferences, then smokers, as opposed to non-smokers (with all other variables remaining equal) should be expected to prefer the lump-sum option. Moreover, the fact that past statistics demonstrate that a smoker’s life expectancy is significantly lower than that of a non-smoker, in addition to the fact that smoking is not part of the pension insurance pricing mechanism in Israel, reinforce the hypothesis that smokers will prefer less annuities than non-smokers

Our investigation relies on unique proprietary data from an insurance corporation in Israel, which contains detailed information regarding the decisions of retirees, as well as a rich set of parameters relating to these retirees, including information on smoking behavior. This data set provides a unique opportunity to investigate real annuitization decisions. The entire data set consisted of information on the decision making of 18,860 retirees (i.e. men over the age of 65, and women over the age of 60) between the years of 2009-2013. However, given the fact that we

⁴ Evidence from the US (Beshears, Choi, Laibson, Madrian and Zeldes (2014)) shows that during 2013 less than 10% of DC owners requested to purchase annuity and in Australia during 2008 only 19 people wanted to buy new annuities (Ganegoda and Bateman (2008)).

would only like to focus on the retirees for which these accounts are their major savings plan, our research sample will consist of 1,556 retirees that have accumulations above 500K NIS⁵. 26% of these retirees are female, of which 9.64% indicated that they are smokers. Each client from our sample could choose a withdrawal of a lump-sum, an annuity, or both, subject to the minimal mandatory annuity law⁶ (that only applies to funds accumulated after 2008). Surprisingly, in our sample, smokers, compared to non-smokers, do not prefer the lump-sum option (the results suggest a non-significant preference for annuities while controlling for other relevant variables such as gender, retirement age, accumulated amount, marital status, and others). This contradicts both the time preference theory discussed above and our expectation regarding the life expectancy calculations made by the retirees in our data. While smokers do not prefer the lump-sum option, those that had an extension required by an insurance company against impaired health condition and hence shorter life span prefer the lump-sum option. The behavior of those with impaired health condition is consistent with our expectation. The fact that these two populations with expected shorter life span behave differently is puzzling.

A possible explanation for this finding could be that even though the literature finds a close relationship between smoking and medical conditions, smokers do not perceive themselves as having a shorter lifespan, meaning that smokers experience certain self-illusions regarding their own life expectancy. This observation led us to further investigate the life and health perceptions of smokers, and its effect on financial decisions. To investigate life expectancy perceptions of individuals in Israel, we obtained the results of an online survey of 1000 Israeli residents, ages 50-70, collected during March of 2015. After omitting missing values, we were left with a final set of 963 respondents. Our results support the conjecture that smokers experience self-illusions regarding health and life expectancy. Namely, smoker and past smokers assess their health condition to be relatively similar and only slightly worse than non-smokers. Moreover, smokers believe that their life expectancy is relatively similar to the average in the population⁷. We provide several robustness tests to support these findings, and in particular we show that smoking (controlling for a current impaired medical condition) does not significantly affect health perceptions.

⁵ Which is close to 130K US \$ as of 2015. Further explanation for that choice is provided in the data section.

⁶ For further information regarding the Israeli pension legislation please see part 2.1.2 below.

⁷ We could not reject the hypothesis that smokers' projection is different than the mean value.

Our project relates and contributes to the literature of time preference, life expectancy, smoking, and long-term savings decisions. We discuss the relevant literature in sections 2 and 3.

This paper continues as follows; Section 2 reviews the setting in which our investigation takes place, section 3 discusses the “Annuity Puzzle”, section 4 presents the data, and section 5 reports the empirical results. In section 6 we present the additional survey and its results and section 7 concludes.

2. The Setting

2.1 Smoking in Israel and Around the Globe

According to CDC analysis, as of 2014, the percentage of American adults ages 18 and over who were defined as “current cigarette smokers”⁸ was 16.8%. This ratio was higher for men (18.9%) than for women (14.8%).⁹ According to a report on smoking conducted by the Ministry of Health in 2014, the percentage of Israeli adults aged 21 and over who were “current cigarette smokers”¹⁰ was 19.8%, with the percentage being higher for men (27.3%) than for women (12.6%).¹¹ There is vast research that indicates that smoking is an unhealthy behavior. For this reason, many countries around the world enforce tobacco companies to warn consumers on the harmful effects of smoking. In the United States, since the 1990s, the estimation is that smoking has been responsible for about 20 percent of the total mortality (Mokdad, Marks, Stroup and Gerberding (2004)), and it is thus considered to be the most significant preventable risk to human health (Wang (2014)).

The academic literature suggests that smokers are different in personal characteristics such as time preference, risk preference and impulsivity. Lipkus, Barefoot, Williams and Siegler (1994) concluded that indicators of impulsiveness, rebelliousness, sensation seeking, gregariousness, self-presentational concerns, and hostility, measured during college, best predicted people who were likely to begin smoking, and that people who continued to smoke were more hostile and engaged

⁸ Current cigarette smokers were defined as those who had smoked more than 100 cigarettes in their lifetime and now smoke every day or some days.

⁹ Early Release of Selected Estimates Based on Data From the National Health Interview Survey, 2014, based on data from National Health Interview Survey, 1997–2014, Sample Adult Core component.

¹⁰ Current cigarette smokers were defined as those who smoke every day or some days.

¹¹ Minister of Health report on smoking in Israel 2014, published may 2015.

in sensation-seeking behaviors. Moreover, some papers related smoking to self-control (Thaler and Shefrin (1981)).

Theoretical work argues that smoking and time preference are closely linked (e.g Becker and Murphy (1988)), while others suggested that the idea of self-control is embedded at the heart of time preference theory (Lahav, Shavit, and Benzion (2015)), yet the empirical work regarding smoking and time preferences is ambiguous. Some empirical papers found direct support for the theoretical relationship between smoking and time preference (e.g fuchs (1982), Bickel, Odum, and Madden (1999), Munasinghe and Sicherman (2006), and Scharff and Viscusi, (2011)). Certain empirical papers presented ambiguous support, or only partial support, for the relationship between smoking and time preference. For instance, Khwaja, Silverman and Sloan, (2007), found that there is no significant difference between smokers and non-smokers in discount rates, but there is a difference in other measures of time preference, such as impulsivity and financial planning. Adams and Nettle (2009), documented that only one of the time preference measures presented in their paper was associated with smoking. Further, Harrison, Lau, and Rutström (2010) found that there is a significant correlation between individual discount rates and smoking among men only.

Moreover, additional research papers have found evidence that is inconsistent with the theory regarding smoking and time preference. These papers concluded that, in practice, smokers have lower discount rates than non-smokers (e.g. Reynolds, Richards, Horn and Karraker (2004), Chabris, Laibson, Morris, Schuldt, and Taubinsky (2008)), despite the clear theory regarding smokers' time preference stating the opposite. These findings are considered to be a longtime puzzle within the research community, as they contradict the assumed relation between time preference and smoking.

In the economic literature, smoking has been associated with risky behavior, and it was argued that smoking status contains precise information about individuals that is not captured by economic and psychological data alone (e.g Viscusi, 1991). It has also been suggested that there might be some personal characteristics, yet unrevealed, that are expressed in smoking and affect financial behavior (Adams, Bose and Rustichini, 2014).

Data from the Israeli Ministry of Health¹² demonstrates the mortality difference between smokers and non-smokers in selected countries. It is evident that there is a gap of more than 9 years in life expectancy between the two groups and that the gap is even wider in the United States (12 years for men and 11 years for women)¹³. The price gap for life insurance policies for smokers versus non-smokers in Israel rises with age.

2.2 The Long Term Savings Market in Israel

This section describes the institutional and regulatory settings in which our empirical investigation takes place. We first describe the structure of the long term saving plans in Israel, and then discuss the extensive financial reforms that occurred in the Israeli pension system over the last three decades. Finally we will refer to the uniqueness of annuities in Israel.

2.1.1 Structure of the Israeli Pension System

The Israeli pension system consists of two layers—one public, and the other private. The public layer, known as the *Israeli National Insurance*, is designed to guarantee a minimal income for every citizen above the qualifying age and income (either 65 or 70 for men and either 60 or 65 for women). The public pension amount that is currently paid to retirees is approximately 17% of the average wage for a single citizen, and 25% for a couple¹⁴.

The private layer is a much more complex pension system, which consists of five types of pensions / long term savings products: (1) "Old" pension funds¹⁵, (2) "new" pension funds¹⁶, (3) "new" general pension funds¹⁷, (4) provident funds¹⁸, and (5) pension insurance policies (also

¹² Minister of Health report on smoking in Israel 2013, published may 2014

¹³ Similar results were reported by Jha, Ramasundarahettige, Landsman, Rostron, Thun, Anderson, Peto (2013) who noted that "Life expectancy was increased 4 to 10 years among smokers who quit, depending on their age at the time of smoking cessation", Taylor, Hasselblad, Henley, Thun and Sloan (2002) concluded that "life expectancy among smokers who quit at the age of 35 exceeded that of continuing smokers by 6.9 to 8.5 years for men and 6.1 to 7.7 years for women", Streppel, Boshuizen, Ocké and Kromhout, (2007) mentioned that "Average cigarette smoking reduced the total life expectancy by 6.8 years, whereas heavy cigarette smoking reduced the total life expectancy by 8.8 years", and by others.

¹⁴ During 2014 these amounts were equal to 1,531 NIS for a single citizen, and 2,301 NIS for a couple which is roughly 440 USD and 660 USD respectively. The Institute for National Insurance pays the minimal pension only to Israeli citizens that have been insured for a certain period of time, as required by the law (10 years of insurance).

¹⁵ DB Pension funds that were closed to new clients by January 1, 1995.

¹⁶ DC Pension funds that were first established on January 1, 1995, and must preserve actuarial balance.

¹⁷ DC Pension Funds that operate a pension plan that is not entitled to the allocation of non-tradable preferred government bonds ("Meyoadot") from the government of Israel.

¹⁸ Funds that are intended for long term savings and normally do not include any risk insurance. Historically a saver could withdraw his saving as a lump-sum according to the principles that will be described below.

known in Israel as "Management Insurance")¹⁹. The focus of this project is on choices within the private layer that are related to the pension insurance policies (5).

These "Management Insurance" / pension insurance policies, some of which provide the saver with tax benefits from the state (the benefits differ between self-employed and salary workers), are managed by insurance companies that provide both operational management and investment of the funds.

It is important to emphasize that the unique form of the Israeli pension insurance policies differs from its contemporaries worldwide. In Israel, savers with a pension insurance policy that was bought prior to 2013 receive a contractual guarantee for a conversion factor from lump-sum to annuity, according to the terms that existed in the market at the time that the policy was issued.²⁰

Table 1 describes the number of funds operating in different categories and volumes under management in the different pension entities in Israel (in million NIS, 2013), based on data from the Ministry of Finance²¹. The volume of funds under management is higher than 1 Trillion NIS, 47% of them are invested in pension funds, 23% in pension-insurance policies and 30% in provident funds.

[TABLE 1]

Due to historic differences in tax incentives, there was a tendency for employees to save using either a pension fund or a pension insurance policy, while people who were self-employed saved mostly using provident funds or pension insurance policies. Moreover, the choice of saving tool fluctuated between different industries, and whether or not there was membership in an employee organization.

¹⁹Trade name of pension insurance products designed for employees. It sets the terms of termination of the insured and includes pension rights and other financial rights. This policy included both a saving component and an insurance component (for different kind of risks such as death and disability).

²⁰Meaning that the insured could ensure the rate of the conversion factor into annuity at the time the policy was issued (for example the insured could purchase this guarantee at the age of 25). In the US for example if you buy an annuity at the age of 25 you do not ensure any conversion factor for the future. In Germany, a client could buy a guaranteed annuity before retirement but the insurance company is allowed to change the guaranteed conversion factor up to 30%.

²¹ Source of data: Ministry of Finance, annual report, 2013.

2.1.2 Three Decades of Structural Reforms in the Israeli Pension System

The Israeli private²² pensions and capital markets have gone through massive regulatory changes and several reforms during the last three decades. These changes were generally designed to reduce the government support of the pension system, to enhance competition in the markets, and to compel a minimal level of pension in both the provision and withdrawal phases. We will focus only on the reforms that are relevant to the choice between annuities and lump sum in the “management” insurance product that we investigated.

In 2000, as part of the "omnibus law of arrangements in the state economy"²³, new principles concerning annuity plans were set. Prior to discussing these key changes, it is important to note that Israeli pension plans were divided into two groups by their primary designation – annuity plans (mainly pension plans and some of the pension insurance policies²⁴), and lump-sum plans (mainly provident funds and other types of pension insurance policies).

Prior to applying the new act, a member of each of the different pension plans could choose whether to withdraw an annuity or a lump-sum at the date of entitlement set by the law²⁵. The new "law of arrangements" was the first step carried out in favor of annuities over lump-sum withdrawals. The law stated that a pension plan designated to pay an annuity, could only be paid as an annuity. As a result of the new act, many owners of pension insurance policies have either changed their products into lump-sum designated insurance policies or acquired a "lump-sum appendix" enabling lump-sum withdrawals. During 2003, the government increased the retirement age and reduced tax benefits for early retirement. At the end of 2005, a new regulation stated that self-employed workers could no longer withdraw lump-sum funds before reaching the age of 60 with at least 5 years of seniority in their fund. This was yet another step towards a complete cancelation of the privilege to receive a lump-sum amount from a long term saving plan.

In 2008, the state of Israel adopted a new amendment to its codex of pension legislation, requiring a minimal annuity by law. The new law, also known as "The Third Addendum", stated

²² In the past, government employees were not insured in the private sector. Rather they were entitled to budgetary pensions that are not in the scope of this paper.

²³ These are legislative amendments for achieving budget reconciliations.

²⁴ Examples for pension insurance policies which were intended to pay annuity were "Adif" and "Gimla".

²⁵ Generally, a member could withdraw his fund as lump-sum after 15 years of seniority, or by the age of 60 with at least 5 years of seniority (or retirement). Please note that the Israeli law states some other specific cases in which lump-sum withdrawal is allowed. We will not discuss them in this framework.

that individuals will be required to save a sufficient amount in an annuity oriented account in order to ensure a minimal pension of approximately 4,503 NIS²⁶. According to the new legislation, only after saving the sufficient amount for an annuity would one be entitled to other tax benefits for additional savings, allowed to be withdrawn as a lump-sum (only upon retirement). It is important to note that the new addendum only referred to savings made after January 2008. Following a substantial protest, a new addendum, known as "The Fifth Addendum", stated that under certain circumstances, accumulated funds could be transmitted into lump-sum withdrawals (mainly for those who were self-employed or as severance compensations), up until the end of 2011.

Regulatory changes in the Israeli pension system persisted. New legislation was further enacted at the end of 2013, which prohibited insurance companies to sell pension insurance policies with guaranteed conversion factor into annuity. This new addendum intended to maintain the stability of the insurance sector, for it was exposed to a great longevity risk, due to binding conversion factor agreements.

3. Annuities Versus Lump-Sum – the Annuity Puzzle

3.1 Theory

The combination of trends of lengthening life expectancy, occupational instability, and the steady erosion of government support in retirement plans, raises many academic questions relating to savings and retirement phases.

Theoretical academic work starting with Yaari (1965), claims that annuities have substantial value, and that retirees should generally use annuities to increase their consumption in retirement. Nevertheless, previous empirical academic work finds little evidence of the purchase of annuities. Evidence from the U.S. (Beshears, Choi, Laibson, Madrian and Zeldes (2013)) demonstrates that during 2013, less than 10% of DC²⁷ owners requested to purchase an annuity, and in 2008 in Australia only 19 people wanted to buy new annuities (Ganegoda and Bateman (2008)). This unexpected result substantially deviated from existing economic theory, and in economic literature is referred to as the "Annuity Puzzle".

²⁶ The minimum wage in Israel at the time, linked to CPI in 2014 prices.

²⁷ Defined Contribution pension plan is a pension plan in which the employer and / or the employee contribute a certain amount of money each period for the benefit of the employee.

The differing explanations generally relate to one of three aspects: market imperfections, product features, or customer features (either socio-economic or behavioral).

From the market and product side, previous research dealt with many reasons for the lack of annuities. These reasons ranged from problems in the pricing mechanism of annuities (Bütler, Staubli and Zito (2008), Chalmers and Reuter (2009)); efficiency of the available products (Scott, Watson and Hu (2006), Stevens (2009)); accumulation size (Bütler and Teppa (2005), Benartzi, Previtro and Thaler (2011)), and a lack of confidence in the insurance company (Beshears, Choi, Laibson, Madrian and Zeldes (2013)). Others claimed that the minority of annuities could result from adverse selection in the markets (Finkelstein and Poterba (2004), Bütler and Teppa (2005)), and the lack of products with protection against inflation risk (Zeithammer and Payne (2013)).

Other aspects of the literature set out to explain the annuity puzzle by examining personal characteristics, including socio-economic parameters, as well as bequest motives and demographic characteristics. Parameters such as gender, marital status, children, and risk aversion have been discussed with no definite conclusion (Cappelletti, Guazzarott and Tommasino (2011), Chalmers and Reuter (2009), Bütler and Teppa (2005), Agnew, Anderson, Gerlach and Szykman (2008)). Further research highlighted other personal characteristics to try and explain the puzzle, such as medical condition (Sinclair and Smetters (2004), Gardner and Wadsworth (2004), Turra and Mitchell (2004)), pre-existence of a social security annuity (Benartzi, Previtro and Thaler (2011), Chalmers and Reuter (2009)), and subjective discount rate (Warner and Pleeter (2001), Bütler and Teppa (2003)).

Additional work reveals a number of psychological and irrational behavioral barriers to annuitization, such as complexity of the decision (Brown (2007), Brown, Kapteyn, Luttmer and Mitchell (2013), Brown, Kapteyn, Luttmer and Mitchell (2013)); acquiescence and default biases (Bütler and Teppa (2005), Agnew, Anderson, Gerlach and Szykman (2008)); difficulty in making irreversible decisions (Brown and Warshawsky (2001)); differing biases that arise from framing (Benartzi, Previtro and Thaler (2011), Beshears, Choi, Laibson, Madrian and Zeldes (2013), Brown, Kling, Mullainathan, Wrobel (2008), Goldstein, Hal, Herschfield and Benartzi (2014)); a difficulty to part from accumulated money (Benartzi, Previtro and Thaler (2011)); mental accounting (Benartzi, Previtro and Thaler (2011); Brown (2007)), ambiguity regarding self-life expectancy (D'Albis and Thibault (2012), Smith, Taylor and Sloan (2001), Payne, Sagara, Shu,

Appelt and Johnson (2012)), and heuristics such as "insurance is only for bad events" (Brown (2007)).

3.2 Annuities Versus Lump-Sum Saving Products in Israel

The extensive process of reforming the Israeli pension market has created a diverse market for annuities²⁸. Unlike annuities in many other countries, all saving products in Israel are linked to inflation. We will describe the annuities available in Israel below.

Pension funds in Israel pay annuities as a default. A member of a pension fund can withdraw a lump-sum from accumulated amounts originated after 2008, only if he can prove having at least the minimal amount of annuity set by the law. Moreover, amounts accumulated before 2008 can only be withdrawn as annuities, but one can capitalize an amount of 25% of one's annuity over the first five years.

In other provident funds, amounts accumulated before 2006 can be withdrawn as lump-sums after 15 years of seniority, or alternatively at the age of 60. Amounts accumulated from 2006 to 2008 can be withdrawn as lump-sums only after the age of 60 and after 5 years of seniority. Amounts accumulated later than 2008 can only be withdrawn as an annuity by transmitting them to a fund for annuity purpose. Note that as for all long-term saving products, a member can withdraw a lump-sum if he can prove he has a minimal annuity.

Further, since 2000, the pension insurance policies described above can be divided into two categories: policies designated for a lump-sum, and policies designated for annuity. Note that the first category also includes policies designated for an annuity with a "lump-sum" appendix. Savings, which are part of the policies that are designated for a lump-sum, prior to 2008 allowed a lump-sum payment according to the adequate law²⁹, while savings in such policies after 2008 allowed a lump-sum payment only for retirees who saved a sufficient amount of money to withdrawal a minimal annuity as set by the law. Having a policy aimed for annuity prior to 2008 allowed mainly for an annuity withdrawal³⁰, while sums accumulated after 2008 could also be withdrawn as lump-sums for retirees with a minimal annuity as mentioned above.

²⁸ Annuities could either be for the retiree or in some cases for kin.

²⁹ The law changed by 2005. After this change one could withdraw a lump-sum only after the age of 60, while before one could withdraw it even at younger ages if the criteria set by the law were satisfied.

³⁰ Excluding funds originated before 2000.

In this work we will focus on the annuitization decision of smokers in Israel that are insured by pension insurance policies, and in doing so exploit a special feature of this product – its pricing—which only considers gender, actuarial life expectancy, and expected rate of return. Insurance policy pricing does not take the individual’s health condition (or smoking status) into account, and therefore could serve as an interesting test case for a smoker’s decisions.

4. The Data

We obtained proprietary data from an insurance corporation in Israel, regarding retirees with pension insurance policies (known as "management insurance"). Our dataset contains information on retirees' withdrawal schemes, between the years of 2009-2013.

We initially received information on 18,860 retirees (i.e. men over the age of 65, and women over the age of 60), including 1,556 retirees with accumulations above 500K NIS. Each client could choose a withdrawal of a lump-sum, an annuity, or both, subject to the minimal mandatory annuity law (that only applies to funds accumulated after 2008, as previously mentioned).

Individuals in Israel can invest their long-term savings in several plans and products. This can be done simultaneously or over time, for example to reflect changes that can occur in the workplace over the course of a lifetime. Given that, in the initial database we received there was a very large difference in the amounts accumulated, as well as for many this is not necessarily their main long-term saving plan. Since we want to avoid the potential mental accounting effects related to small amount on our analysis, we chose to focus our investigation on choices related to meaningful sums of money for the individuals.³¹ However, since we do not have information regarding the income level of the retirees in this dataset, we only analyzed accounts that the accumulated funds are over 500K NIS. We based this threshold on investigation on characteristics of long-term savers in Israel.³²

³¹ For accumulations that are lower than 500, almost 80% of the population chose the full lump-sum option in contrast to 15.87% percent for the higher amounts.

³²This threshold was chosen since we aim to address decisions of retirees for whom the accumulation in this insurance corporation are relatively substantial (some retirees might have many insurance policies in many insurance companies made by different employers). We compare our data to public information published by "Old Mivtachim", the largest Israeli old pension fund (historically, members of the old pension funds usually did not have

4.1 Summary Statistics in the Administrative Data

The administrative dataset contains a rich set of socioeconomic and demographic data for each retiree, such as date of birth, date of purchase of the policy, date of repayment, gender, marital status, indication of smoking, annuity factor, age difference between spouses (only for joint-life policies), investment management method, medical and profession supplements to the policies, indication for residence, last practice, indication for insurance agent and other insurance additions to the policy (risk, work disability, long term care insurance and health insurance).

Table 2 contains descriptive statistics of the different variables in our dataset used in this paper.

[TABLE 2]

For clients with accumulated funds above 500K, the mean age is 67.2. 74% of the participants are male, 75.5% are married, while 9.64% are divorced and 4.82% are widows/widowers. 9.64% of these participants are classified by the insurance corporation as cigarette smokers³³.

It should be noted, however, that in contrast to other empirical evidence (e.g. Beshears, Choi, Laibson, Madrian and Zeldes (2014), Ganegoda and Bateman (2008)), the majority of retirees (with substantial accumulations) choose to receive at least some portion of the money via annuity. This can be explained by the Israeli legislation described above and by the fact that, in the past, owners of pension insurance policies have had preferred conversion factors that made annuities very attractive. Nevertheless, the aim of this paper is not to focus on patterns in annuity withdrawal in general in Israel, or to solve the annuity puzzle. Rather, we focus on long-term saving choices of smokers versus non-smokers, and females versus males.

Table 3 below presents the distribution of annuity choice over gender, marital status and smoking status:

other pension accounts). We can see that in our data the average accumulated fund designed for annuity (rather than lump-sum) is 794K NIS with standard deviation of 533K NIS (while in the public numbers published by "Old Mivtachim", the average accumulation for clients between the ages of 60 to 64 is 728K NIS). The average annuity of clients in our data is 3,816 NIS (also similar to the average annuity reported by "Old Mivtachim", 4,177 NIS³²). Moreover, the average (client level) accumulation designed for a lump-sum withdrawal in our data is 449K NIS, where the standard deviation is 583K NIS and the maximal lump-sum accumulation is 8 million NIS.

³³"Smokers" could be current or past cigarette smokers since we do not know how frequent the insurance companies update the socioeconomic data.

[TABLE 3]

Women are significantly more likely to choose a full annuity than men (92.1% percent of women chose to annuitize, while only 81.2% of men chose the same), although in Israeli pension insurance policies, gender is taken into account within the pricing of the policies (hence from the pricing perspective we did not expect any difference between males and females). Singles are very likely to choose annuity, consistent with previous literature (such as Butler and Teppa (2005)). Regarding smokers in our data, 76% are male and that the average accumulation of smokers is 770K NIS, while the average accumulation of non-smokers is 945K.

5. Interesting Setting for Investigating the Time Preference Argument About Smokers: Do Smokers Choose Less Annuities?

5.1 Why it is an Interesting Setting?

The calculation of a certain retiree's monthly payment is usually through an annuity factor. This annuity factor, for the most part, considers elements that affect life expectancy such as gender. In Israel, health conditions (unlike gender), is not part of the annuity pricing mechanism. This fact implies that two people who are exactly the same, besides their health condition, will be offered the same annuity by the insurance companies. Thus, we would expect that smokers and other less healthy people (either actual or in expectation) would realize that their life expectancy is somewhat lower than non-smokers, and that this realization would ultimately affect their annuity versus lump-sum choice.

Our conjecture stems from literature such as that conducted by Cappelletti, Guazzarott and Tommasino (2011), which demonstrates that impaired health reduces annuity preferences. This result is consistent with two different explanations: first, retirees wish to avoid financial 'shocks', which are often caused by unexpected medical expenses (see for example Sinclair and Smetters (2004)), and therefore they will prefer the lump sum choice over the annuity. From a different point of view, un-well retirees should expect a lower life expectancy, and as a result would be more sensitive to bequest motives. Since the literature suggests that smoking status is a good estimate for impaired health, and also suggests that smokers may have a higher present preference (reflected in higher subjective discount rate), we hypothesis that smokers should choose less annuities compared with non-smokers, with all else equal.

5.2 Smoking and Annuity Choices - The Empirical Investigation

First, we divided our sample into different groups of annuity withdrawals: *full annuity* - a client is defined as "full annuity" if all accumulations were converted into an annuity (regardless of the annuity value), *legal minimum* - a client is defined as "legal minimum" if only some of his accumulations were converted into an annuity, and the final annuity is between 3,800 and 4,500 NIS, *lower than minimum* - a client is defined as "lower than minimum" if only some of his accumulations were converted into an annuity, and the final annuity is lower than 3,800 NIS, *partial yet higher than the minimal law* - a client is defined as "partial" if only some of his accumulations were converted into an annuity, and the final annuity is higher than 4,500 NIS. We find that smokers significantly prefer annuities. As shown in figure 1 below, 61% of smokers chose full annuities, whereas only 47% of non-smokers chose this option. This decision is not due to the difference in conversion factors between smokers and non-smokers (by comparing these conversion factors we find no significant difference between the conversion factors of smokers and non-smokers).

[FIGURE 1]

Next, we conducted a series of descriptive regressions examining the characteristics of retirees who choose to annuitize. Our characteristics consist of 3 main groups: (1) personal characteristics; (2) pension policy characteristics; (3) macroeconomic FE.

5.2.1 Choosing an Annuity

In our first examination Equation (1), we ignore smoking and investigate the potential main characteristics that may affect the decision to choose annuity:

$$(1) y_{ann} = \alpha + \beta_1 male + \beta_2 retirement_age + \beta_3 gdp + \beta_4 rf + \beta_5 total_amount + \beta_6 divorced + \beta_7 widoer + \beta_8 married + \beta_9 unknown_marital_status + \beta_{10} purchahse_age + \beta_{11} no_of_policies + \beta_{12} percent_post_2008 + \epsilon_i$$

Where:

"y_ann" is a dummy variable for annuitization. "y_ann"=1 if the retiree chooses any portion of annuity versus a full lump-sum ("y_ann"=0).

"Retirement age" is the retiree's age at the time of decision. Retirees in our sample are allowed to postpone their retirement.

"GDP" is the Israeli GDP at the retirement year in fixed prices³⁴.

"RF" is the risk free rate at the retirement year³⁵.

"Total amount" is the total accumulation at retirement. A higher accumulation implies that the account in discussion is the main account of the client.

"Divorced", "Widower", "Married" and "Un-known marital status" are dummy variables for marital status (the category "Single" was omitted).

"Purchase age" is the average age of the client (over all of his policies) in which the policies were purchased. This variable is correlated with the client conversion factor, and hence can serve as a proxy for it (we do not have information about conversion factor for clients who chose the full lump-sum option).

"No_of_policies" represents the number of different policies for each client, in this particular insurance corporation.

"Percent_post_2008" is the proportion of money accumulated after 2008 and therefore must be withdrawn as an annuity up to the mandatory monthly annuity.

The results for probit and logit models are described in columns (1)-(4) in table 4 below. Overall, all models are significant with pseudo R^2 equals around 25%:

[Table 4]

³⁴ Data from the Central Bureau of Statistics.

³⁵ The Bank of Israel declared effective rate of return.

We find that purchase age and macroeconomic status are related to the annuity choice, while most of the individual socioeconomic characteristics (such as marital status and gender), do not significantly affect individual preferences (Consistent with previous literature (such as Butler and Teppa (2005))).

In order to understand both the impact of seniority in the fund and conversion factors, we included "purchase age" which is the average age of the client (over all of his policies) at the time that the policies were purchased, into the regression. Its coefficient is negative and significant in all specifications, implying that a one year delay in the purchase of a pension tool will reduce the likelihood of choosing an annuity (this could result from the increase in the conversion factor). With respect to the specification of the year dummies (column (2) in table 4 below), holding all other variables at their mean, an increase of one year in the purchase year will reduce the probability to purchase an annuity by 1.6%.

As expected, as a result of the new reform in Israel we described above, the percent of accumulation after 2008 is significant and positive, implying a higher likelihood of purchasing an annuity with money accumulated after the new Israeli legislation.

Contrary to previous literature such as Butler and Teppa (2005), the stock of capital at retirement does not play an important role in all specifications (coefficients are very small and not significant). Nevertheless, all regressions refer to accumulations of over half a million NIS³⁶. Age at retirement and number of policies are not significant.

Some may argue that using GDP and rate of return in order to capture macroeconomic FE is problematic since we only investigate a short period of time, hence for a robustness test we use a year FE method, as indicated in equation (2), where we added dummy variables for the year:

$$(2) y_{ann} = \alpha + \beta_1 male + \beta_2 retirement_age + \beta_3 year_dummies' + \beta_4 total_amount + \beta_5 divorced + \beta_6 widoer + \beta_7 married + \beta_8 unknown_marital_status + \beta_9 purchahse_age + \beta_{10} no_of_policies + \beta_{11} percent_post_2008 + \epsilon_i$$

Where:

³⁶ Close to 130K US \$.

Year_dummies are dummy variables for the years 2009-2012 respectively, indicating the year in which the retiree made the choice between annuity and lump-sum as defined above (year 2013 was omitted).

For most variables the modification from equation (1) did not make a difference. The 2009 year dummy (the year in which the annuitization decisions were made) is positive and significant, implying that a year after the financial crisis, the likelihood to annuitize increased. For robustness we also checked the impact of including the yield on market portfolio (TA-100 index), the results remained similar. Next we will omit the GDP, rate of return and TA-100 variables and use the year dummies.

5.2.2 Smoking and Medical Condition

Following the analysis above, we will now examine the impact of smoking and medical condition on the decision to annuitize, while controlling for the other variable that were previously discussed. Three variables were chosen as proxies for impaired health: if the individual is a smoker; if the individual has an extension required by an insurance company against impaired health condition, and whether he or she has an extension related to a risky profession required by an insurance company. The variables were added to our previous specifications (equation 2). The results of the estimation of equation (3) are reported in table 5:

$$(3) y_{ann} = \alpha + \beta_1 male + \beta_2 retirement_age + \beta_3 year_dummies + \beta_4 total_amount + \beta_5 divorced + \beta_6 widoer + \beta_7 married + \beta_8 unknown_marital_status + \beta_9 purchahse_age + \beta_{10} no_of_policies + \beta_{11} percent_post_2008 + \beta_{12} smoker + \beta_{13} mortality_increase + \beta_{14} professional_increase + \epsilon_i$$

Where:

"Smoker" is a categorical variable with the value of 1 for smoker and 0 for non-smoker.

"mortality_increase" is a dummy variable for having an extension required by an insurance company against impaired health condition. Note that the increased premium is for the risk insurance and not for the annuity (since in most of the world health factors are not taken into

account when pricing annuities). "mortality_increase" equals 0 for no extension and 1 for clients with extensions. We would expect that retirees with a mortality extension would be less likely to annuitize because of lower life expectancy.

"professionanl_increase" is a dummy variable for an extension required by an insurance company from an insured with a risky profession. The increased premium is for the risk insurance and not for the annuity (for, in most of the world, health factors are not taken into account when the pricing annuities). "professionanl_increase" equals 0 for no extension and 1 for clients with extensions. We would expect that retirees with a professional extension would be less likely to annuitize because of lower life expectancy (due to damaged health caused by the risky profession).

For robustness, in order to investigate the relationship between smoking and the other health proxies that may affect the estimation, we estimated the same regression without the insurance tariff add-ons:

$$(4) y_{ann} = \alpha + \beta_1 male + \beta_2 retirement_age + \beta_3 year_dummies + \beta_4 total_amount + \beta_5 divorced + \beta_6 widoer + \beta_7 married + \beta_8 unknown\ marital\ status + \beta_9 purchahse_age + \beta_{10} no_of_policies + \beta_{11} percent_post_2008 + \beta_{12} smoker + \epsilon_i$$

The results are reported in table 5 below:

[TABLE 5]

In table 5 we present the estimated results of the effect of medical condition on the annuity decision. For specifications with a binary dependent variable, results are qualitatively similar when using either logit or probit models. In particular, our main coefficients of interest (capturing the effect of medical condition) have the same sign and similar levels of statistical significance within the two estimation techniques. The precise magnitudes of the estimated marginal effects from probit or logit estimations are sensitive to the point in the distribution at which marginal effects are evaluated and are calculated and reported at the mean. Overall, all models are significant with pseudo R^2 equaling around 25%

When examining both mortality and professional extensions, it is clear that both coefficients are negative in the logit and the probit specification, but only the mortality extension is significant. Retirees that were required to pay more for their life insurance (meaning that they are considered less healthy or at higher risk of being so) are less likely to purchase annuities at retirement. For instance, we can see that in the probit specification (table 5, columns), holding all other variables at their mean, being in the group required to pay extra for the risk insurance reduces the probability (marginal effect at means) to annuitize by 13.9% (logit results are very similar). This result is consistent with the theory, and implies that ill people are indeed less likely to purchase annuities.

Surprisingly, cigarette smoking does not have a negative significant effect on the demand for annuity. This neither fits our predictions regarding smokers' time preferences, as presented above³⁷, nor the assumption that since health condition is not a part of the pricing mechanism in these pension insurance policies, smokers would prefer the lump-sum option.

Our results hold when we include or do not include other variables for health condition as described above. In particular, columns (13) – (16) in table 5 show that whether we used smoking status alone as a representation of medical condition or we added mortality increases, smoking condition does not significantly effect annuitization.

Table (6) below presents other robustness tests, specifically we added a probit specification in which the dependent variable is choosing the full lump sum option and two specifications (ols and tobit) in which the dependent variable is the percent of accumulation designated for annuity, we show that our results hold in these tests.

[TABLE 6]

A possible explanation for our findings could be that even though literature describes a close relationship between smoking and medical condition, smokers do not perceive themselves as having a shorter lifespan, meaning that smokers experience self-illusion regarding life expectancy. This conjecture led us to further investigate the self-life perception of smokers and its effect on financial decisions.

³⁷ Regarding the entire population in our dataset 11.46% are smokers. Regarding the members with high accumulation (over 500K) only 9.64% are.

6. Additional Explanation: Optimism Regarding the Consequences of Smoking Activity on Health and Life Expectancy

6.1 The Survey Setting, Sample and Questions

6.1.1 Sample Characteristics:

To investigate life expectancy perceptions of individuals in Israel, we obtained the results of an online survey of 1000 Israeli residents who were 50-70 years old during March 2015. After omitting missing values we were left with a final set of 963 respondents.³⁸ Summary statistics of respondents in the survey are reported in table 7 below:

[TABLE 7]

The mean age of those that responded to the survey is 58.17 years (median equals to 58, std. equals to 5.45). 40.6% of participants are male; hence our survey is more female concentrated compared to the population in Israel. The family status of the respondents is varied, 73.4% are married while 16.9% are divorced and 3.3% are widows/widowers.³⁹ On average our sample is more educated than the total population of Israel. Only 0.2% of participants have less than high school diploma, 22.0% have a high school diploma and 76.5% have a higher education (including college, graduate school, and other higher education such as rabbinical studies).⁴⁰ 88% of the sample believe that their health condition is good or very good, 17.4% of the survey participants reported that they currently smoke, and 31.5% reported that they had smoked in the past (in our research, a person is defined "smoker" if he smokes over three cigarettes per day)⁴¹.

³⁸ The survey was provided by "Sarid - Research Services and Training", using an online panel of registered potential participants with a wide residential distribution aged who registered voluntarily. In exchange for their response, they respondents gained points that are convertible into money or vouchers.

³⁹ Compared to true data from CBS for 2012, the family status of Israeli citizens over the age of 50 is as follows - 68% are married while 13% are divorced and 15% are widows/widowers. Please note that the CBS data also includes citizens aged over 70.

⁴⁰ According to the CBS social questionnaire, only 26.4% of the population have achieved academic studies, while 3% have studied in a rabbinical school (Yeshiva). The fact that the survey participants have, on average, higher education than the population can be explained by the choice of conducting survey on line to respondents that are older than 50 years old.

⁴¹ According to a Minister of Health report on smoking in Israel 2014, published May 2015, 27.3% of male and 12.6% of female within the adult population smoke.

With regards to smokers and past smokers in our survey, it should be mentioned that out of the smokers 58% are female, while out of past-smokers 53% are female and out of non-smokers 62.4% are female. 69.05% of smokers have a higher education degree, compared to 78% for past smokers and non-smokers (the difference is significant in 3% significance level) implying that smokers are less educated than past and non-smokers. With regard to income, 64.29% of smokers report that they earn more than the average income in the population; compared to 65.68% and 55.69% of past smokers and non-smokers respectively (the differences are not statistically significant).

6.1.2 The Survey Structure:

Our survey consisted of questions related to life expectancy estimations, demographic questions, long-term savings decision choices and self-health assessments. Most of the questions were multiple choice questions, while some were open-ended questions (such as occupation), and some questions included a scale of responses (i.e. probabilities). The median time taken to complete the survey was 6.5 minutes.

As the focus of our research is to obtain life expectancy perceptions, a question that is clearly not an easy one to answer, we asked the respondents several questions, all well accepted in the financial economics academic literature⁴². Specifically, we presented the respondents with the following questions:

- *In your opinion, what is the current life expectancy in Israel (each respondent for their own gender)?*

This question was not intended to assess subjective life expectancy. Rather, it was designed to understand the perception of life expectancy of others (in the population). Please note that we did not ask about conditional life expectancy at the specific age of the respondent, since we were interested in asking a clear and relatively simple question that would not confuse our sample.

- *Do you expect your own life expectancy to be lower, identical or higher than the average life expectancy you have mentioned above?*

⁴² And each clearly has its advantages and disadvantages, either regarding the complexity of the question or with respect to the information obtained.

Comparing self-life expectancy to the life expectancy of the population was used for example by Beshears, Choi, Laibson, Madrian and Zeldes (2014), who asked respondents "how much longer they expected to live relative to others their age".

- *Using numbers between zero (0) and ten (10), where zero represents "no chance" and 10 represents complete certainty, what is the chance you will reach the age of 85?*
- *Using numbers between zero (0) and ten (10), where zero represents "no chance" and 10 represents complete certainty, what is the chance you will reach the age of 95?*

Asking respondents to state the probability they will reach the age of X is the common methodology of assessing subjective life expectancy used both by the HRS⁴³ and by the European SHARE⁴⁴ (which are the main sources of data for self-life expectancy research).

- *What is your father's age? If he died please specify the age of death⁴⁵.*

Parental longevity was taken into account in some research such as Van Doorn, Carol, and Stanislav V. Kasl (1998), Balia (2011) and others.

6.2 The Survey Results

6.2.1 Survey Results – Life Expectancy

We asked the respondents for their opinion on the life expectancy in the population for their own gender (Table 8). The proximity of the median value that the respondent evaluated (81.1 for male and 82.54 for female), as compared to the actual life expectancy at birth in Israel according to CBS (80.3 for male and 83.9 for female), and to life expectancy at the age 58⁴⁶ (82.5 for male and 85.1 for female), is an indicator that the survey respondents took the survey seriously and devoted attention to answering the questions.

As mentioned above, we also asked the respondents for the subjective probability that they will live to the age of 85 and 95. The mean probability to reach these ages were 67.5% and 3.84% respectively, meaning that on average our respondents estimated the probability of reaching the age of 85 to be higher than the probability of reaching the age of 95, as expected.

⁴³ The U.S. Health and Retirement Study that that was used by many studies (e.g. Koijen, Van Nieuwerburgh, and Yogo (2015)).

⁴⁴ Survey of health, aging and retirement in Europe.

⁴⁵ Papers such as Smith, Taylor Jr, Sloan, Johnson and Desvousges (2001) Khwaja, Sloan and Salm (2006), Elder (2013).

⁴⁶ The average age in our survey.

We asked survey respondents if they expect to live more (category "3"), less (category "1") or the same (category "2") as the life expectancy in the population (that was specified by them in the previous question). 34.2% of the respondents believed they would live longer than the average life expectancy, whereas 52.7% thought that they would live the same time as average, and 12.9% suspected they would live less. On average our respondents believed they would live more than the life expectancy in the population (average score of 2.21, which is statistically different than 2, and represents the perception that a certain respondent will live the same time as the average in the population).⁴⁷

Our results are very similar to the results reported by Beshears, Choi, Laibson, Madrian and Zeldes (2014), who conducted two surveys relating to U.S. respondents and stated that "In Survey 1, 36% of participants said they expected to live longer than the average person their age, 54% said they expected to live about the same amount of time as the average person their age, and 10% said they expected to die sooner than the average person their age. Responses to Survey 2 were similar: 34% of participants anticipated a relatively long life, 54% anticipated a life about as long as that of an average person of the same age, and 12% anticipated a relatively short life."

[TABLE 8]

Our findings that only 12.9% of respondents think that they will live less than the average life expectancy is not necessarily an indication of over optimism. Beshears, Choi, Laibson, Madrian and Zeldes (2014) noted that the somewhat wide proportion of respondents projecting a relatively long life could result from the fact that the sample is more educated than average in the population, and since longevity is positively correlated with education (Meara, Richards and Cutler (2008).

6.2.2 Gender and Life Expectancy Estimation

It is well documented in Israel, and in other countries, that on average women live longer than men (Figure 2). For instance, Xu, Kochanek, Murphy and Arias (2014) show that the gender mortality gap in the U.S during 2012 was 4.8 years at birth, and 2.6 years at the age of 65 (conditional life expectancy). Evidence from developed countries show the same pattern of excess life expectancy of women compared to men. Further, Solberg and Yotav (2014) noted that

⁴⁷ Please see appendix 3.

conditional life expectancy in OECD countries as of 2012 and at the age of 65 were 17.4 or 20.8 for men or women respectively⁴⁸. In Israel, conditional life expectancy at the age of 65 is even higher – 18.8 for men and 21 for women. Figure 2 demonstrates the differences in conditional life expectancy of men and women aged 60 in selected countries⁴⁹.

[FIGURE 2]

One would expect that this unambiguous result should therefore be reflected in respondents' perception of life expectancy. Yet, as previous academic literature documented, females tend to underestimate their own life-expectancy. Perozek (2008), using data from the American 1992 Health and Retirement Study (HRS), presented that male participants' self-life expectancy is in line with social security actuary life tables, while female subjective assessment is to some extent lower than these actuary life tables. He suggested that these findings could either be an indication for future narrowing of the “gender-gap” in life expectancy, or that women overestimate mortality risk relative to men. In another study, Griffin, Loh and Hesketh (2013) conducted an online survey of 2,579 Australian respondents aged over 55 and concluded that women had significantly higher odds of being in the group who underestimated their self-life expectancy by five or more years (compared to actuarial estimates), even after controlling for health and other factors. Moreover, they noted that this could leave females vulnerable to underfunding their retirement. On the contrary, Teppa (2013), using data from the “De Nederlandsche Bank” (DNB), found that both males and females underestimate their survival probabilities at all ages. However, he did conclude that men have a better view of their survival probabilities than women.

In our survey, the average life-expectancy forecast for male participants, is 81.11 years, while actual life expectancy at birth in Israel for men according to CBS was 80.3 in 2013. Additionally, the average forecast for female participants is 82.54 years, while actual life expectancy at birth in Israel for women according to CBS was 83.9 in 2013⁵⁰. These results could

⁴⁸ Meaning that a man who reached the age of 65 is expected to live on average 17.4 years to the age of 82.4.

⁴⁹ [Source of data: United Nations.](#)

⁵⁰ As previously mentioned, we asked respondents for their projected life expectancy at birth. Please note, that by definition, this life expectancy is lower than life expectancy at their age (since this number represent a conditional life expectancy under the assumption that the respondent has passed over some major mortality risk by reaching the age of 50-70).

imply that women in Israel are somewhat pessimistic regarding their subjective life expectancy compared to men.⁵¹

6.2.3 Survey Results – Life Expectancy Smokers and Past Smokers

First, we asked respondents in our survey to assess their *health condition* by rating their self-health status on a scale of 1-4. Value “1” reflects very good health, and value “4” reflects the poor health condition (8 people refused to answer and were omitted for this analysis).

Table 9 presents results for smokers, past smokers and non-smokers. Smokers and past smokers assess their health condition to be very close (average values of 1.849 and 1.815 respectively), and only slightly worse than non-smokers (the difference between average values of 1.849 and 1.739 is significant in confidence level of 95⁵²%).

[TABLE 9]

With regard to self-health assessment, we investigated the relation between smoking and health perception, controlling both for socioeconomic features (such as age, number of children, gender, marital stats, education and income) and for related health condition features (such as smoking in the present or the past, participation in extreme sports activities, and the age of parents’ death). We would expect to see that smoking is positive and significant. Nevertheless, smoking does not appear to significantly affect health perception as reported in table 10 below. These results imply that all the rest equals a smoking person in our survey does not perceive himself any less healthy.

[TABLE 10]

We then investigated if current smokers or past smokers have a different estimation than non-smokers about the life expectancy of the total population. It seems that past-smokers are

⁵¹ This implication is even stronger once we take into account that our survey participants are more educated than the general population and as education is positively correlated with longevity (Beshears, Choi, Laibson, Madrian and Zeldes (2014) and (Meara, Ellen R., Seth Richards, and David M. Cutler, 2008)).

⁵² We also performed a nonparametric Wilcoxon rank sum test for the difference between the median of the different groups (smoking vs. past smoking and smoking vs. non-smoking). We failed to reject either of the null hypothesis that the median values are equal.

slightly more optimistic regarding the life expectancy of the total population, as they project a life expectancy of 82.15 years; while smokers project a life expectancy of 81.17 (the difference is statistically significant). A similar result is obtained comparing non-smokers to smokers. While non-smokers believe that the life expectancy is 82.11, smokers believe it to be 81.17 (the difference is statistically significant). Nevertheless, the different projections between past-smokers and non-smokers are statistically insignificant, as past-smokers project a life expectancy of 82.15 for the entire population, while non-smokers project one of 82.11.

Next we investigate their perception regarding their own life expectancy. On average we expect that smokers, if they are rational (and all else remaining equal), will estimate that they will live less than the life expectancy of the general population. Figure 3 presents the proportion of respondents who believe they will live as average. Figure 3 illustrates that the 57% of smokers believe that they will live as average, comparing to 53% of past smokers and 51% of non-smokers. The difference is not statistically significant, implying that the same proportion of smokers, non-smokers and past smokers believe they will live similar to the average.

[FIGURE 3]

With respect to the smokers population, 57% believe they will live according to the average, 22% believe they will live above the average, and only 21% believe they will live less than the average in the population. These results imply that 79% of smokers believe that they will live the same or more than the average life expectancy. This proportion is significantly higher than the group of smokers who believe that they will live less than life expectancy in the population (21%). To reinforce these results, we calculated the median and mean projection of self-life expectancy in the different groups. The median projection of life expectancy for both smokers and non-smokers is exactly "2" (the difference from the value "2" is not statistically significant using a one sample Wilcoxon median test for both of the populations), meaning that at least half of the participants believe they will live the same or above the average life expectancy in the population. The mean projection is 2.286 for non-smokers and is it significantly different from the mean "2". This is not surprising; if smoking negatively affects life expectancy, then conditioning on non-smoking and having a more educated population (education is positively correlated with life expectancy) will lead to obtaining a slightly higher self-life expectancy estimation on average. We also find that the mean projection for smokers is 2.011, which is not significantly different from

the mean "2". This result can be an indication of over optimism as conditioning on smoking, since the average life expectancy should be lower. However, we also have the issue of higher education as mentioned above.

In order to test for robustness of the previous results, we obtained a sub-sample from the full survey population, in which the proportions of education levels are compatible with education proportions in the Israeli population, as published by the CBS. We sampled 30 sub-samples of 100 observations each from the population, and tested for the median and average projections of smokers from the 30 different sub-samples. The median of the 30 median projections is "2". The average projection was discovered to be 1.99, which is not statistically different from "2". We made the same examination for other sub-samples of the 3000 examinees, and found that, for each and every sub-sample, the projection of smokers was not statistically different from "2", meaning that smokers do in fact believe that on average their life expectancy is similar to the average life expectancy of the population, implying the over optimism of smokers. One may claim, that conditional on living to the age of 50-70, a smokers should be optimistic regarding his life expectancy. Nevertheless, as mentioned above, mortality from smoking is higher at older age (as reflected in life insurance policies pricing).⁵³

The average projection for past smokers is 2.204, and significantly different from the mean "2". This may indicate some optimism, as conditioning on past smoking, the average should reflect the health damage caused by the previous smoking behavior. This result is consistent with previous literature such as Khwaja, Sloan, and Chung (2007), which used data from HRS⁵⁴ to show that current smokers are relatively over-optimistic. The difference between all three sub-groups is statistically significant, implying that non-smokers and past smokers significantly believe that on average they will live longer than current smokers.

In addition, in a specification reported in table 10, we investigated the impact of self-health assessment and smoking on self-life expectancy, controlling both for socioeconomic features (such as age, number of children, marital status, education and income) and for related health condition features (such as smoking in the present or the past, participation in extreme sports activities, and

⁵³ As previously mentioned the gap in prices between smokers and non-smokers in Israeli insurance policies rises with age.

⁵⁴ The U.S health and retirement study.

the age of parents death). The results indicated that neither smoking nor past smoking influence life expectancy perception. Consequently we argue that a smoker that does not define himself unhealthy nowadays does not perceive the difference in life expectancy comparing to a non-smoker.

7. Conclusions

In this paper we took advantage of the special settings that exist within the pricing mechanism of Israeli insurance pension policies, in order to better understand properties of time preferences and long-term savings decisions of smokers. In order to do so, we used a unique dataset from an Israeli insurance corporation, containing information regarding real annuitization decisions of retirees. Moreover, we focused on the annuitization decisions of smokers in Israel, who are insured by pension insurance policies, using a special feature of this product – its pricing, which only considers gender, actuarial life expectancy and expected rate of return. Insurance policy pricing does not take health condition (or smoking status) into account, and hence creates a distinct advantage for the lump-sum option for less healthy retirees. These unusual settings comprise an interesting case study. Smokers should realize that health is not priced in annuities, and in addition smokers are expected to be unwilling to give up the pleasure of smoking in the present in favor of health and longevity in the future. Hence, cigarette smokers are expected to prefer a withdrawal of their pension accumulated funds as a lump-sum (in the present) rather than as an annuity (compared to non-smokers). Our findings suggest that, surprisingly, smoking does not have a significant effect on the annuity decision, and the effect found is different than expected, namely, smokers are more likely to annuitize.

A possible explanation could be that even though the literature finds a close relationship between smoking and medical condition, smokers do not perceive themselves as having a shorter lifespan, meaning that smokers experience self-illusions regarding their own life expectancy. This observation led us to a further investigation on the self-life perception of smokers and its effect on financial decisions. We obtained the results of an online survey of 1000 Israeli residents, 50-70 years old. Our survey consisted of questions related to life expectancy estimations, demographic questions, long-term savings decision choices and self-health assessment. The survey results suggested that smokers believe they will live to the average life expectancy.

In contrast to the time preference theory, in this study we find that smokers do not prefer the present, as they do not choose the lump-sum option when retiring. This result is interesting both for analyzing real decisions with data from an Israeli insurance corporation, and for the fact that in addition to the theoretical prediction, pension insurance policies in Israel do not take health consideration within the pricing process, and hence smokers are expected to choose the lump-sum option even more.

Our results suggest that smokers might be over optimistic regarding their subjective life expectancy, a fact that is expected to influence the decision making process in general, and financial decisions in particular. Moreover, our unique natural experiment shed light on the influence of unrealistic subjective life expectancy assessments on the annuitization decisions of smokers. This idea should be further investigated, as it could help us to better understand the annuity puzzle.

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Table 1 - Money under management by the different entities

Pension Entity	Number	Money under management, Millions, NIS	% out of total
Total Pension Funds	43	533,191	47%
Old pension Funds	18	372,915	33%
New Pension Funds (general, Comprehensive and others)	25	160,276	14%
Total Insurance Companies	12	265,044	23%
Total Provident Funds	221	347,343	30%
Provident Funds	88	203,301	18%
Educational Provided Fund and others	133	144,042	13%

Notes: The Israeli pension industry consists of 43 pension funds, 12 insurance companies and 221 provident funds, as of 2013. The volume of funds under management is higher than 1 Trillion NIS, 47% of these funds are managed by pension funds, 23% by insurance companies and 30% by provident funds.

**Table 2 - Clientele characteristics administrative data
Clients with accumulations over 500K NIS**

VARIABLES	(1) N	(2) Mean / %	(3) sd	(4) min	(5) max
Retirement age	1,556	67.2	3.6	60	89
Male	1,151	74%			
Marital status					
Divorced	150	9.64%			
Widower	75	4.82%			
Married	1,175	75.5%			
Smoking activity					
Smoker	150	9.64%			

Notes: The mean age is 67.2 years, 74% of participants are male, 75.5% are married, while 9.64% are divorced and 4.82% are Widows/widowers. 9.64% % of the participants are classified as smokers by the insurance corporation (please note that they could be past smokers since the insurance companies do not update socioeconomic data).

Table 3 - Distribution of annuity choice over gender, marital status and smoking status Accumulations over 500K NIS, Number of clients				
		annuity_included	lump_sum	Total
gender	female	373	32	405
		92.10%	7.90%	100.00%
	male	936	215	1,151
		81.32%	18.68%	100.00%
	Total	1,309	247	1,556
		84.13%	15.87%	100.00%
Marital status	Divorced	136	14	150
		90.67%	9.33%	100.00%
	Married	1,029	146	1,175
		87.57%	12.43%	100.00%
	Widower	66	9	75
		88.00%	12.00%	100.00%
	Single	41	1	42
		97.62%	2.38%	100.00%
	unknown	37	77	114
		32.46%	67.54%	100.00%
Total	1,309	247	1,556	
	84.13%	15.87%	100.00%	
Smoking status	smoker	135	15	150
		90.00%	10.00%	100.00%
	Non smoker	1,012	197	1,209
		83.71%	16.29%	100.00%
	Unknown	162	35	197
		82.23%	17.77%	100.00%
Total	1,309	247	1,556	
	84.13%	15.87%	100.00%	

Notes: annuity_included means that the client chose some portion of annuity; Lump_sum means that the client chose the full lump-sum option (no annuity at all). With regard to smoking, for the analysis below we will omit the category of 'unknown'.

Table 4 – Annuity decisions regression

Dependent variable: choosing any part of annuity (rather than the full lump-sum choice)

VARIABLES	Basic regression with macroeconomic FE				Basic regression with year FE			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Probit coeff	Marginal effects at mean	logit coeff	Marginal effects at mean	Probit coeff	Marginal effects at mean	logit coeff	Marginal effects at mean
Gender	-0.199 (0.122)	-0.0380 (0.0232)	-0.377 (0.238)	-0.0358 (0.0224)	-0.203* (0.123)	-0.0386* (0.0232)	-0.386 (0.239)	-0.0365 (0.0224)
retirement_age	0.00567 (0.0163)	0.00108 (0.00310)	0.0130 (0.0294)	0.00123 (0.00278)	0.00524 (0.0163)	0.000997 (0.00310)	0.0128 (0.0294)	0.00121 (0.00277)
total_amount	1.69e-08 (6.32e-08)	3.22e-09 (1.20e-08)	1.20e-08 (1.09e-07)	1.14e-09 (1.03e-08)	-1.97e-08 (6.32e-08)	-3.74e-09 (1.20e-08)	-1.86e-08 (1.09e-07)	-1.76e-09 (1.03e-08)
Divorced	-0.547 (0.476)	-0.104 (0.0902)	-1.275 (1.092)	-0.121 (0.102)	-0.523 (0.474)	-0.0995 (0.0896)	-1.264 (1.094)	-0.119 (0.102)
Widower	-0.508 (0.497)	-0.0968 (0.0942)	-1.250 (1.121)	-0.118 (0.105)	-0.487 (0.495)	-0.0927 (0.0937)	-1.243 (1.123)	-0.118 (0.105)
Married	-0.543 (0.456)	-0.103 (0.0863)	-1.300 (1.057)	-0.123 (0.0986)	-0.528 (0.453)	-0.101 (0.0856)	-1.304 (1.059)	-0.123 (0.0985)
Un-known marital status	-2.104*** (0.471)	-0.401*** (0.0887)	-3.965*** (1.075)	-0.376*** (0.0987)	-2.080*** (0.468)	-0.396*** (0.0881)	- (1.076)	-0.374*** (0.0985)
purchase_age	0.0848*** (0.0114)	0.0162*** (0.00213)	-0.154*** (0.0214)	-0.0146*** (0.00197)	0.0836*** (0.0115)	-0.0159*** (0.00214)	- (0.0215)	-0.0144*** (0.00197)
no_of_policies	0.0146 (0.0131)	0.00279 (0.00249)	0.0434 (0.0272)	0.00411 (0.00257)	0.0146 (0.0131)	0.00277 (0.00250)	0.0425 (0.0273)	0.00402 (0.00257)
percent_post_2008	2.613*** (0.438)	0.498*** (0.0817)	4.747*** (0.823)	0.450*** (0.0758)	2.597*** (0.440)	0.494*** (0.0817)	4.722*** (0.826)	0.446*** (0.0758)
GDP	-2.48e-06** (1.18e-06)	-4.74e-07** (2.25e-07)	-4.85e-06** (2.17e-06)	-4.59e-07** (2.05e-07)				
Rf	-5.905 (6.248)	-1.126 (1.189)	-7.340 (11.57)	-0.696 (1.097)				
year2009					0.460*** (0.173)	0.0875*** (0.0329)	0.871*** (0.320)	0.0823*** (0.0301)
year2010					0.180 (0.148)	0.0343 (0.0282)	0.354 (0.271)	0.0335 (0.0256)
year2011					0.0438 (0.131)	0.00833 (0.0250)	0.155 (0.243)	0.0146 (0.0229)
year2012					0.137 (0.134)	0.0261 (0.0255)	0.288 (0.251)	0.0272 (0.0237)
Smoker								
mortality_increase								
professional_increase								
Constant	7.679*** (1.375)		14.17*** (2.610)		5.129*** (0.944)		9.275*** (1.820)	
Observations	1,556	1,556	1,556	1,556	1,556	1,556	1,556	1,556
Pseudo R ²	0.2425	0.2425	0.2423	0.2423	0.2438	0.2438	0.2436	0.2436

Notes: Probit and logit, Standard errors in parentheses. Dependent variable, Y_{ann} is an indicator variable for choosing any part of annuity (rather than the full lump-sum choice). Main explanatory variables are gender, retirement age, GDP and rate of return (rf) in specifications (1) and (2), or year dummies in specifications (3) and (4), total accumulation amount (total_amount), marital status, purchase age, number of policies and the percentage of accumulation saved after 2008. Specification for retirees with accumulated funds of more than 500K in this insurance corporation (N=1,556). *** p<0.01, ** p<0.05, * p<0.1

Table 5- Medical condition – Probit and logit

Dependent variable: choosing any part of annuity (rather than the full lump-sum choice)

VARIABLES	Medical status regression with year FE (including smoking)				Smoking status regression with year FE			
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	Probit coeff	Marginal effects at mean	logit coeff	Marginal effects at mean	Probit coeff	Marginal effects at mean	logit coeff	Marginal effects at mean
Gender	-0.179 (0.136)	-0.0297 (0.124)	-0.321 (0.262)	-0.0227 (0.337)	-0.203 (0.135)	-0.0340 (0.141)	-0.351 (0.261)	-0.0251 (0.373)
retirement_age	-0.00181 (0.0179)	-0.000301 (0.00323)	-0.00235 (0.0324)	-0.000166 (0.00336)	0.00253 (0.0177)	0.000424 (0.00343)	0.00590 (0.0319)	0.000421 (0.00665)
total_amount	7.68e-08 (7.21e-08)	1.28e-08 (5.38e-08)	1.11e-07 (1.23e-07)	7.86e-09 (1.17e-07)	7.28e-08 (7.41e-08)	1.22e-08 (5.14e-08)	1.02e-07 (1.26e-07)	7.27e-09 (1.08e-07)
Divorced	-3.956 (120.5)	-0.658 (17.35)	-13.88 (680.5)	-0.979 (33.47)	-3.975 (120.5)	-0.667 (17.48)	-13.89 (681.9)	-0.992 (33.97)
Widower	-3.969 (120.5)	-0.661 (17.34)	-13.95 (680.5)	-0.984 (33.40)	-3.977 (120.5)	-0.667 (17.48)	-13.96 (681.9)	-0.997 (33.90)
Married	-3.917 (120.5)	-0.652 (17.38)	-13.84 (680.5)	-0.977 (33.51)	-3.941 (120.5)	-0.661 (17.51)	-13.89 (681.9)	-0.992 (33.97)
Un-known marital status	-5.494 (120.5)	-0.914 (16.30)	-16.54 (680.5)	-1.167 (30.68)	-5.515 (120.5)	-0.925 (16.43)	-16.58 (681.9)	-1.184 (31.12)
purchase_age	-0.0776*** (0.0128)	-0.0129 (0.0530)	-0.140*** (0.0237)	-0.00985 (0.146)	-0.0792*** (0.0127)	-0.0133 (0.0543)	-0.143*** (0.0235)	-0.0102 (0.152)
no_of_policies	0.00754 (0.0140)	0.00126 (0.00566)	0.0295 (0.0293)	0.00208 (0.0310)	0.00761 (0.0140)	0.00128 (0.00572)	0.0285 (0.0291)	0.00204 (0.0303)
percent_post_2008	2.515*** (0.469)	0.418 (1.719)	4.514*** (0.873)	0.318 (4.729)	2.395*** (0.466)	0.402 (1.643)	4.312*** (0.867)	0.308 (4.570)
GDP								
Rf								
year2009	0.716*** (0.199)	0.119 (0.490)	1.378*** (0.381)	0.0972 (1.444)	0.724*** (0.199)	0.121 (0.497)	1.391*** (0.380)	0.0993 (1.475)
year2010	0.131 (0.160)	0.0219 (0.0936)	0.247 (0.290)	0.0174 (0.259)	0.131 (0.159)	0.0220 (0.0936)	0.248 (0.290)	0.0177 (0.264)
year2011	-0.00360 (0.143)	-0.000599 (0.0239)	0.0440 (0.261)	0.00311 (0.0497)	-0.0164 (0.142)	-0.00275 (0.0264)	0.0244 (0.261)	0.00174 (0.0318)
year2012	0.0975 (0.144)	0.0162 (0.0707)	0.202 (0.267)	0.0142 (0.212)	0.0996 (0.143)	0.0167 (0.0723)	0.196 (0.265)	0.0140 (0.208)
Smoker	0.173 (0.172)	0.0288 (0.122)	0.306 (0.329)	0.0216 (0.321)	0.152 (0.169)	0.0254 (0.108)	0.296 (0.329)	0.0211 (0.315)
mortality_increase	-0.835** (0.338)	-0.139 (0.573)	-1.450** (0.577)	-0.102 (1.520)				
professional_increase	-0.254 (0.248)	-0.0422 (0.178)	-0.517 (0.434)	-0.0364 (0.542)				
Constant	9.780 (120.5)		24.19 (680.5)		8.517 (120.5)		21.88 (681.9)	
Observations	1,359	1,359	1,359	1,359	1,359	1,359	1,359	1,359
Pseudo R ²	0.2569	0.2569	0.2563	0.2563	0.2512	0.2512	0.2506	0.2506

Notes: Probit and logit, Standard errors in parentheses. Dependent variable, Y_{ann} is an indicator variable for choosing any part of annuity (rather than the full lump-sum choice). Main explanatory variables are gender, retirement age, year dummies, total accumulation amount (total_amount), marital status, purchase age, number of policies, and the percentage of accumulation saved after 2008. For medical condition we added smoking status (in all specifications) and mortality increase. Specifications for retirees with accumulated funds of more than 500K in this insurance corporation and information about smoking status ($N=1,339$). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 6- Robustness

Dependent variables: choosing full lump sum and proportion of accumulations designated for annuity

VARIABLES	choosing full lump sum		proportion of accumulations designated for annuity	
	(1) Logit coeff	(2) Marginal effects at mean	(3) Ols coeff	(4) Tobit coeff
Gender	0.178 (0.136)	0.0296 (0.124)	-0.00332 (0.0226)	-0.000968 (0.0264)
retirement_age	0.00258 (0.0180)	0.000429 (0.00347)	-0.00229 (0.00355)	-0.00458 (0.00425)
total_amount	-7.61e-08 (7.21e-08)	-1.27e-08 (5.33e-08)	4.20e-09 (1.34e-08)	6.05e-09 (1.56e-08)
Divorced	3.957 (120.5)	0.658 (17.34)	-0.0941 (0.0607)	-0.0980 (0.0701)
Widower	3.969 (120.5)	0.660 (17.33)	-0.131* (0.0673)	-0.136* (0.0779)
Married	3.915 (120.5)	0.651 (17.37)	-0.101* (0.0559)	-0.105 (0.0645)
Un-known marital status	5.492 (120.5)	0.913 (16.29)	-0.558*** (0.0638)	-0.721*** (0.0762)
purchase_age	0.0771*** (0.0128)	0.0128 (0.0527)	-0.0188*** (0.00229)	-0.0215*** (0.00269)
no_of_policies	-0.00775 (0.0140)	-0.00129 (0.00578)	-0.0108*** (0.00262)	-0.0108*** (0.00308)
percent_post_2008	-2.525*** (0.470)	-0.420 (1.726)	0.213*** (0.0749)	0.293*** (0.0876)
year2009	-0.715*** (0.199)	-0.119 (0.490)	0.112*** (0.0339)	0.142*** (0.0395)
year2010	-0.130 (0.160)	-0.0217 (0.0929)	-0.000921 (0.0295)	0.00405 (0.0346)
year2011	0.00178 (0.143)	0.000296 (0.0238)	-0.0368 (0.0266)	-0.0366 (0.0312)
year2012	-0.0975 (0.144)	-0.0162 (0.0707)	0.00689 (0.0242)	0.0108 (0.0283)
smoker	-0.175 (0.172)	-0.0291 (0.123)	0.0370 (0.0279)	0.0424 (0.0324)
mortality_increase	0.816** (0.340)	0.136 (0.560)	-0.188** (0.0756)	-0.242*** (0.0922)
professional_increase	0.305 (0.242)	0.0507 (0.212)	-0.0511 (0.0487)	-0.0623 (0.0576)
Constant	-9.843 (120.5)		2.203*** (0.217)	0.364*** (0.00798)
Observations	1,359	1,359	1,359	1,359
R ²			0.2628	
Pseudo R ²	0.2573	0.2573	0.2535	0.2358

*Notes: Logit, Ols and Tobit, Standard errors in parentheses. Dependent variables, Y_lump and Y_prop are an indicator variable for choosing a full lump sum (rather than any part of annuity) and the proportion of accumulation designated to annuity. Main explanatory variables are gender, retirement age, year dummies, total accumulation amount (total_amount), marital status, purchase age, number of policies, and the percentage of accumulation saved after 2008. For medical condition we added smoking status (in all specifications) and mortality increase. Specifications for retirees with accumulated funds of more than 500K in this insurance corporation and information about smoking status (N=1,359); smoking effect is non-significant in all different specifications. *** p<0.01, ** p<0.05, * p<0.1*

Table 7 – Summary statistics of the survey respondents

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
Age	963	58.17	5.458	50	70
Kids	963	2.744	1.539	0	13
Male	963	0.406	0.491	0	1
Single	963	0.0519	0.222	0	1
Married	963	0.734	0.442	0	1
Divorced	963	0.169	0.375	0	1
Widower	963	0.0332	0.179	0	1
No high school	963	0.00208	0.0455	0	1
High school	963	0.220	0.415	0	1
Higher education	963	0.765	0.424	0	1
Smoking	963	0.174	0.380	0	1
Past smoking	963	0.315	0.465	0	1
Live longer than average	963	0.343	0.475	0	1
Live less than average	963	0.130	0.336	0	1
Live as average	963	0.528	0.500	0	1
High income	963	0.603	0.489	0	1
Good health	963	0.884	0.321	0	1
Physical problems	963	0.455	0.498	0	1

Notes: The mean age of those that responded to the survey is 58.17 years (median equals to 58, std. equals to 5.45). 40.6% of participants are male; hence our survey is more female concentrated compared to the population in Israel. The family status of the respondents is varied, 73.4% are married while 16.9% are divorced and 3.3% are widows/widowers. On average our sample is more educated than the total population of Israel. Only 0.2% of participants have less than high school diploma, 22.0% have a high school diploma and 76.5% have a higher education (including college, graduate school, and other higher education such as rabbinical studies). 88% of the sample believe that their health condition is good or very good, 17.4% of the survey participants reported that they currently smoke, and 31.5% reported that they had smoked in the past

Table 8 – Projected life expectancy in the population for males and females

VARIABLES	(1) N	(2) Mean	(3) Sd	(4) Min	(5) Max	(6) Median
projected life expectancy in the population	963	81.96	4.45	40	100	82
projected life expectancy in the population (male)	391	81.11	3.98	65	100	81
projected life expectancy in the population (female)	572	82.54	4.67	40	96	83
self-life expectation	963	2.21	0.65	1	3	2
self-life expectation (male)	391	2.28	0.66	1	3	2
self-life expectation (female)	572	2.16	0.64	1	3	2

Notes: “Projected life expectancy in the population” is a variable indicating the respondent’s perception of life expectancy in the population measured in years. “Self-life expectation” is a variable indicating if respondents believe they will live more (value “3”), equal (value “2”), or less (value “1”) than the life expectancy in the population, as mentioned by the question “projected life expectancy in the population”. No. of participants is 963 divided into 391 males and 572 females. The projected mean life expectancy of male and female participants is 81.11 and 82.54 respectively. Actual life expectancy at birth in Israel, according to CBS, is 80.3 for men and 83.9 for women (2013).

Table 9 – Self-life expectancy and self-health assessment compared with the population for smokers and non-smokers

VARIABLES	(1) N	(2) mean	(3) Sd	(4) min	(5) max	(6) Median
projected life expectancy in the population smokers	168	81.17	5.57	40	95	81.5
projected life expectancy in the population smokers (male)	70	80.1	4.24	65	90	80
projected life expectancy in the population smokers (female)	98	81.94	6.25	40	95	83
projected life expectancy in the population past smokers	303	82.15	4.11	60	90	82
projected life expectancy in the population past smokers (male)	140	81.70	3.68	70	90	82
projected life expectancy in the population past smokers (female)	163	82.5	4.42	60	90	83
projected life expectancy in the population nonsmokers	492	82.11	4.20	67	100	82
projected life expectancy in the population nonsmokers (male)	181	81.04	4.03	70	100	80
projected life expectancy in the population nonsmokers (female)	311	82.72	4.19	67	96	83
self-life expectation smokers	168	2.011	0.656	1	3	2
self-life expectation smokers (male)	70	2.071	0.728	1	3	2
self-life expectation smokers (female)	98	1.969	0.599	1	3	2
self-life expectation past smokers	303	2.204	0.654	1	3	2
self-life expectation past smokers (male)	140	2.257	0.661	1	3	2
self-life expectation past smokers (female)	163	2.159	0.647	1	3	2
self-life expectation nonsmokers	492	2.286	0.639	1	3	2
self-life expectation nonsmokers (male)	181	2.386	0.627	1	3	2
self-life expectation nonsmokers (female)	311	2.228	0.639	1	3	2
Health projection of smokers	166	1.849	0.675	1	4	2
Health projection of past smokers	302	1.815	0.661	1	4	2
Health projection of non-smokers	487	1.739	0.663	1	4	2

Notes: “projected life expectancy in the population” is a variable indicating the respondent’s perception of life expectancy in the population. “Self-life expectation smokers” is a variable indicating if respondents believe they will live more (value “3”), equal (value “2”), or less (value “1”) than the life expectancy in the population, as mentioned by the question “projected life expectancy in the population”. No. of participants is 963 divided into 168 smokers, 303 past-smokers and 492 non-smokers. The projected mean life expectancies of smokers, past-smokers and non-smokers are 81.17, 82.15 and 82.11 respectively. All sub-groups of participants believe they will live above the average life expectancy. “Health projection” is a variable indicating the respondent’s assessment of subjective health. If respondents believe they are in very good health they will report the value “1” and if they believe they are in bad health they will report the value “4”. No. of participants that answered this question is 955 divided into 166 smokers, 302 past-smokers and 487 non-smokers. Non_smokers assess their health the best (value 1.739 which is the closest to “1”), however, the answers of smokers and past smokers are not statistically different, meaning that smokers and past smokers assess their health the same.

Table 10 – Life and health perception in the survey*Dependent variable: health perception (column 1) and life perception (column 2)*

VARIABLES	(1) ols health perception	(2) ols life perception
Age	0.00850** (0.00387)	0.000881 (0.00419)
Kids	-0.00834 (0.0131)	-0.00310 (0.0141)
Male	0.0467 (0.0387)	0.121*** (0.0418)
Single	0.380* (0.199)	-0.0269 (0.215)
Married	0.335* (0.183)	0.0944 (0.197)
Divorced	0.278 (0.187)	-0.0808 (0.201)
Widower	0.423** (0.208)	0.176 (0.225)
Smoking	0.0732 (0.0522)	-0.0744 (0.155)
Past smoking	0.00576 (0.0428)	-0.0678 (0.0460)
High school education	-0.480 (0.407)	-1.253*** (0.441)
High education	-0.584 (0.406)	-1.144*** (0.440)
Unknown education	-0.585 (0.445)	-1.068** (0.481)
Extreme sport activities	-0.0284 (0.0941)	-0.0334 (0.102)
Age of father death	-0.000934 (0.000612)	7.78e-05 (0.000659)
Age of mother death	0.000522 (0.000553)	-0.000398 (0.000596)
High income	-0.144*** (0.0396)	0.0195 (0.0430)
Health perception		-0.266*** (0.0339)
Health perception and smoking (interaction).		-0.0885 (0.0791)
Physical problems	0.654*** (0.0377)	
Constant	1.331*** (0.504)	3.761*** (0.547)
Observations	955	955
R-squared	0.284	0.141

Notes: Ols, Standard errors in parentheses. Dependent variables, life perception and health perception are. Main explanatory variables are gender, marital status, smoking decisions, education, income, parent's age of death. In the specification of life perception health perception and interaction between health perception and smoking. (N=955). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Figure 1 – Annuity withdrawal between smokers and non-smokers (among clients with accumulations over 500K NIS)

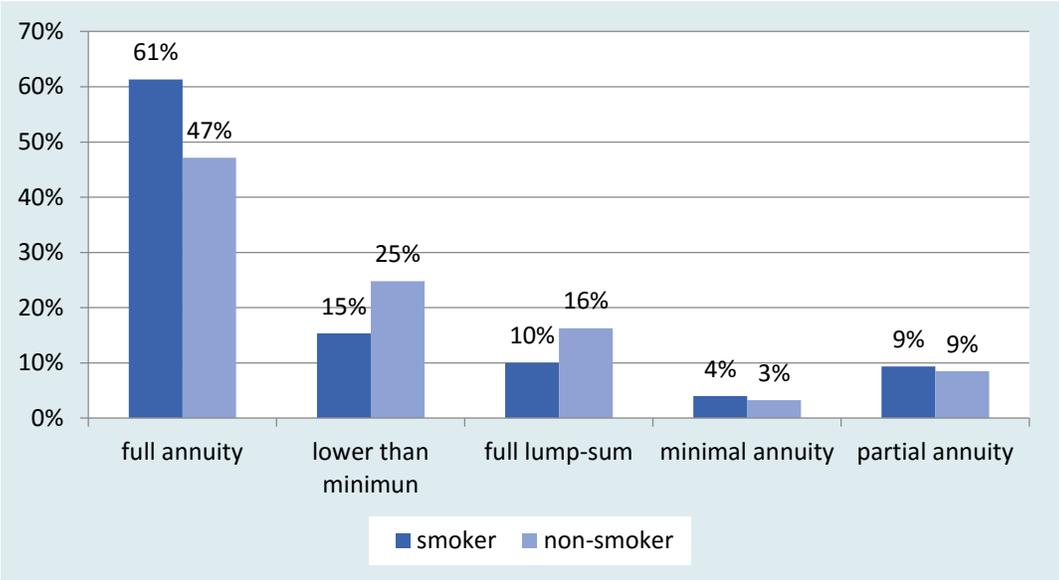
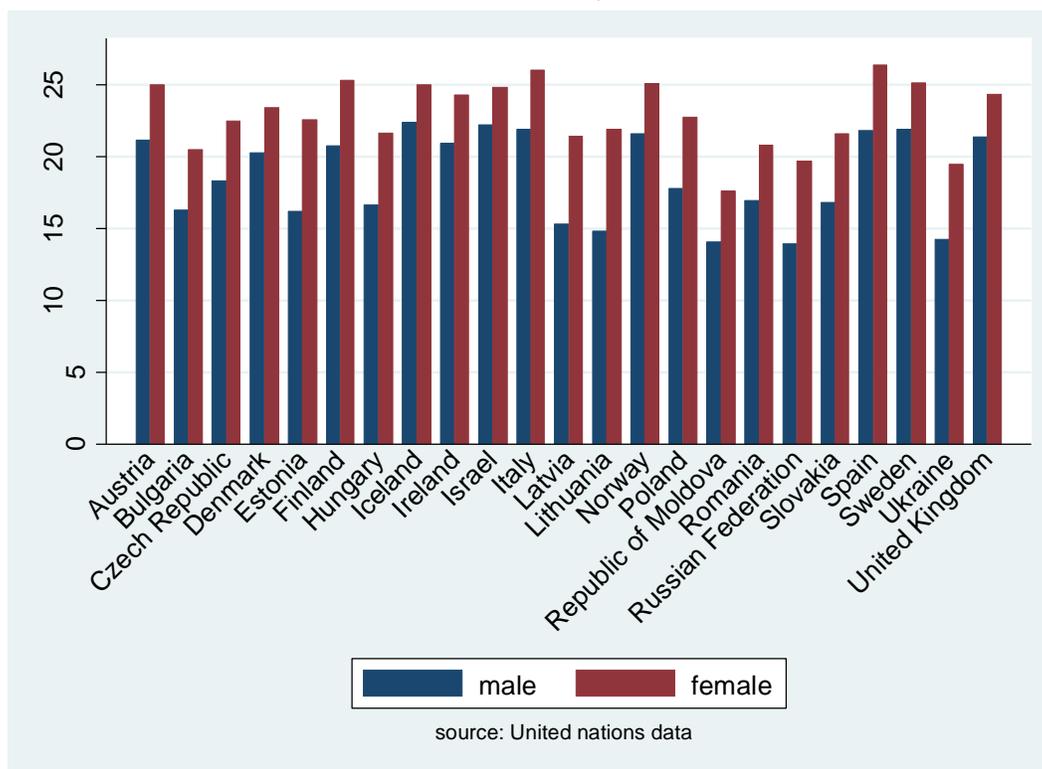


Figure 2 – Gender gap in conditional life expectancy, of people of the age of 60 in selected countries, 2000-2005



Notes: Figure 2 illustrates that the gender gap in life expectancy between males and females is consistent in many countries all over the world, and favors the females.

Figure 3 – proportion of self-life expectancy reporting

Figure 3 illustrates that the 57% of smokers believe that they will live as average, comparing to 53% of past smokers and 51% of non-smokers.

