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**CRITICALITIES IN THE U.S. PENSION SYSTEM  
AND BEHAVIOURAL ECONOMICS TO ITS RESCUE**

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## ABSTRACT

Il fenomeno dell'invecchiamento della popolazione da un lato e i recenti cambiamenti a cui è andato incontro il sistema pensionistico statunitense dall'altro, hanno fatto sì che molti cittadini americani si trovino ora a dovere provvedere autonomamente e integrativamente all'accumulazione di risparmi per riuscire a far fronte a un futuro sempre più incerto in materia pensionistica. A tal proposito, un quesito che sorge spontaneo è se gli individui siano equipaggiati in maniera opportuna per occuparsi delle proprie decisioni di risparmio. La risposta che viene data dalle teorie economiche standard risulta essere positiva. Modelli come quelli proposti da Modigliani e Friedman prevedono un consumatore perfettamente razionale in grado di compiere scelte ottimali di consumo e risparmio nel tempo. Purtroppo però, la realtà dei fatti in parte smentisce ciò che le teorie affermano. La maggior parte degli individui non è in grado di compiere autonomamente decisioni complesse come quella legata al risparmio. La scarsa educazione in materia e alcuni bias cognitivi fanno sì che la maggior parte dei cittadini americani non risparmi una quantità di denaro sufficiente o opportuna o commetta degli errori quando si tratta di iscriversi ai piani pensionistici. È per questo motivo che recentemente l'economia comportamentale si è mobilitata ed è andata in loro soccorso. Una linea di pensiero che si propone di usare i risultati ottenuti dall'economia comportamentale e sviluppare nuovi strumenti di politica che aiutino gli individui nelle loro decisioni prende il nome di "paternalismo libertario" e vede come maggiori esponenti Thaler and Sunstein. Dall'economia comportamentale vengono due principali soluzioni al problema del cosiddetto "under-saving" (sotto-risparmio, risparmio insufficiente). In dettaglio, queste due soluzioni comprendono i piani ad adesione automatica e il piano "Save More Tomorrow". A queste si aggiungono alternative che hanno avuto risultati meno soddisfacenti ma non per questo di minore importanza.

Negli ultimi anni il sistema pensionistico americano ha visto un conseguente incremento nell'offerta di piani pensionistici ad adesione automatica o di piani equivalenti al cosiddetto piano "Save More Tomorrow". Ciò nonostante sono ancora necessari miglioramenti per innalzare il livello di risparmio dei cittadini americani e consentire loro di vivere il periodo del pensionamento in maniera più agiata o comunque meno problematica.

# TABLE OF CONTENTS

<i>INTRODUCTION</i>	p. 4
<b>CHAPTER I.</b> The US pension system: an overview	p. 6
1. The American Pension System	p. 6
2. Individual Retirement Accounts (IRAs)	p. 6
3. The Social Security System	p. 7
3.1 The “Baby boomers”	p. 8
3.2 “Aging society”	p. 8
4. Defined Benefit Plans (DB)	p. 11
5. Defined Contribution Plans (DC)	p. 11
6. From defined-benefit plans to defined-contribution plans: historical trends in retirement plans	p. 13
7. Are people saving enough?	p. 15
<b>CHAPTER II.</b> Behavioral economics and savings decisions: from theory to practice	p. 18
1. Neoclassical theories	p. 18
2. Econs vs Humans	p. 19
3. Bounded Rationality	p. 19
4. Heuristics and cognitive biases	p. 20
4.1 Self-control	p. 21
4.2 Status quo bias	p. 23
4.3 Loss aversion, the endowment effect and money illusion	p. 25
<b>CHAPTER III.</b> Improving decisions through nudge theory	p. 29
1. Evaluating Nudge theory	p. 29
2. Nudges and the under-saving problem in the US	p. 32
3. The Save More Tomorrow program (SMarT)	p. 37
4. Other insights from behavioural economics	p. 39
4.1 Simplifying	p. 39
4.2 Active choices	p. 40
4.3 Earmarking and reminders	p. 41

5. Do retirement savings policies actually increase total savings?	p. 42
6. Recent evidence and developments	p. 43
<i>CONCLUSION</i>	p. 46
<i>ACKNOWLEDGEMENTS</i>	P. 48
<i>REFERENCES</i>	p. 49

# INTRODUCTION

*“American workers have been handed the keys to a fully loaded vehicle. But few workers have been given driving lessons, and as a result, there is little gas in the tank to fuel a financially secure retirement”*

*(Natixis Global Asset Management, 2013:5)*

On the one hand, the American pension system is being threatened by the so-called “aging society” phenomenon. People living longer and having fewer children seriously pose a threat on the funding of the public pension system and individuals are increasingly asked to prepare by themselves to an uncertain future. On the other hand, the US private pension system has gone through a major shift throughout the years and responsibility for how much to save and how to properly invest money relies always more on each individual.

Are individuals ready and adequately informed to deal with this complex environment and make optimal decisions? Standard economic theories would assume that consumers are perfectly rational individuals that are able to predict their future income, make optimal consumption and saving decisions and have the necessary willpower to implement them. This is what theories such as those developed by Nobel-prize winners Modigliani and Friedman (respectively the *life-cycle model* and the *permanent income model*) claim. But do theories actually describe individuals’ behaviour in the real world? Unfortunately, evidence strongly undermines these beliefs and shows that, while most individuals recognize that they should be saving more, they fail to do so.

As the above quote by the Natixis Global Asset Management (2013) states, “few workers have been given driving lessons”. In other words, few individuals are able to make adequate savings decisions and successfully plan for retirement. Lack of all the necessary information and the presence of human biases affect the capacity of individuals to succeed in joining pension plans and saving the right amount of money in order to live comfortably at retirement.

As a result, in recent years free “driving lessons” have started coming from behavioural economics. In particular, a line of thought that aims to exploit findings from behavioural economics and develop policy tools in order to help moving people towards their desired path is named “Libertarian Paternalism” and its main representatives are Thaler and Sunstein. In the

US, application of behavioural economics to the retirement saving context has led to the development of two major solutions specifically, “automatic enrolment” and the “Save More Tomorrow” program (SMarT). The results of these programs have been outstanding. Nowadays, these programs have started spreading around and few companies are offering them. Nonetheless there is still lots of room for improvement.

This piece of work is structured as follows. The first chapter is dedicated to a brief explanation and description of the American pension system and the major shift that has occurred in recent years. Moreover, there will be an overview of the demographic changes that have affected all the principal economies in recent years. The second chapter presents neoclassical economic theories and their contribution to the description of individual savings behaviour and compares standard economic theories to those newly developed by behavioural economists. To this purpose, the main biases that affect the saving decision context and that contribute to a suboptimal saving rate will be outlined. Lastly, the third chapter will present elements of a possible solution. The chapter starts by illustrating a recent line of thought that exploits finding from behavioural economics, specifically “libertarian paternalism”. Follows the exposition of the two main programs that exploit human biases and that have been developed and tested in the US (i.e. “automatic enrolment” and the “SMarT” program). To conclude, recent evidence and developments in this context will be presented.

The decision to focus this piece of work on the United States was mainly motivated by the fact that the richest empirical literature on retirement savings is available to that country. Moreover, the demographic changes that have affected the US are also relevant for many other developed countries and have put a strong focus on the problem of the pension system funding.

# CHAPTER I

## THE US PENSION SYSTEM: AN OVERVIEW

### 1. The American Pension System

The pension system in the United States is often referred to as a “three-legged stool”, literally a stool sustained by three main legs:

- i. Individual retirement accounts (IRAs);
- ii. The Social Security system;
- iii. Employer-sponsored plans, that include defined benefit pension plans and defined contribution savings plans.

Nowadays, the three-legged stool lies on a shaky ground. Structural demographic changes are threatening the Social Security system and individuals are increasingly required to rely on employer-sponsored pension plans if they want to have a chance to live pleasantly in retirement. What’s more, in past years private pension plans have gone through major shifts and defined contribution plans have become the norm. This transition has placed responsibilities to fund retirement on each individual. All of this contributing to an uncertain future as regards individuals’ retirement welfare.

This chapter will be entirely dedicated to a thorough description of the above-mentioned sources of retirement income as well as to outlining the shifts that have occurred in the US economy. To conclude, there will be some considerations on the savings environment.

### 2. Individual Retirement Accounts (IRAs)

Provided by financial institutions, an individual retirement account grants tax advantages for retirement savings in the United States. Any individual that has taxable compensation and that is less than 70 years old can contribute to traditional IRAs. Contributions are deductible as long as individuals are not covered by any other retirement plan at work. Retirement funds are not kept in individual retirement accounts indefinitely. Indeed, when an individual reaches the age of 70, there are required minimum amounts of money that he/she has to withdrawal from the account (i.e. “required minimum distributions”). Withdrawals are included in taxable income

except from parts that have already been taxed or that are tax-free. Withdrawals can be made at any time; however early withdrawals are subject to a surcharge (Internal Revenue Service, no date).

The Investment Company Institute (2002) estimates that 22 percent of total pension assets is invested in Individual Retirement Accounts. However, that percentage could be greater if fiscal benefits available to people that adopt this tool to save for retirement increased.

### **3. The Social Security System**

In the 1930s people suffered from severe economic difficulties due to the Great Depression. In this regard, the then U.S. President Franklin Delano Roosevelt within the reform program of the New Deal established several systems to mitigate the economic depression. Among these systems, the Social security had a special resonance. This system has its roots in the Social Security Act signed out on the 14<sup>th</sup> of July 1953 and it was designed to provide financial assistance to the elderly by ensuring a minimum income to people aged 65 and over. Nowadays, more than 170 other countries have a social security system. These include economies such as: the United Kingdom, France, Mexico and Chile (Social Security Administration, 2017).

The idea underlying this system is the following. The government taxes current workers and in the meanwhile the social security contributions that current workers make are used to pay retired workers. This is known as “pay-as-you-go” structure. Contributions that current workers pay go into a fund, specifically the Social Security Trust Fund, and the same fund makes payments to retired workers. It should be noted that the “pay-as-you-go” structure is not rigorous. Indeed, in some years payments to retired workers can be larger than tax receipts and in other years they can be smaller. Originally, payments matched receipts and the system was roughly balanced. However, in the 1980s policymakers started questioning the “pay-as-you-go” structure. The problem occurred when demographic changes significantly altered the system, making it unbalanced in the very long term. If, for instance, the number of retirees relative to the number of workers (i.e. dependency ratio) remarkably increases all other things being equal, tax revenues will no longer suffice and in order to meet the obligations of the system either taxes have to increase or benefits have to fall.

The U.S. Social Security system has recently been threatened by the “aging society” phenomenon and specifically the transitioning of the so-called “Baby Boomers” into their retirements.



### 3.1 The “Baby boomers”

After World War II, the birth rate in many countries significantly increased. People born between 1946 and 1964 have thus been labelled as “Baby Boomers”. Figure 1.1 shows the 1960 U.S. population pyramid and the baby boom bulge is clear in the ages 0-14 (U.S. Bureau of the Census, no date). By 2020 Baby Boomers will be pre and early retirement ages. 75 million Baby Boomers near retirement or already in retirement strain services and programs required by an elderly population, particularly the Social Security System and its ability to provide benefits to all retirees (Natixis Global Asset Management, 2016). This implies that the financial situation of Baby Boomers at retirement will be a function of their participation in employer-sponsored retirement plans today. On top of that, men who turn 65 in 2030 can expect to live six years longer than those who turned 65 in 1970 (Dong et al., 2017). Rising life expectancy means that Baby Boomers have to save up for additional years of retirement.

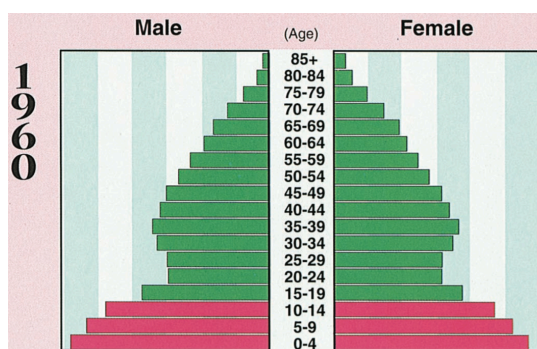


Figure 1.1: The Baby Boom generation (1960)

Source: U.S. Bureau of the Census (no date)

### 3.2 “Aging society”

Rising life expectancy is a structural change that is affecting all the major developed economies and together with low fertility rates, it contributes to the development of the so-called “aging society” phenomenon (United Nations, 2015). According to the United Nations (2015), nowadays 12 percent of the world population is aged 60 and over, and estimates bring that percentage up to 21 by 2050.

The first cause of the “aging society” phenomenon is that in recent years life expectancy has risen. Figure 1.3 shows life expectancy at birth<sup>1</sup> both in 1970 and 2013 and it is clear that in

<sup>1</sup> According to OECS, life expectancy at birth “measures how long, on average, people would live based on a given set of age-specific death rates” (OECD, 2015).

OECD countries life expectancy at birth has continued to increase steadily, rising by more than 10 years since 1970 (OECD, 2015). Life expectancy at 65 has steadily increased as well, rising by 5.5 years on average since 1970 (Figure 1.4) (OECD, 2015). The gains in longevity can be explained by factors such as improved lifestyle, advances in healthcare and better education.

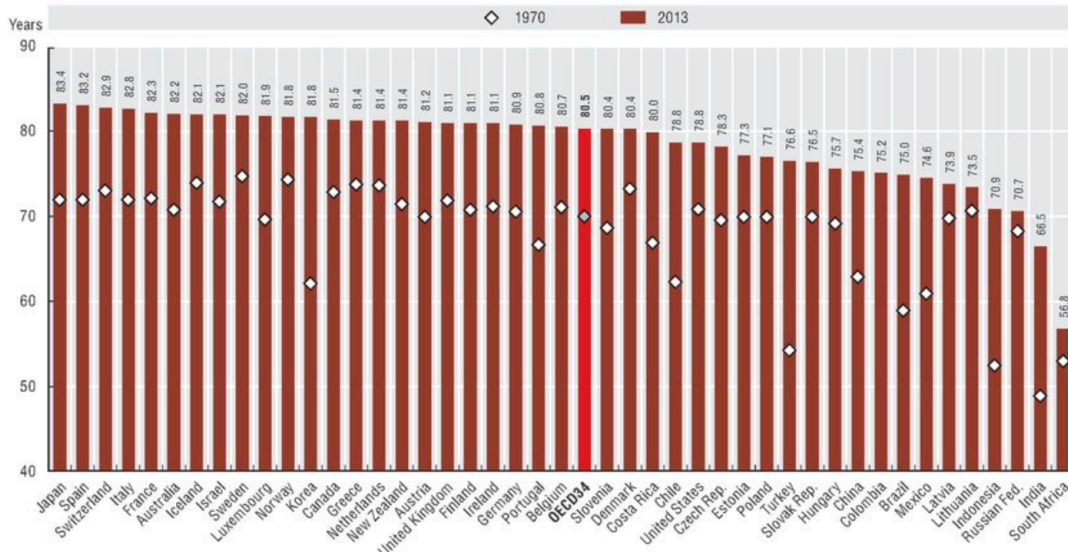


Figure 1.3: Life expectancy at birth, 1970 and 2013 (or nearest years)

Source: OECD (2015)

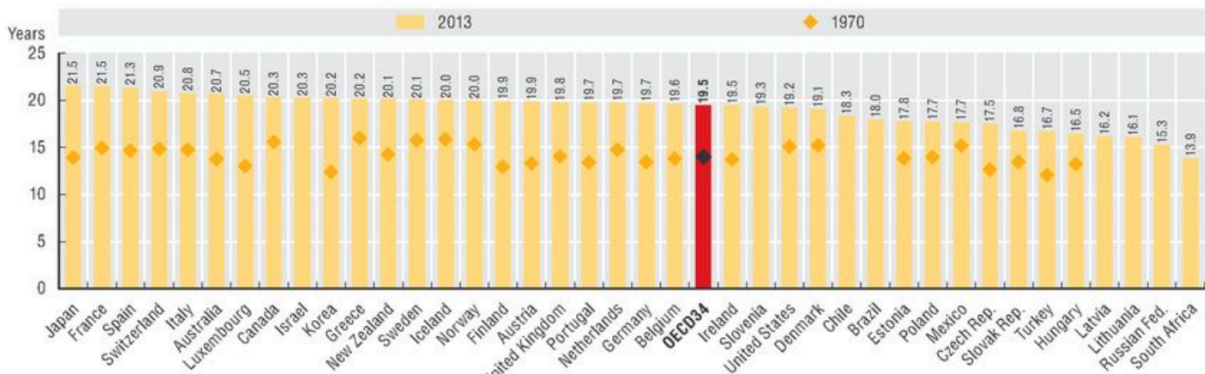


Figure 1.4: Life expectancy at age 65, 1970 and 2013 (or nearest years)

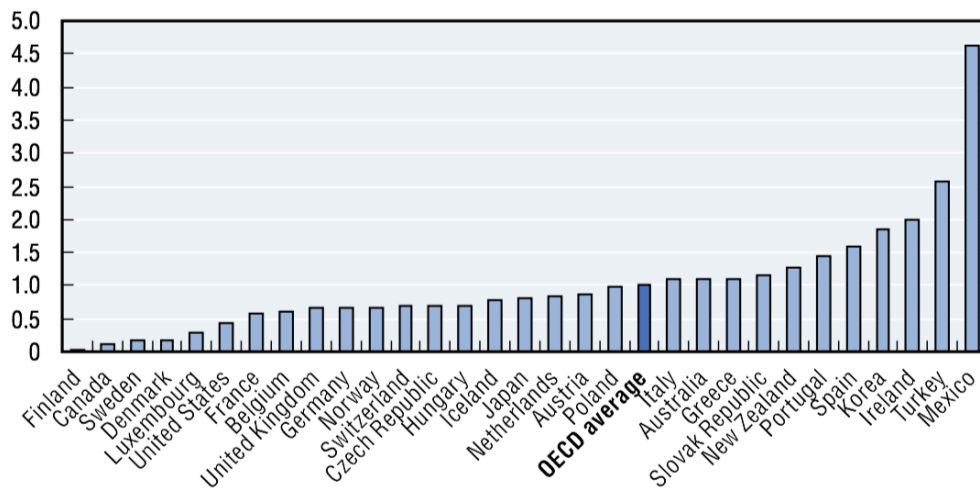
Source: OECD (2015)

The second cause of the “aging society” phenomenon is the decline in fertility. Declining fertility leads to an increase in the average age of a population since the numerical strength of each new generation is smaller. In OECD countries, total fertility rates<sup>2</sup> have declined for young

<sup>2</sup> The total fertility rate is “the number of children that are expected to be born to women of child-bearing age” (OECD, 2006).

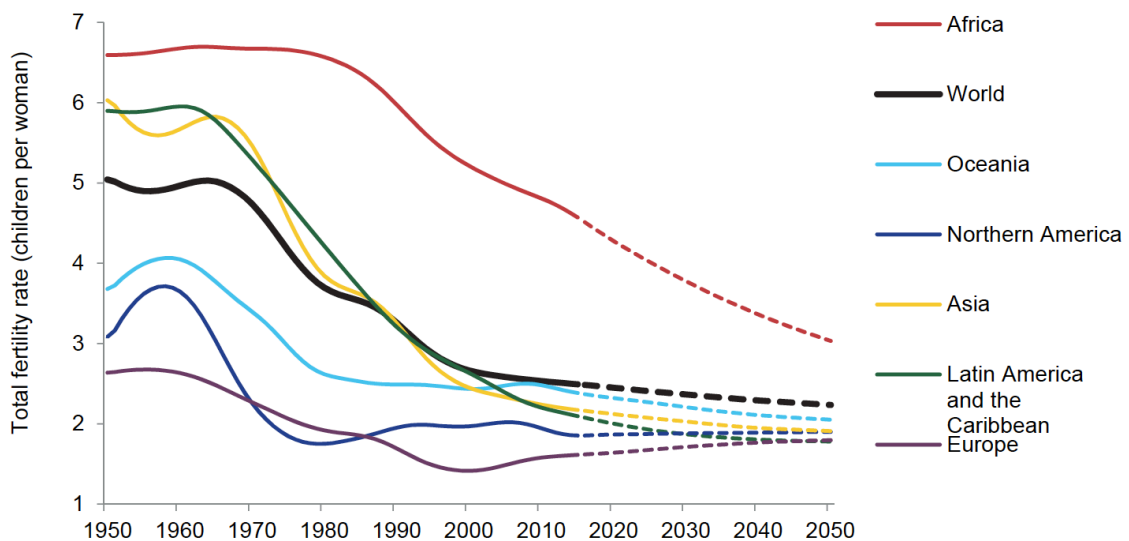
woman. Figure 1.5 shows the long-term decline in fertility rates as an absolute difference between 1970 and 2004 fertility rates (OECD, 2006).

Trends in total fertility are shown in figure 1.6. Fertility rates are projected to fall until 2050 (United Nations, 2015).



**Figure 1.5: Decline in Total fertility rates since 1970**

Source: OECD (2006)



**Figure 1.6: Total fertility rate trends for the world and regions, 1950-2050**

Source: United Nations (2015)

Overall, the “aging society” phenomenon, with the rising average age of the population and the rising percentage of people in retirement age is threatening the funding of the Social Security system. What’s more, many financial experts believe that people need about 70-80 percent of their pre-retirement income in order to live comfortably in retirement. However, estimates show that Social Security benefits are only designed to replace 40 percent of pre-retirement income.

As a result, people are increasingly required to rely on savings that they have accumulated on employer-sponsored pension plans or individual saving accounts in order to bridge the gap. Yet, we will see that also in the employer-sponsored plans world, workers are always more required to determine by themselves how much to save and how to invest money properly.

#### **4. Defined Benefit Plans (DB)**

Defined benefit plans share some similarities with the Social Security system. These plans are funded by the employer, who is usually the only contributor to the plan and is committed to provide specific monthly benefits to the employee at retirement. Benefits are usually determined by factors such as salary, age, and years of service at the company and they are defined and known in advance. In a typical plan, benefits received by a worker are a proportion of the salary paid over the last few years of work and that proportion depends on the years of service. Many defined benefit plans allow employees to choose how they want their benefits to be paid (payment options include: a single life annuity, a qualified joint and survivor annuity or a lump-sum payment). Usually there is a specific number of years that individuals have to work within a company before having the right to any retirement benefit under the plan. This is known as “vesting” process and people are typically fully vested in the retirement plan after five years working for the same company. If they leave before that time, they will lose any unvested pension benefits (Broadbent et al., 2006; U.S Department of Labour, 2017).

Defined-benefit plans have one main virtue: as long as the employee keeps working for the same employer, the only decision employees have to make is when to start receiving benefits, while employers take charge of every responsibility. However, defined-benefit plans are complicated to employees who change job frequently. Indeed, if they do not meet the minimum employment period and thus, they are not fully “vested”, they can end up with no retirement benefits. In other words, DB plans favour those who stay and progress in a specific company (Boeri et al., 2006). On top of that, defined-benefit plans are also costly for employers to administer. As a result, many companies are switching over to defined-contribution plans.

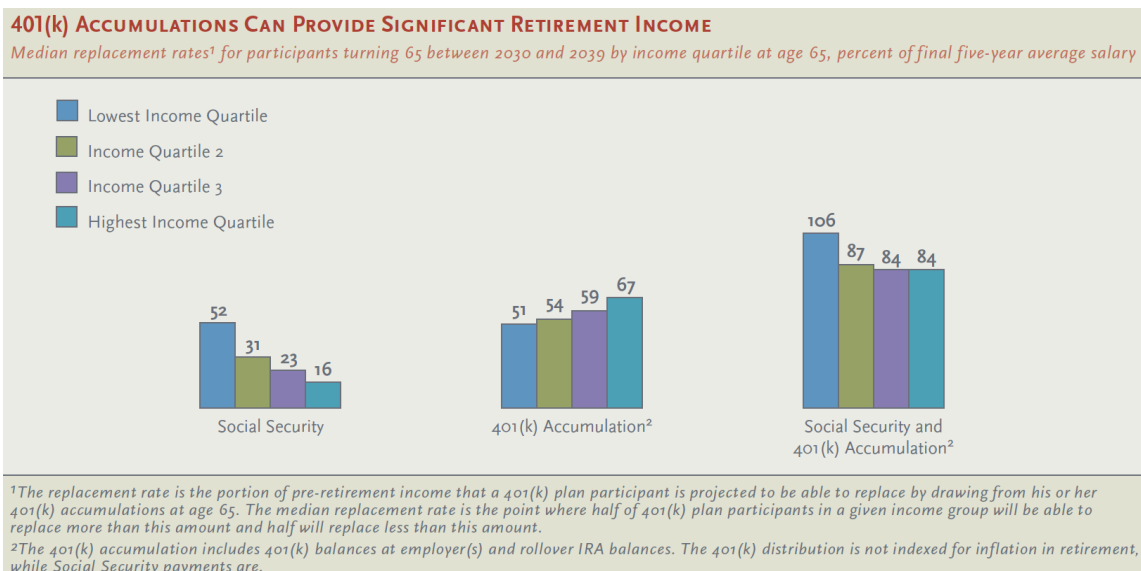
#### **5. Defined Contribution Plans (DC)**

Defined contribution plans do not provide a defined benefit amount at retirement. By contrast, under these plans employees and sometimes employers make specific contributions to the employee’s individual account. Responsibility for how much to contribute and for choosing

how these contributions are invested (e.g. invest in bond or in stocks) weighs heavily on the employee. Sometimes the employer matches a certain percentage of the employee's contribution (i.e. "matching contributions"). At retirement the employee will receive the balance of its individual account, that will reflect the contributions made throughout the years and the performance of the investments. Defined contribution plans are completely portable, so that workers are free to move from one job to another. What's more, they are flexible and give employees the chance to adjust their savings rate and investment decisions over time (Broadbent et al., 2006).

Among the different types of defined-contribution plans, nowadays the most common is the 401(k) plan. This plan was named in 1978 after Section 401(k) was added to the US tax code. However, it is not until the 1981 that the Internal Revenue Service (IRS) officially described the rules for these plans. In most 401(k) plans, employees opt into the plan, that is, they enrol by indicating the amount they wish to contribute from their pay before taxes are taken out and they select the investment. Every year employees can stop making contributions or change the amount of money intended for the plan. The employer usually adds to the employee's own account with the already mentioned "matching contributions".

401(k) plans are a powerful savings tool that can provide significant income at retirement. The 401(k) plan ability to provide significant retirement income has been estimated by developing the EBRI/ICI 401(k) Accumulation Projection Model (Investment company institute, 2006). The baseline scenario provided by the model is illustrated in figure 1.7. It estimates that the median replacement rate of 401(k) plans is 51 percent of pre-retirement income in the first year of retirement for individuals in the lower quartile at age 65, while for individuals in the highest income quartile that percentage goes up to 67. By contrast, Social Security replaces a higher proportion of lower income participants' salary because the system is specifically designed to support the poorer, but when looking at the highest income quartile, the replacement rate goes down to 16 percent. As a result, especially middle and high income households have to join 401(k) plans in order not to miss out the great opportunity that they offer.



**Figure 1.7: 401(k) accumulations as a source of significant retirement income**  
**Source: Investment Company Institute (2006)**

## 6. From defined-benefit plans to defined-contribution plans: historical trends in retirement plans

A general perception exists that the U.S. now more mobile workforce has made defined-benefit plans a less effective way to save for retirement. On top of that, government regulation has raised the price of offering defined-benefit plans while it has opened up new options for defined contribution plans, making defined-contribution plans a cheaper and better choice to employers. The increased spread of defined-contribution plans at the expense of defined-benefit plans dates back to the 1970s. The initial phenomenon is clear when looking at data from the US Department of Labour, which analyses the 5500 annual reporting forms from 1977 to 1985, limiting the analysis to plans with 100 or more participants and including only primary plans<sup>3</sup> (EBRI, 1989).

From Table 1.1 it appears that over the period analysed, the total number of primary pension plans rose. However, when looking at defined-benefit plans it is clear that they increased from 15.652 in 1977 to 23.174 in 1985 but they fell as a proportion of all primary plans from 77,7 percent to 64,7 percent. The scenario is very different for defined-contribution plans. Over the years the number of defined-contribution plans more than doubled and they increased as a proportion of all primary plans from 21,8 percent to 34,7 percent. The same trend is evident

<sup>3</sup> The restriction is due to differences in filing requirements for smaller firms and due to the intent to analyse pension changes among larger employers.

when looking at the number of active participants (Table 1.1). Furthermore, the increasing diffusion of defined-contribution plans is not limited to a particular industry. Over the period 1977-1985 defined-benefit plans decreased as a percentage of primary plans in each industry considered in the analysis (Table 1.2).

This transition towards defined-contribution plans has not ceased throughout the years (Figure 1.8). Since the 1980s, the number of defined-contribution plans has steadily increased while the number of defined-benefit plans remained flat or even decreased. Similarly, the number of active participants covered by a defined-benefit plan decreased while the number of active participants covered by a defined-contribution plan grew (Figure 1.9) (U.S Department of Labour, 2016). It is no coincidence that in a study from the National Institute on Retirement Security by Nari Rhee (2013) it appears that employees participating in pension plans and near retirement will be the last generation widely covered by defined-benefit plans. By contrast, younger generations are half as likely to be covered by defined-benefit plans.

**Number of Primary Plans and Active Participants by Plan Type:  
5500 Reporting Forms<sup>a</sup>**

Plan Type	Plans				Participants (millions)			
	1977	1980	1983	1985	1977	1980	1983	1985
Defined Benefit	15,652 (77.7)	22,010 (74.7)	23,264 (70.3)	23,174 (64.7)	20.3 (88.9)	26.4 (87.1)	26.0 (82.0)	26.7 (78.7)
Defined Contribution	4,384 (21.8)	7,271 (24.7)	9,623 (29.1)	12,427 (34.7)	2.2 (9.9)	3.6 (11.9)	5.3 (16.9)	6.9 (20.4)
Other <sup>b</sup>	101 (0.5)	187 (0.6)	209 (0.6)	231 (0.6)	0.3 (1.2)	0.3 (0.9)	0.4 (1.1)	0.3 (0.9)
Total	20,137 (100.0)	29,468 (100.0)	33,096 (100.0)	35,832 (100.0)	22.8 (100.0)	30.3 (100.0)	31.7 (100.0)	33.9 (100.0)

<sup>a</sup>Firms having no primary plans of 100 or more participants and tax-exempt organizations are excluded. The numbers in parentheses represent percent of column totals.

<sup>b</sup>These plans include defined benefit plans with benefits based partly on balance of separate account of participant (code section 414(k)), annuity arrangements of certain exempt organizations (code section 403(b)(1)), custodial accounts for regulated investment company stock (code section 403(b)(7)), pension plans utilizing individual retirement accounts or annuities (described in code section 408) as the sole funding vehicle for providing benefits.

**Table 1.1: Number of primary plans and active participants by plan type**

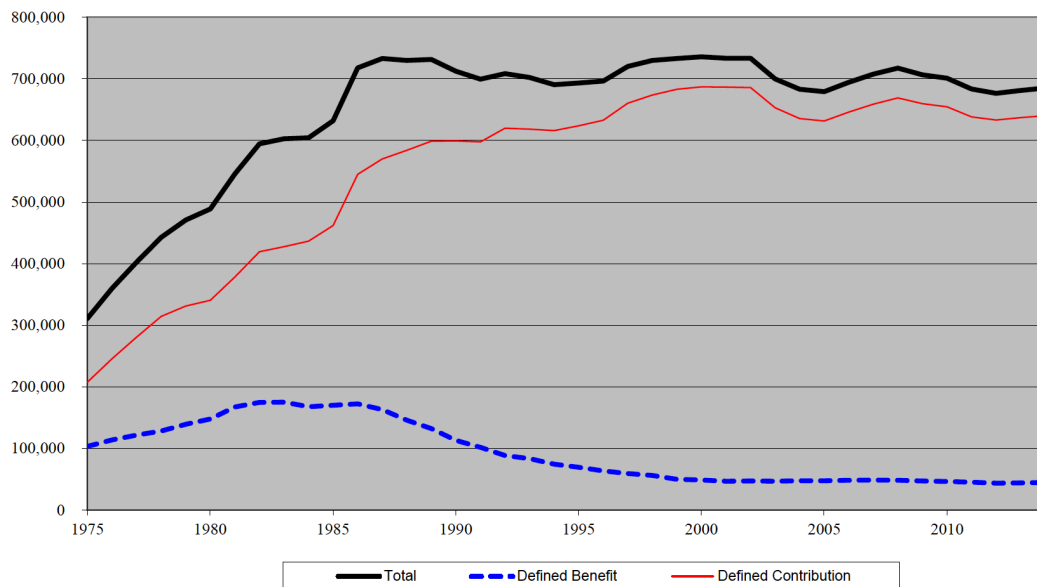
**Source: EBRI (1989)**

**Distribution of Primary Plans by Industry and Plan Type:  
5500 Reporting Forms<sup>a</sup>**

Industry	Defined benefit				Defined contribution			
	1977	1980	1983	1985	1977	1980	1983	1985
Agriculture	103 (72.5)	142 (68.3)	174 (61.3)	170 (57.4)	38 (26.8)	66 (31.7)	110 (38.7)	124 (41.9)
Mining	296 (82.0)	426 (78.2)	458 (69.8)	411 (64.8)	63 (17.5)	115 (21.1)	196 (29.9)	223 (35.2)
Construction	862 (75.1)	1,054 (68.5)	1,229 (61.3)	1,229 (57.3)	279 (24.3)	579 (30.0)	646 (37.6)	908 (42.4)
Manufacturing	8,849 (83.1)	12,119 (81.4)	12,539 (78.8)	11,807 (74.0)	1,759 (16.5)	2,719 (18.3)	3,328 (20.9)	4,114 (25.8)
Ferrous Metal	329 (91.1)	418 (92.1)	405 (90.8)	350 (84.7)	30 (8.3)	35 (7.7)	40 (9.0)	62 (15.0)
Motor Vehicles	329 (93.2)	410 (91.4)	417 (88.7)	433 (85.6)	24 (6.8)	40 (8.9)	53 (11.3)	72 (14.2)

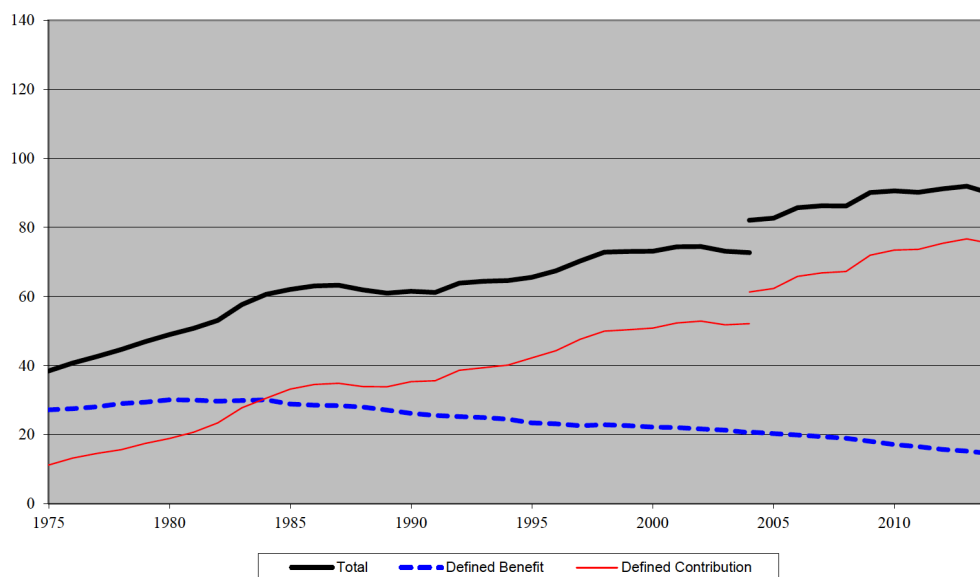
**Table 1.2: Distribution of primary plans by industry and plan type**

**Source: EBRI (1981)**



**Figure 1.8: Number of pension plans, by type of plan, 1975-2014**

**Source: U.S. Department of Labour (2016)**



**Figure 1.9: Number of active participants in pension plans, by type of plan<sup>4</sup>, 1975-2014**

**Source: U.S. Department of Labour (2016)**

## 7. Are people saving enough?

A study from the National Institute on Retirement Security by Nari Rhee (2013) revealed that retirement account ownership is not so common. Indeed, based on 2010 data almost 45 percent of working-age households lack retirement accounts. That percentage is even more puzzling when analysing single age groups because it appears that 40 percent of the working-age

<sup>4</sup> Numbers in billions.



households near retirement lack retirement accounts. Overall, 38.3 million working-age American households lack a retirement account. The percentage of workers that is estimated will not be able to maintain the same standard of living at retirement has increased from 31 to 51 from 1983 to 2010 (Benartzi and Thaler, 2013).

According to a study by Fikus and Johnson (1997), individuals themselves know that they are not saving enough. Indeed, 76 percent of respondents declared that they should be saving more. Saving for retirement appears to be a remote issue in people's mind. Day-to-day operations (e.g. mortgage, car payments, etc.) are given priority while savings decisions are deferred. In a study by the Employee Benefit Research Institute (EBRI) (1994) most participants admitted not having seriously thought about retirement savings issues and one of them stated "I really didn't know about planning for retirement. You hear about it but I guess I had other things on my mind and I couldn't afford it. Therefore, I just didn't pay that much attention" (EBRI, 1994:129). Similarly, in a 1993 survey by Mathew Greenwald & Associates people were asked whether they were confident about the job they were doing or financially preparing for retirement. 75 percent of respondents were "somewhat confident, not too confident, nor not at all confident". Most people justify themselves by saying that they do not know where to start when it comes to start planning for retirement. In 2004, 57 percent of Americans were unsure about how much to save for retirement (Boeri et al., 2006). On top of that, financial pressures and negative associations with retirement ensure that people are motivated to avoid the issue (EBRI, 1994).

What's more, even among employees that have access to employer-sponsored plans, a quarter fail to join (Benartzi and Thaler, 2013). If, for instance, we consider the above-described defined-contribution plans, despite the greater responsibilities they place on individuals, they are a sweet deal. Indeed, contributions are tax deductible and accumulations are tax deferred. On top of that, many employers offer to match employees' contribution (for instance, they commonly offer to match 50 percent of the employees' contributions up to 6 percent of the salary). Basically, this match is free money for employees. However, if we take 401(k) plans, enrolment rates in these plans are far from 100 percent despite the financial benefits that these plans have to offer. According to the Investment Company Institute (2006) roughly 30 percent of employees eligible to join a pension plan fail to enrol. In other cases, workers take months or years just to join the plan. On top of that, in a study by Choi et al. (2002) 68 percent of participants in a defined-contribution savings plan said that their savings rate is "too low", 31 percent regarded it as "about right" and only 1 percent said it was "too high".

As the pension systems puts more pressure and responsibilities on each individual and they are always more required to be self-reliant, a fundamental issue will be that of understanding why people do make mistakes in this context by not addressing retirement savings decisions, saving too little or procrastinating the decision to join pension plans. It is then interesting to study whether it is possible to help people increasing their savings and ensure them a comfortable retirement. The following sections will try to analyse human behaviour's flaws and provide elements of a solution.

# CHAPTER II

## BEHAVIORAL ECONOMICS AND SAVINGS DECISIONS: FROM THEORY TO PRACTICE

### 1. Neoclassical theories

Economists have long been studying how people make consumption and savings decisions. In this purpose, in the early 1950s two main theories have been developed. Milton Friedman from the University of Chicago developed the “*permanent income model*”; whereas Franco Modigliani together with one of his students, specifically Richard Brumberg, developed the “*life-cycle model*”. Both theories’ starting point is the idea of the foreseeing consumer. According to this idea, a consumer is able to predict his/her total future income, that is the sum of “non-human” income (e.g. value of the house, value of bonds, value of bank deposits, etc.) and “human” income (i.e. salary after tax in discounted value) (Blanchard et al., 2014). However, it is unrealistic to believe that individuals have all the necessary information in order to predict their total income and to make all the relevant calculations. On top of that, underlying the life-cycle model and the permanent income model there are three other utopian assumptions. First, that people accumulate and decumulate assets to maximise some lifetime utility function. Second, that people have the ability to solve the optimization problem. Third, that people have the necessary willpower to implement the optimal plan (Thaler and Sunstein, 2008).

According to Modigliani and Brumberg’s theory, when making consumption decisions individuals take into account their whole life and thus, consider both their current income and their income expectations. The life-cycle is divided into three main stages: youth (low income), adulthood (high income) and old age (low income). The first phase is that of young adults that are still studying or that are at the beginning of their working life. They take on debts in order to face their consumption needs. Adulthood follows, where incomes start rising and throughout these years, individuals are both able to repay their debt and to save for retirement. Money and assets gathered during maturity are then used to finance consumption during retirement, when income is naturally supposed to be lower than the salary earned during the working life.

Similarly, Milton Friedman focuses on the idea of “permanent income” and imagines that individuals have a perfect rational behaviour and have the far-sightedness to smooth consumption over time. Friedman distinguishes permanent income from current income.

Current income is affected by transient shocks such as periods of unemployment or illness, whereas permanent income is fixed and it is the income that an individual is expected to receive based on his/her capabilities and qualifications. Friedman asserts that consumption decisions depend on permanent income and not on current income. When income is higher than expected, individuals save the exceeding part; while when income is lower than expected, individuals use their savings to make up for the loss. On balance, individuals prefer levels of consumption balanced through time and thus, try to make their consumption decisions as uniform as possible (i.e. consumption smoothing).

## **2. Econs vs Humans**

Although Modigliani and Friedman theories seem to give an exhaustive and reasonable explanation of human behaviour, many saving decisions prove them wrong. Indeed, evidence suggests that individuals have difficulties in planning their own future and particularly, planning for retirement. Data from the Health and Retirement study (HRS) from 1992 regarding American individuals aged 50 and over shows how almost 1/3 of those interviewed had not planned to join any retirement plan yet. Similarly, the Employment Benefit Research Institute conducted a survey in 2003 and it estimated that only 20 percent of American families had enough money to live comfortably at retirement, whereas 30 percent of American families would not have any savings at retirement and 40 percent of American families had not even estimated how much money they would need at retirement.

As a result, evidence suggest that consumers are anything but foreseeing. Why, then, is there a gap between actual savings and those predicted by neoclassical economic theories? In answering this question, two main reasons for this gap will be considered:

- i. humans' bounded rationality and consequent lack of necessary information in order to make relevant decisions and calculations;
- ii. the existence of systematic human biases.

## **3. Bounded Rationality**

Herbert Simon in 1957 started talking about “bounded rationality”, by which he meant that “people act intentionally rational but only limitedly so”. “Bounded rationality” is about scarcity of mind, recognizing that individuals making decisions always face information problems. They lack sufficient access to information in quality and in quantity in order to make insightful

decisions and even in presence of relevant information, they lack the capability to process it (Verbeke, 2013). Many employers have tried to educate their employees by providing the necessary information in order to make better decisions and motivate them to enrol in retirement plans. However, results show that education seems to have a minimal impact when it comes to savings decisions. In one of the studies provided by Bentartzi and Thaler (2007), an employer offered its employees a financial education program free of charge. The employer itself organized a test before and after the education program in order to verify the impact of the program. Results show that while the average score of the employees before the programme was 54, after the education programme it was 55; proving that teaching is hard and it often leads to disappointing results. Similarly, a study conducted by Choi, Laibson, Madrian and Metrick (2002) on the effects of employee seminars shows that while everyone leaves educational seminars enthusiastic about saving more, only 14 percent actually join a savings plan. If compared to the percentage of those who did not attend the seminar but joined a savings plan (7 percent), the improvement is meaningless.

#### **4. Heuristics and cognitive biases**

In their studies of human thinking, Tversky and Kahneman (1974) distinguished between two kinds of thinking: one that is intuitive and automatic and another that is controlled and rational. The first cognitive system is known as “Automatic System” (Thaler and Sunstein, 2008) or “System I” (Stanovich and West, 2000; Kahneman, 2011), whereas the second cognitive system is known as “Reflective System” (Thaler and Sunstein, 2008) or “System II” (Stanovich and West, 2000; Kahneman, 2011). The operations of System 1 are associative and emotional, often the result of habits and thus, difficult to control or modify. Intuition is an informal mode of reasoning, not based on analytical reasoning or calculations. By contrast, the operations of System 2 are self-conscious and controlled.

Another reason for people not saving the right amount of money is that many people in everyday life are too busy to spend time thinking and analysing everything and thus, they make a wider use of System 1 by adopting simple heuristics or rules of thumb to make decisions. However, heuristics can lead to systematic biases. In the retirement savings context, four biases need to be taken into account: self-control problems, status quo bias, loss aversion and money illusion.

## 4.1 Self-control

People who try to quit smoking but fail to do so, people who under-save, people who overeat and people who put off an unpleasant task all share one common feature: they have self-control problems. These are only a few examples from everyday life situations in which individuals would like to behave in one manner but instead, choose to behave in another way that they will not appreciate in the long run. Thaler and Shefrin (1981) describe this inconsistency with an emblematic metaphor. They propose a two-self model and identify man as an organization composed of a “planner” and many “doers”. The planner represents the long-run preferences of an individual and its rationality. Its main purpose is to maximise the lifetime utility function. By contrast, doers are myopic and selfish, they live for the moment and represent the short-term preferences of an individual. The conflict between the judicious planner and the undiscerning doers is what individuals experience when having self-control problems.

When making everyday life decisions (e.g. savings decisions, work decisions, healthcare decisions, etc.) individuals have to weight costs and benefits distributed in different time periods. Intertemporal decisions are important since they define an individual’s wealth. In 1937 Paul Samuelson introduced what in the period ahead would have become the basis of microeconomics, that is the utility function. Rational consumers are supposed to maximise an utility function  $U(\cdot)$ , that is described as follows:

$$U_t(u_t, u_{t+1}, \dots, u_T) = \sum_{\tau=t}^T \delta^\tau u_\tau$$

The so-defined intertemporal utility function assumes that a consumer’s preferences are “time consistent”, by which we mean that the choices that a consumer makes in a defined period in time  $t$  are the same in every other period. If, for instance, in period  $t$  an individual states that he/she prefers to consume  $c_2$  in  $t + 2$  rather than consuming  $c_1$  in  $t + 1$ , in  $t + 1$  he/she will continue to prefer  $c_2$  in  $t + 2$  rather than consuming  $c_1$  immediately. Time consistent preferences are represented by the above function, that is characterized by an exponential and constant discount factor (*i. e.*  $\delta^t$ ).

However, starting with Thaler (1981) and throughout the past 25 years, research has seriously questioned the validity of such a function. Samuelson himself at the end of his 1937 paper (*i.e.*

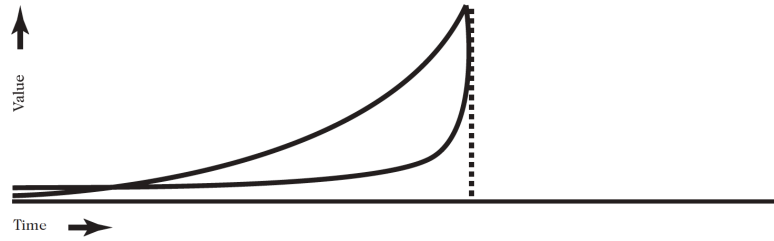
“A note on the Measurement of Utility”) in presenting the “serious limitations” of his model, warned that the model could not be so accurate because people in everyday life could discount utility at different rates and their behaviour could not in fact be consistent. Self-control problems are ubiquitous in humans’ everyday life. There is a gap between what people feel they should do or plan to do and what they actually do and they usually change their set of preferences as soon as the future arrives. For instance, today a hypothetical consumer may desire to start an aggressive savings plan next month but when next month actually arrives, his/her tastes will have changed and the decision will be to postpone any sacrifices another month. These preferences are referred to as “time-inconsistent” or “dynamically inconsistent”. O’Donoghue and Rabin (2000) talk about the “pursuit of immediate gratification”, by which they mean individuals’ myopic preferences for immediate rewards (and costs) rather than for better-off results in the long-term.

Time inconsistent preferences are represented by a hyperbolic discount function. The results of Thaler’s (1981) studies have led behavioural economists to believe that individuals discount preferences according to a diminishing discount factor. In other words, individuals are impatient and consumption is preferred as long as it is anticipated in time (Malhotra et al., 2002). Present rewards and costs are preferred to those in the long term. This behaviour is represented with the hyperbolic discount function:

$$U_t(u_t, u_{t+1}, \dots, u_T) = \delta^t u_t + \beta \sum_{\tau=t+1}^T \delta^\tau u_\tau$$

This function models time-consistent impatience.  $\beta$  is the parameter that models an individual’s preference for immediate gratification. If  $\beta = 1$ , then the model is the one predicted by Samuelson and individuals have time-consistent preferences; whereas if  $0 < \beta < 1$ , individuals have self-control problems (Della Vigna, 2007).

While the exponential discount function  $\delta^t$  is characterized by a constant discount rate ( $\log \frac{1}{\delta}$ ), the hyperbolic discount function is characterised by a discount rate that declines as  $\tau$  rises ( $\frac{\gamma}{1+\alpha\tau}$ ) (Laibson et al., 1998). Figure 2.1 below compares the two functions.



**Figure 2.1: Exponential discount function and hyperbolic discount function in comparison**

**Source: Ainslie (1992)**

As already said, hyperbolic consumers will report a gap between what they would like to save and what do actually save. In this purpose, both Berhneim’s (1994) surveys’ results and Laibson’s (1997) calculations find that in a hyperbolic economy, actual savings rates are 11 percentage points lower than target savings rates.

O’Donoghue and Rabin (2000), reviewing the studies by Strotz (1956) and Pollak (1968), outline two extreme behaviours. On the one extreme, “sophisticated” agents are aware of their self-control problems and correctly predict how they will behave in the future. On the other extreme, “naïve” agents have the incorrect belief that they will have the necessary willpower and that they will behave in the future according to their current preferences. Behavioural economics believe that the way humans anticipate their future behaviour is somewhere in between sophisticated and naives: individuals are aware of their self-control problems but they underestimate their firmness (i.e. partial naivetè) (Malhotra et al., 2002; Thaler, 2015).

#### **4.2 Status quo bias**

In many everyday life decisions, people have a general tendency to maintain their current or previous decision or situation rather than changing the decision they have made. It is what Samuelson and Zeckhauser (1988) refer to as “status quo bias” and it is most commonly known as “inertia”. For instance, networks executives know that it is worth working hard on scheduling because of the “carryover effect”, that is viewers’ propensity not to change channel when they have started the evening on one specific channel. Similarly, status quo bias is easily exploited (Thaler and Sunstein, 2008). It is common for publishing groups to offer free subscription to magazines for a limited period of time. However, once the period is over, people would continue to receive magazines and they would have to pay them at a normal rate, unless they take an



active decision and cancel their subscription. Publishing groups know that when the default choice is “renewal” rather than “non-renewal”, probability of subscription is much higher.

Samuelson and Zeckhauser (1988) conducted a study on the division between bonds and stocks (TIAA-CREF) for retirement investment and found out that in important periodic decisions many people make the same choices year after year. They analysed the behaviour of participants in retirement plans in 1986. After determining the amount of the annual contribution, participants have to divide their premium between bonds (TIAA fund) and stocks (CREF fund). Despite the changes in the rates of return of the funds, there was little evidence of changes in participants’ allocation of their premium. In 1986, barely 30 percent of those surveyed had changed their distribution of premium and in a 12-year average length of participation the percentage is even more striking because less than 2.5 percent of all participants make any change in a given year. It is difficult to predict if those who did not change their asset allocation did so for a reason. However, since to do nothing is easy and effortless, the “status quo bias” could be a good explanation for their inertia.

Connected to the “status quo bias” is the “default effect”. As many people fail to make a decision and maintain the status quo, many public policies could lead to the desired outcome by designating the preferred option as the default (e.g. organ donation, automatic enrolment). Studies have shown that defaults can be powerful in influencing individuals’ decision making for three main reasons. First, individuals might think that defaults are suggestions by policy makers and thus, represent a recommended action. Second, making an active decision involves effort, while accepting the default is effortless. Third, while defaults often represent the status quo, a change usually involves a trade-off. Since individuals are loss averse and thus, weight losses more than the equivalent gains, they avoid any change from the default (Johnson and Goldstein, 2003).

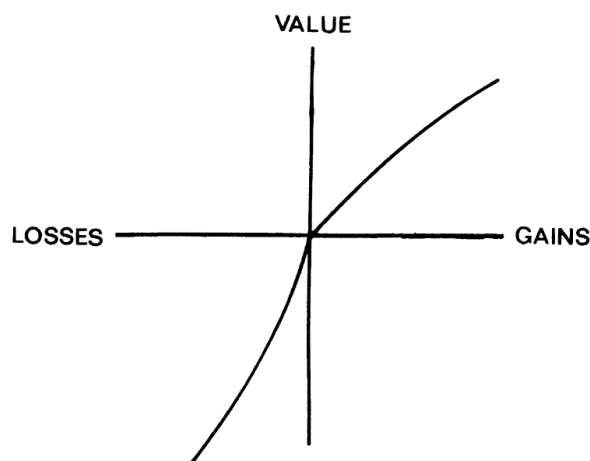
As already said, setting the right default can have a remarkable effect. Bears witness the remarkable success of the introduction of automatic enrolment in savings plans in the US. Chapter three will be entirely dedicated to this topic but it is worth giving a brief introduction here. Traditionally, most companies required employees to enrol in a specific savings plan (e.g. 401(k) plan) and if they took no action they remained outside retirement plans. In recent years, a new approach has spread around: employees are automatically enrolled in savings plans and they have to make an active choice in order to opt out the plan. The default choice has changed

from non-enrolment to enrolment and as we will see, the consequences of this change on participation rates have been outstanding.

### 4.3 Loss aversion, the endowment effect and money illusion

People are loss averse. The pain they get by a loss is greater than the reward for an equivalent gain. For instance, evidence suggest that the unhappiness people would get by losing 100 euros is greater than the happiness of gaining the same amount of money. Particularly, through dedicated experiments, Kahneman, Knetsch and Thaler (1990) predict that loss aversion reaches levels of 2-2,5. As a result, a loss of 100 euros would be compensated only by a 200-250 euros gain. Loss aversion kicks in when it comes to savings too. Indeed, people perceive saving for retirement as a loss because it reduces their spending power.

Kahneman and Tversky propose a value function that takes into account the fact that people are loss averse. It is concave for gains and convex for losses, steeper for losses than for gains. On average, individuals are loss averse when considering gains but they are willing to take on risk rather than accepting a sure loss (Figure 2.2).



**Figure 2.2: The value function**

**Source: Kahneman (2003)**

Loss aversion leads to what Kahneman and Tversky refer to as “endowment effect”. That is, people “demand much more to give up an object rather than they would be willing to pay to acquire it”. This result is incompatible with standard economic theory because it leads to asymmetric evaluations of gains and losses, resulting in a gap between willingness to pay

(WTP) a defined object and willingness to accept (WTA) the price to sell it. Particularly, WTP is consistently lower than WTA.

In 1960 Coase proposed a theorem according to which in an economy where there are complete competitive markets with no transaction costs and no income effects, parties will naturally gravitate towards the most efficient and mutually favourable outcome. In a world where there is the endowment effect, Coase's theorem no longer holds (Kahneman et al., 1990). Similarly, standard microeconomic theories assume reversible indifference curves. That is, "if an individual owns  $x$  and is indifferent between keeping it or trading it for  $y$ , when owning  $y$ , the individual should be indifferent about trading it for  $x$ ". However, as a result of the endowment effect, reversibility does not reflect individuals' preferences and the direction of proposed trades has an effect on people's choices; leading to nonreversible indifference curves.

Many studies and experiments have been conducted in order to provide evidence for the endowment effect. However, they all lead to the same results. People have a tendency not to give up what they have, partly because of loss aversion. Even with markets, sellers demand twice as much as buyers are willing to pay (Thaler, 2015).

Here a straightforward study will be presented. It involved students from the University of Victoria and it was divulged in a study from Knetsch (1989). Students were divided into three comparable groups. The first group consisted of 76 students. They were given a mug and they were later on asked if they would exchange their mug for a 400-gram Swiss chocolate bar. The second group consisted of 87 students that were offered the opportunity to make the opposite trade, that is exchange the initially-given chocolate bar for a mug. Lastly, the third group consisted of 55 people and they were simply offered a choice between receiving a chocolate bar or a mug. It is worth noting that incentives were compatible and there were no income or wealth effects. Based on standard economic theories, there should have been an equal proportion favouring one good over the other in each group. However, initial entitlements and direction of trade influenced participants' valuation of each good. Table 2.1 shows the results.

Group	Proportion Favoring (In Percent)		N
	Mug Over Candy	Candy Over Mug	
1. Give up mug to obtain candy	89	11	76
2. Give up candy to obtain mug	10	90	87
3. No initial entitlement	56	44	55

**Table 2.1: Results of a study at University of Victoria**

When given a choice without prior entitlement, 56 percent of participants prefer a mug over a candy. However, the same percentage varies from 10 percent to 89 percent depending on initial entitlements. Therefore, individuals' asymmetry in evaluating loss and gains is clear.

Related to the fact that people are loss adverse is the “money illusion” theorem. The term was introduced by Keynes, who focused his attention on the fact that most people think about their wealth and income in nominal terms rather than in real ones. The difference between real income and nominal income is that real income and prices take into account the level of inflation in an economy. As many people think in terms of nominal income, when they get a pay rise they believe that their wealth is increasing because they do not take into account the consequences of inflation. In a study about fair behaviour, Kahneman, Knetsch and Thaler (1986) asked a sample of residents of Toronto and Vancouver a series of questions about whether they thought a specific economic action was fair or not. Particularly, results of two questions give evidence to the fact that people think in nominal terms and that it is, thus, easier to cut real wages during inflation periods. The first question was about a company making small profit but being located in a town experiencing recession and unemployment but no inflation. In this particular context, the company's decision to decrease wages by 7 percent on that particular year was regarded as unfair by 63 percent of respondents, while only 37 percent regarded the situation as acceptable<sup>5</sup>. The second question was about the same company and town, but this time inflation in the economy was 12 percent. In this context, the company's decision to increase salaries by 5 percent on that year was regarded as acceptable by 78 percent of respondents and as unfair by only 22 percent of respondents<sup>6</sup>.

<sup>5</sup> Total number of respondents: 125.

<sup>6</sup> Total number of respondents: 129.

Given that the change in real wages is the same in these two situations, people's propensity to think in nominal terms is clear. Particularly, it is worth noting that a 7 percent cut in real wages is regarded as fair when framed in terms of nominal wage increase but the same cut is regarded as unfair when posed in terms of a nominal wage cut.

# CHAPTER III

## IMPROVING DECISIONS THROUGH NUDGE THEORY

### 1. Evaluating Nudge theory

Standard economic theory has proven to be both easy and straightforward. People are supposed to calculate their lifetime income, consider how much they will need at retirement and then, simply put aside the necessary money in order to live leisurely when they retire. This approach is excellent as a theory. However, when it comes to individuals' actual behaviour, theory is not enough and it does not hold anymore. People's actions are more revealing than their words and evidence suggests that people are not saving enough. This is due in part to bounded rationality problems and in part to systematic biases that affect human behaviour. This section will be dedicated to understand how humans' systematic biases can be exploited in order to boost retirement savings.

Thaler and Sunstein (2008) in their book "Nudge – improving decisions about health, wealth and happiness" suggest an alternative to traditional regulations (e.g. expensive procedures and worthless campaigning as well as invasive choice regulation). Particularly, they believe that certain behaviours that are the result of human biases can be "nudged" towards better and preferred behaviours. They claim that humans can be influenced by nudges (to use Thaler and Sunstein's words, people are "nudge-able") and thus, people's life and society's problems can be improved and solved by designing the right "nudge".

To use Thaler and Sunstein words, a nudge is

*“any aspect of the choice architecture that alters people's behaviour in a predictable way without forbidding any options or significantly changing their economic incentives. To count as a mere nudge, the intervention must be easy and cheap to avoid”.*

(Thaler and Sunstein, 2008:6)

Nudges are small features, irrelevant factors in the environment that catch the attention of people and influence their behaviour. A famous example of how nudges work is that of the Schiphol International Airport in Amsterdam. It appears that men are neglectful to where they aim when using urinals. However, their attention and carefulness can be increased if they see a

target. In this purpose, images of black houseflies have been impressed near the drain of each urinal. The effect has been outstanding. Indeed, studies show that flies have reduced spillage by 80 percent<sup>7</sup>.

A key role in designing the right nudges is played by the “choice architect”. He/she indirectly influences the choices other people make by organizing the context in which people make decisions (e.g. employers, public policy makers, doctor presenting treatment alternatives, etc.). To explain what they mean by “choice architects”, Thaler and Sunstein (2008) give the example of Carolyn. Carolyn is the director of food services at a school and she works in the school’s cafeteria. Together with a friend, she conducted a study in which she analysed whether the different display of different food items would influence the choices children made. They found out that by simply modifying the display of different food items in the cafeteria, Carolyn could increase or decrease their consumption by 25 percent. Carolyn is what Thaler and Sunstein have named “choice architect”, because she can influence what children eat simply by choosing a specific arrangement of food items in the cafeteria. In other words, she can nudge.

This line of thought that embraces nudges and relies on theories from behavioural economics, cognitive psychology as well as microeconomics, has been labelled as “libertarian paternalism”. On the one hand, “libertarian” refers to the fact that people are given freedom of choice. Indeed, libertarian paternalism proposals are intentionally designed to retain freedom of choice and they are not in the strongest terms mandates. “Paternalism”, on the other hand, stands for the desire of this movement to guide people’s choices towards directions that will improve their lives (Thaler, 2015).

Nudges have already encountered strong influence around the world (Thaler, 2015). A contribution to the US nudging agenda came from Sunstein, who served as the administrator of the office of Information and Regulatory Affairs (OIRA). Moreover, in 2014 the cognitive neuroscientist Maya Shankar created a small nudge unit in the White House and labelled it as the White House Social and Behavioural Sciences Team (SBST). Similarly, in 2010 in the UK the leader of the conservative party David Cameron established a nudge unit known as the Behavioural Insight Team (BIT). The aim was, once again, to improve policies and public services by applying behavioural sciences. In 2014, 136 countries had integrated behavioural

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<sup>7</sup> Example discussed in Vicente (2006) and presented in Thaler and Sunstein (2008).

sciences in specific parts of public policies while 51 had indeed entirely developed public policies bearing in mind behavioural sciences<sup>8</sup>.

The spread of nudge theory has not been without criticisms. Objections to nudges with relative counterarguments have been proposed in Thaler and Sunstein (2008). Particularly, three are the main arguments that have been presented. First, it is argued that most of the time people make choices that are in their best interest or that are still better than those that somebody else would make for them. By contrast, Thaler and Sunstein (2008) assert that people make good choices in contexts in which they are experienced and in which they have good information and instant feedback (e.g. ice-cream flavour choice). In other domains, people are unexperienced and poorly informed and thus, evidence shows that when decisions are difficult and rare, individuals systematically fail in making good choices (e.g. retirement savings decisions, treatment decisions, investment decisions, etc.). As a result, in these contexts it would be useful to provide some help so that individuals are able to make the optimal decision for themselves (i.e. nudging). Second, sceptics argue that it is possible for government and institutions to avoid influencing people's choices. However, Thaler and Sunstein (2008) point out that in many situation governments and private institutions have to make a choice that will somehow affect (intentionally or non-intentionally) individuals' behaviour and choices. Most of the time it is difficult to be purely neutral and avoid some kind of nudging. As can be seen is a simple example such as that of Carolyn's cafeteria, by structuring the context in which people make decisions, choice architects will inevitably influence people's choices. Carolyn must make a decision on how to arrange food items in her cafeteria and that arrangement will inevitably have an effect on food consumption among children. Third, critics state that libertarian paternalism always involves some kind of coercion for individuals. However, libertarian paternalistic interventions are designed in order to retain freedom of choice and thus, individuals that wish to avoid such interventions are free to do so. Those who embrace libertarian paternalism forcefully oppose themselves to obligations and bans. For instance, if we take programs that help people in increasing their savings (e.g. automatic enrolment and the Save More Tomorrow program that will be analysed later), individuals are explicitly informed about them and they voluntarily accept or refuse to participate. Overall, both weak and strong objections to nudge theory have found comprehensive explanations and counterarguments in Thaler and Sunstein work (2008).

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<sup>8</sup> The study was published in 2014 and it was conducted by the economic and social research council. It was presented in Thaler (2015).



## 2. Nudges and the under-saving problem in the US

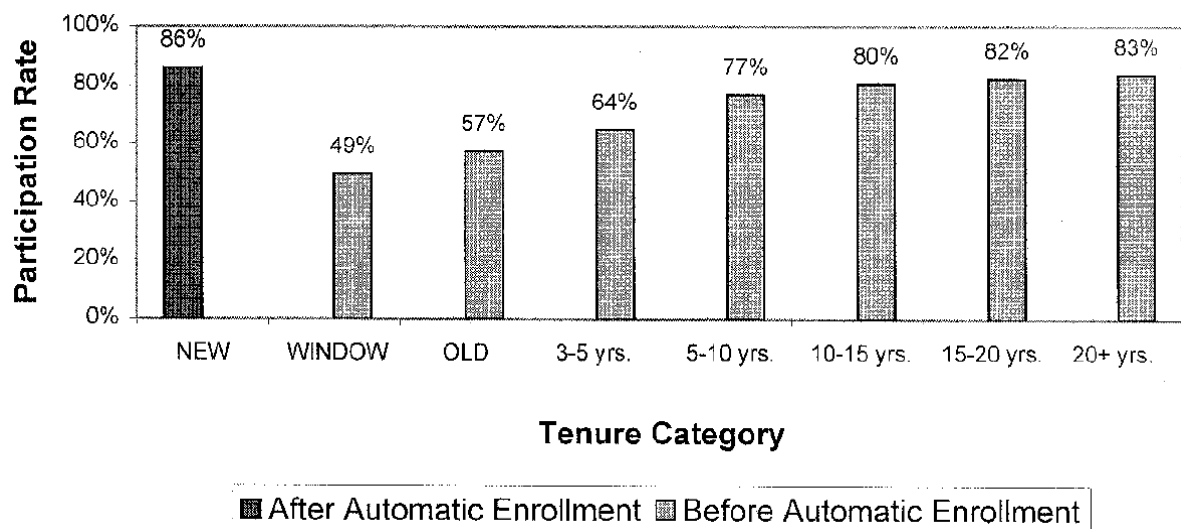
Proponents of nudging have long tried to provide solutions to the under-saving problem and have tried to design pension plans so as to exploit human biases. Thaler in his 1994 paper “Psychology and Savings Policies” came up with a policy proposal to encourage workers’ participation in retirement plans. He proposed what it is now known as “automatic enrolment”. Automatic enrolment leverages over humans’ tendency to procrastinate and takes advantage of the fact that people tend to accept the default option. Thaler later on learned that he was not the first to think about automatic enrolment since a few firms (e.g. McDonald’s) had already tried to change the design of retirement plans in that direction but had labelled such a change as “negative election” instead of “automatic enrolment” (Thaler, 2015).

Under standard enrolment plans people willing to join a pension plan have to fill out forms, choose a saving rate and decide how to invest the money in order to sign up for the plan. In this context, the default option is “non-enrolment”: unless workers choose to opt in, they are outside the retirement plan. By contrast, under automatic enrolment or negative election the default option changes and it is now “enrolment”: unless workers choose to opt out, they are enrolled in a retirement plan at some default saving rate and in some default investment product. Several studies have proven the great results automatic enrolment can lead to.

Mandrian and Shea (2001) have analysed the savings behaviour and 401(k) participation of employees in a large Fortune 500 company in the healthcare and insurance industry before and after a change in the company retirement plan. The study focuses mostly over a two-years period, specifically from 1997 to 1999. This window of time allows researchers to evaluate the consequences of the change in the 401(k) company plan, that occurred in April 1998. Before the change in the retirement plan, individuals were eligible to participate in 401(k) plans after one or more years of employment at the firm and they had the option of contributing up to 15 percent of compensation, with 50 percent of employer match up to 6 percent of salary. After the change, all employees were made immediately eligible to participate in the retirement plan even though the one-year service was still required in order to receive the employer match. At the same time, newly hired employees were automatically enrolled in the retirement plan with a 3 percent contribution rate allocated to the money market fund unless they clearly choose to opt out. Employees had the freedom to change both the contribution rate and the fund allocation at any time.

In order to analyse employee-level data, employees were divided into three subgroups. The first group comprised individuals hired between April 1996 and March 1997. When the change occurred, they were eligible for the 401(k) plan with employer match since they had been working for one or two years at the company. This group is referred to as “OLD” group. The second group encompasses individuals hired between April 1997 and March 1998. These employees became immediately eligible in April 1998 but they were not eligible to participate in the retirement plan before because they had less than one year of tenure. This group is referred to as “WINDOW” group. The last group comprises all the individuals hired between April 1998 and March 1998. These employees became immediate eligible through automatic enrolment and they are referred to as the “NEW” group. The results are meaningful: average participation in the retirement plan is considerably higher under automatic enrolment for recently hired employees.

Figure 3.1 shows that for those individuals hired prior to automatic enrolment, participation in the retirement plan is increasing in tenure. Much of the increases emerge within the first ten years of employment. After that, increases are minor. However, the highest participation rates occur under automatic enrolment. 86 percent of individuals hired under automatic enrolment participate in the 401(k) plan. This percentage is striking since it is even higher than the participation rate of highly tenured individuals hired before automatic enrolment (i.e. 83 percent).



**Figure 3.1: 401(k) plan participation rates**

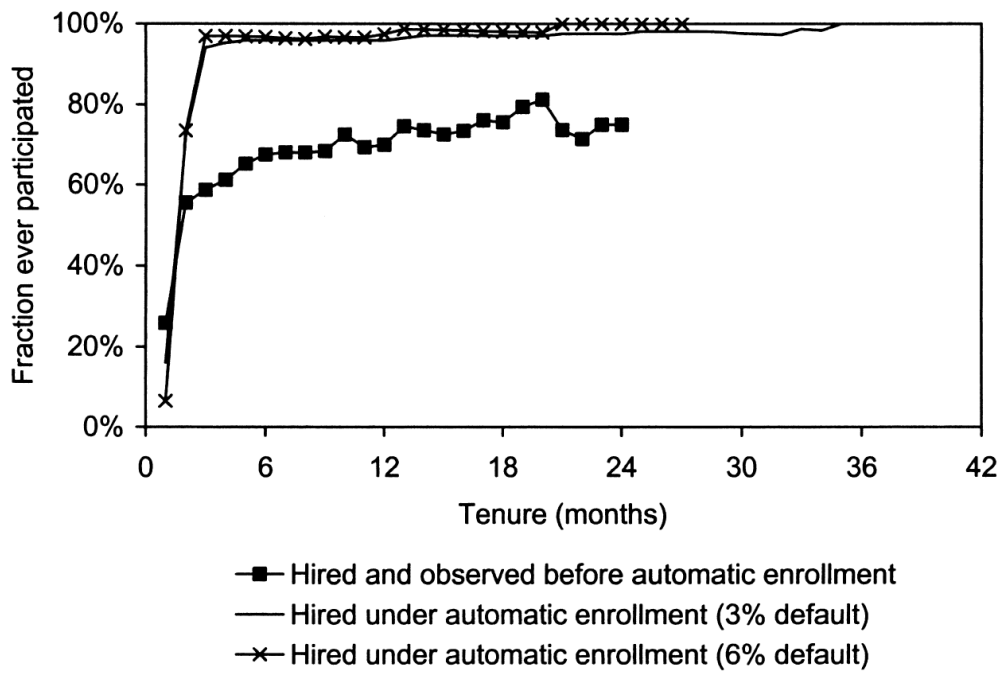
**Source: Mandrian and Shea (2001)**

More recently Beshears et al. (2009) have analysed a medium-size chemicals company and they have reached the same results as the ones obtained by Mandrian and Shea (2001). Prior to the switch to automatic enrolment in December 2000, the company analysed had a standard defined contribution savings plan and employees could contribute to the plan up to 15 percent of pay with 50 percent of employer match up to 6 percent of salary. In December 2000 the company adopts automatic enrolment with a default contribution rate of 3 percent. This change affected newly hired individuals as well as previously hired individuals that did not participate in the plan. In October 2001 the company implements another change in the plan by rising the default contribution rate to 6 percent. This change applied only to newly hired individuals.

As observed by Mandrian and Shea (2001), for individuals hired before automatic enrolment savings plan participation is increasing in tenure, with low initial levels of savings plan participation that increase slowly with employee tenure. By contrast, from the very beginning participation rates of those employees hired under automatic enrolment are striking, with 98 percent of employees participating in the savings plan and that percentage slightly increasing in the years ahead. After three months of employment the difference in participation rates under the standard enrolment regime and under the automatic enrolment regime is astonishing. Indeed, the difference in participation rates between the two regimes is of almost 35 percentage points after three months of employment. After 24 months of employment, that difference decreases to 25 percentage point but still remains considerable (Figure 3.2).

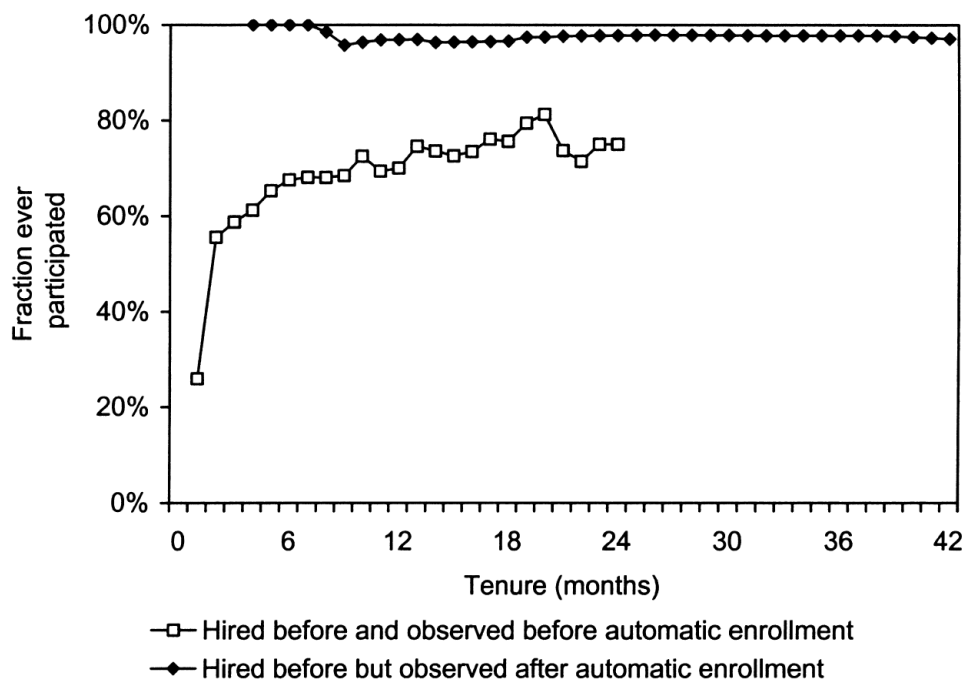
The same meaningful results are reached when comparing participation rates under standard enrolment regime with those under automatic enrolment for existing nonparticipants. (Figure 3.3)

What's more, it is worth noting that participation rates under automatic enrolment at 3 percent default rate are virtually the same as participation rates under automatic enrolment at 6 percent default rate. As a result, the percentage at which the default savings rate is set does not affect participation in retirement plans.



**Figure 3.2: The effect of automatic enrolment on new hires**

Source: Beshears et al. (2009)



**Figure 3.3: The effect of automatic enrolment on existing non-participants**

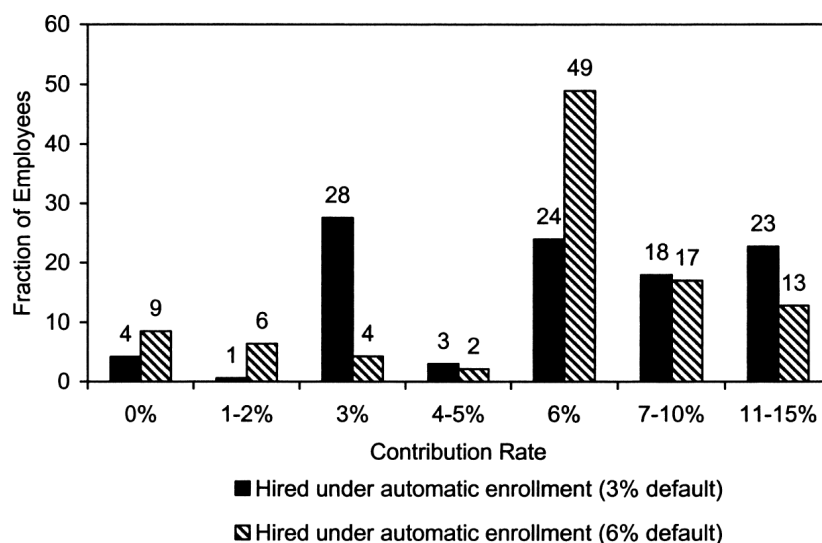
Source: Beshears et al. (2009)

It follows that two are the main consequences of the introduction and implementation of automatic enrolment. Firstly, employees join savings plans sooner and second, participation in savings plans dramatically increases.

Despite the great effects that automatic enrolment has on participation rates, it is not a win-win game. Indeed, while it effectively ensures that a significantly higher number of employees participates in pension plans, it does not persuade employees to make accurate decisions about how much to save for retirement. Indeed, it emphasizes individuals' inertia and contributes to their suboptimal savings contributions and investment choices (Benartzi, and Thaler, 2007).

Beshears et al. (2009) compare contribution rates of employees hired under automatic enrolment with a 3 percent contribution rate to those hires under automatic enrolment with a 6 percent contribution rate. The comparison is among employees with the same tenure so that differences in time do not interfere with the results.

As shown in figure 3.4, under the 6 percent default regime 49 percent of employees have a 6 percent contribution rate and that percentage increases to 79 when considering employees that have a contribution rate at or above 6 percent. Under this regime, only 4 percent of employees have a contribution rate of 3 percent. By contrast, when considering the 3 percent default regime, it appears that 28 percent of employees contribute at the default rate while only 24 percent of employees have a 6 percent contribution rate. It is worth noting that moving from the 6 percent default regime to the 3 percent default regime, the percentage of employees having a 3 percent contribution rate increases by seven times while the percentage of employees contributing at the match threshold (6 percent) halves. In addition, under the 3 percent default regime the percentage of those contributing at or above the match threshold (6 percent) is 65 percent. There is a 14 percentage point gap if compared with the 6 percent default regime and it is a blunder considering the strong financial incentives arising from the employer match.



**Figure 3.4: Automatic enrolment and 401(k) contribution rates for new hires**  
**Source: Beshears et al. (2009)**

Results are even more striking if considering employees that were not participating in retirement plans before automatic enrolment. In this purpose, Beshears et al. (2009) compare contribution rates of individuals hired before automatic enrolment that were not subject to automatic enrolment since they had already joined the pension plan with those hired before automatic enrolment but that were not participating in pension plans and thus, subjected to automatic enrolment at a 3 percent default regime. Employees already participating in the pension plan before automatic enrolment rarely chose to contribute at 3 percent. Indeed, among those employees, 31 percent chose to contribute at the match threshold and that percentage goes up to 89 when considering employees that chose to contribute at or above 6 percent. Only 3 percent of employees not subjected to automatic enrolment chose a 3 percent contribution rate. By contrast, among employees subjected to automatic enrolment, 60 percent are contributing at a 3 percent default contribution rate while only 5 percent contribute at the march threshold and 25 percent contribute at or above 6 percent. In other words, moving from non-enrolment as default option to enrolment as default option, the percentage of employees having a 3 percent contribution rate increases by 20 times while the percentage of employees contributing at or above the match threshold decreases by two-thirds.

### **3. The Save More Tomorrow program (SMarT)**

In order to increase contribution rates, Benartzi and Thaler (2004) have developed an automatic contribution rate escalator that has been labelled as the “Save More Tomorrow” (SMarT) plan. The program is designed to exploit five systematic human biases:

- i. Procrastination: most people think that they should be saving more and plan to save more but then procrastinate and fail to do so;
- ii. Self-control: people have more safe-control when it comes to the future than the present because they are present-biased;
- iii. Loss aversion: people weight losses more than gains;
- iv. Money illusion that is about loss aversion measured in nominal terms and not in real terms;
- v. Inertia.

The Save More Tomorrow program is designed to overcome all these obstacles that do not allow people to save the right amount of money for retirement. The idea is that people commit themselves now to increase their saving rate “later” and particularly, the increase in the

contribution rate is designed to correspond to a future pay rise. As a result, people would not regard their increased contribution rates as losses since pay rises and saving increases would be synchronized and perceived loss aversion would be mitigated. Self-control problems imply that people would consider opportunities to save more in the future more tempting than those in the present. Present bias is bypassed with the SMarT program by asking people to commit themselves now for something that would have effect in the future. Lastly, inertia would not be a problem anymore by combining this program with automatic enrolment. Therefore, once enrolled in the program, employees would need to take explicit action in order to opt out. As we will see, the Save More Tomorrow program has a twofold consequence: firstly, it increases participation rates and secondly, it increases savings rates. These findings have proven right in six different companies in different industries (Choi et al., 2004).

The first implementation of the program took place in a medium-size manufacturing company in 1998. Employees were given the chance to meet with a financial consultant that had a specific software designed to figure out the optimal savings rates based on relevant information from each employee. 90 percent of employees accepted this opportunity and since most of them had low savings rates, the software would usually suggest the maximum savings rate allowed (i.e. 15 percent of pay). However, suggesting such a big increase in savings would have been infeasible and thus, the consultant would usually suggest raising the savings rate by 5 percentage points. About 25 percent of employees accepted to immediately increase their savings rate by 5 percentage points. The other three-quarters that refused this advice were offered the Save More Tomorrow program. In other words, they agreed to increase their savings rate by 3 percentage points each time they got a pay rise and with such an increase they would have reached the maximum tax-deferred contribution in 4 years. 78 percent of employees accepted to participate in the program and their savings rate almost quadrupled three and a half years and four pay rises later.

To show the dramatic impact of the program, employees are divided into three groups. The first group comprises those who did not meet with the consultant and that had a contribution rate of about 6 percent. Due to inertia, their contribution rate remained stuck at around 6 percent over the three years. The second group consists of employees who did meet with the consultant but accepted the first advice to increase their savings rate by 5 percentage points. Their savings rate rose from about 4 percent to 9 percent after the first pay raise but then remained constant over the years. The third group contains those who joined the Save More Tomorrow program. They started with the lowest contribution rate (i.e. around 3 percent) but then over the three years the

savings rate gradually increased and by the third year it had almost quadrupled reaching a percentage of 13.6. (Table 3.1)

AVERAGE SAVING RATES (%) FOR THE FIRST IMPLEMENTATION OF SMarT					
	Participants Who Did Not Contact the Financial Consultant	Participants Who Accepted the Consultant's Recommended Saving Rate	Participants Who Joined the SMarT Plan	Participants Who Declined the SMarT Plan	All
Participants initially choosing each option*	29	79	162	45	315
Pre-advice	6.6	4.4	3.5	6.1	4.4
First pay raise	6.5	9.1	6.5	6.3	7.1
Second pay raise	6.8	8.9	9.4	6.2	8.6
Third pay raise	6.6	8.7	11.6	6.1	9.8
Fourth pay raise	6.2	8.8	13.6	5.9	10.6

**Table 3.1: Comparison of different saving rates for the first implementation of SMarT**

**Source: Benartzi and Thaler (2004)**

Most of the people who joined the SMarT program remained stuck with their decision. As regards the few employees who did leave the program, they did not return to their previous lower savings rate but instead, they only ceased increasing their savings rates. This is the proof that the Save More Tomorrow plan not only overcomes inertia but nudges people towards their preferred choices.

#### **4. Other insights from behavioural economics**

Besides automatic enrolment and automatic escalation, three other behavioural policies have been proposed in order to nudge people towards better behaviours in the retirement savings context (Madrian, 2014). The types of intervention that will be discussed include: “simplifying”, active choice mechanisms, and “earmarking” and reminders.

##### **4.1 Simplifying**

Complexity has been argued to act as a barrier that impedes individuals from joining retirement plans. Determining the right saving rate or asset allocation could be confusing and thus, individuals react by just postponing this unpleasant task (Thaler and Sunstein, 2008; Beshears



et al., 2013). To reduce complexity in the retirement savings context, Choi, Laibson and Madrian (2009) propose a new intervention named “Quick Enrolment”. According to this program, employees are able to enrol in a retirement plan by opting in at a default contribution rate and an asset allocation pre-selected by the employer. They studied the effects of quick enrolment on three companies and they found out that among new hires, participation rates tripled if compared to standard enrolment plans where employees have to choose both the savings rate and the asset allocation. Furthermore, quick enrolment increased participation rates of existing non-participants by 10 to 20 percentage points. Even though these results are not as striking as those obtained through automatic enrolment, they are still meaningful.

Beshears et al. (2013) build on the findings from Choi, Laibson and Madrian (2009) but extend and improve the analysis. While Choi, Laibson and Madrian (2009) follow employees for a 11-months horizon after the implementation of quick enrolment, Beshears et al. (2013) extend that horizon to 54 months and they find out that dropout rates are rare and employees tend to stick with quick enrolment at the pre-selected contribution rate and asset allocation for years. Moreover, quick enrolment forms sent by email had a huge impact, with annual mailing rising by 10 percent the percentage of non-existing participants who joined the plan. Besides quick enrolment, they also proposed a program named “easy escalation”. The program is similar to quick enrolment but allows existing participants to raise their contribution rates to a pre-selected level (in the firm studied the level selected was 6 percent). 15 percent of employees that were contributing at low levels but that received by email the easy escalation form, successfully increased their contribution rates to the pre-selected.

## **4.2 Active choices**

Another alternative to automatic enrolment is to require workers to make an active decision about whether to join a retirement plan. Firms adopting active choice mechanism encourage employees to think about the important decision they have to face, avoid procrastination and state a preference within a defined time frame. In a study by Carroll et al. (2009) a company adopted an active decision mechanism where employees had to make an active decision about whether to join a retirement plan within 30 days. After the deadline, there was no penalty but employees who failed to express a preference would simply not participate in the plan (non-enrolment default). Compared to standard enrolment mechanism, results show that participation rates under active decision mechanism increased by 28 percent.

### 4.3 Earmarking and reminders

Soman and Cheema (2011) focus their study on “earmarking”. The term is a synonymous of “budgeting” and it refers to the allocation of money for a particular purpose. The study conducted by Soman and Cheema (2011) targeted workers in India receiving cash wages regularly (from once a day to once a week) and living in a cash economy because of the lack of banks and post offices in most of Indian rural villages. Workers being studied were given a savings target: they had to earmark part of their weekly wage as savings and set the money aside in either one envelope (non-partitioned) or two envelopes (partitioned). Results show that workers with partitioned savings amounts save more than those with non-partitioned savings amounts. Soman and Cheema (2011) explain this behaviour by saying that individuals feel guilty when using earmarked amounts for unrelated expenses and thus, they avoid spending earmarked amounts and consequently, increase savings. As a result, the study encourages having multiple accounts designated to specific purposes (e.g. a retirement income account together with a retirement health account) as an effective means to increase the amount saved.

The study also discusses the effectiveness of visual reminders on savings. In this purpose, Soman and Cheema (2011) attached on some envelopes the picture of households’ children and they found out that the probability to open the envelope decreased when there was a picture on the envelope. Particularly, savings increased by 15 percent when there was a picture on the envelope. Associating savings with the welfare of children had an impact in mitigating households’ self-control problems.

In studying the effect of reminders, Karlan et al. (2016) propose a model that hypothesizes that people under save because they do not pay attention to future expenditures. Their study predicts that reminders (text messages or emails) are effective when they draw the attention of individuals on a future goal and particularly, the study shows that reminders increase savings by 6 percent while increasing the probability to achieve a future goal by 3 percent. Similarly, Kast et al. (2012) conducted a savings field experiment in Chile in which they analysed the effect of text message reminders on savings behaviour and they found that savings strongly increase among those who received these reminders. As a result, they strongly suggest considering this policy tool since it is wider applicable and it can reach millions of people thanks to the wide spread of smartphone usage. Another feature of text message reminders is that unless people unsubscribe, they will continue receiving text messages. In this purpose, we have already seen that the “enrolment”-kind of default has a great impact on savings behaviour.

However, further research in the field is needed in order to generalize these results with certainty.

## **5. Do retirement savings policies actually increase total savings?**

Economists think of money as a fungible tool. Therefore, when it comes to savings they believe that if people are nudged to increase their savings rate in one place, they will save less or take on debt somewhere else. One question that they have tried to answer is whether these new behavioural policies actually increase total savings in an economy (Chetty et al.,2014; Thaler, 2015). Until recently, it was difficult to provide a categorical answer to the question and thus, the query remained unanswered. However, in 2014 a group of American and Danish economists has succeeded in providing an answer using Danish data on savings. They divided agents into two groups: “active savers” and “passive savers”. Active savers are comparable to what Thaler and Sunstein (2008) defined as “econs”. They are able to make active savings decisions by maximizing a utility function. By contrast, passive savers are financially unsophisticated and face difficulties when planning for retirement. They estimate that 85 percent of individuals are passive savers, while only 15 percent of individuals are active savers.

The study shows that passive savers, that represent a large share of the population, significantly respond to automatic contributions and thus, when they are automatically enrolled in retirement savings plans and start increasing their savings rates they do not decrease savings elsewhere or take on debt (i.e. that savings is new). In other words, the first main conclusion of the study is that automatic savings plans and default policies (i.e. policies that modify savings rate passively) have a strong impact in increasing total savings in an economy.

The second finding of the study shows that automatic savings plans are a much more effective policy tool rather than subsidies for retirement accounts. Indeed, the study shows that only active savers respond to price subsidies and that response usually represents a substitution from other accounts. The study estimates that for every dollar that the government spends on subsidies, the increase in total savings is of only 1 percent.

To conclude, automatic enrolment or default policies dramatically influence the savings behaviour of the bulk of the population that does not pay attention to saving for retirement (i.e.

passive savers). In doing so, these policies have a huge impact on increasing retirement savings in an economy at lower fiscal costs.

Similarity of patterns in savings behaviour (e.g. active/passive choice) and in the pension system in both Denmark and the US ensure that these results can be generalized to the US as well. Nonetheless, it is clear that more accurate results could be obtained by directly studying the economy of interest.

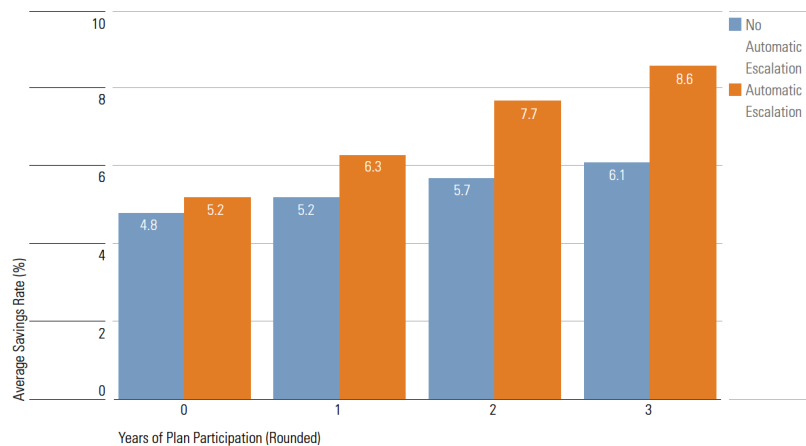
## **6. Recent evidence and developments**

Nowadays, in the US automatic enrolment is spreading around. A study from the National Compensation Survey conducted by Butrica, Dworak-Fisher and Persun (2015) that focuses on 401(k) plans found out that the percentage of plans characterized by an automatic enrolment feature rose from around 4 percent in 2002 up to 32 percent in 2012. The Financial Times (2015) brings that percentage up to 68 percent in 2014 when looking at firms offering automatic enrolment plans to at least part of their employees. Similarly, a study by Vanguard (2017) determined that in 2016, 45 percent of their plans offered automatic enrolment. If compared to a percentage of 10 in 2006, the increase is striking.

Automatic enrolment plans are a great tool to increase participation in retirement plans. However, they typically have a low and suboptimal default savings rate and people are likely to stick with that savings rate due to inertia and procrastination (Benartzi and Thaler, 2007). In his study, Blanchett (2017) points out that 49 percent of plans being studied adopt a 3 percent default savings rate, which is relatively low. One way to make up for this flaw and increase contributions is to increase the default savings rate. Beshears et al. (2009) had already emphasized that individuals are likely to accept the default savings rate regardless of the level and thus, Blanchett (2017) stresses that a minor change in the plan design such as that of increasing the default savings rate could have a major impact on individuals' savings level. In order to increase employees' savings level, Blanchett (2017) suggests adopting an aggressive default savings rate, at best 6 percent and virtually 8 or 10 percent.

Another way to increase contributions to retirement plans are features such as automatic escalation and the Save More Tomorrow program. Recently, Blanchett (2017) has confirmed the findings of the previous studies by Benartzi and Thaler (2004) on the impact of the Save More Tomorrow program. Particularly, he emphasizes the fact that the difference in savings

rate growth over time is remarkable when comparing plans that offer automatic escalation to plans that do not offer automatic escalation (Figure 3.5).



**Figure 3.5: Impact of automatic escalation on saving rates over time**

**Source: Blanchett (2017)**

Benartzi and Thaler (2013) conducted a study in order to evaluate whether automatic escalation actually increased retirement savings. They found that the program has in fact a remarkable effect. Assuming an average \$60,000 annual compensation and an increase of 3 percent in deferral rates, they found out that thanks to automatic escalation, annual savings increased by \$7.4 billion. Nowadays, 51 percent of employers offer plans with automatic escalation features or offer the Save More Tomorrow program (Thaler, 2015). In the coming years, the challenge will be that of increasing the utilization of this program. One suggestion could be that of using auto escalation in conjunction with auto enrolment, making auto escalation the default (Benartzi and Thaler, 2013; Shagrin, 2016).

In recent years, the idea that every American worker should have access to a payroll deduction-based kind of plan has taken hold. In this purpose, the Obama Administration proposed a program labelled “auto-IRA”. According to this program, employers with more than 10 employees that do not offer a retirement plan have to automatically enrol their employees in an IRA account (John, 2010; Benartzi and Thaler, 2013). As with other automatic features, employees can choose to opt-out, to save more or less and they can change the investment fund at any time. Auto-IRAs come as a practical and simple solution to a serious problem and the main target of this program are especially low and middle income families that find it hard to save (Iwry and John, 2009). The program has helped giving access to retirement accounts to 13 million people in five different states (i.e. almost 1/4 of the US population that lack a retirement

account) (Jamieson, 2017; Muro, 2017). If combined with auto-escalation, the new program could have had a great potential (Benartzi and Thaler, 2013). Nonetheless, the Trump administration has recently managed to repeal the rule that allowed auto-IRAs (Jamieson, 2017).

# CONCLUSION

On the one hand, demographic changes are posing a serious threat on the American pension system. The “aging society” phenomenon ensures that people have to save up money for additional years of retirement while at the same time, given the low fertility rates, it lowers the benefits available at retirement. On the other hand, in the last decade the American private pension system has experienced a move away from defined-benefit pension plans to defined-contribution pension plans. The transition from paternalistic DB plans to DC plans has shifted investment risk from firms (i.e. the corporate sector) to each employee. Nowadays in the U.S., responsibility to save enough money and appropriately invest it relies heavily on each individual.

According to standard economic theories (e.g. those developed by Modigliani and Friedman), the current retirement savings environment should not be considered a problem. Indeed, consumers are rational individuals that do not need any help because they are able to solve an optimization problem, make the right intertemporal choices as regards consumption and saving and preserve those choices in time.

However, when compared to evidence, theory does not hold anymore. Many studies and surveys point out that individuals are not saving enough and at the same time, many individuals themselves state that they face some difficulties in saving and planning for retirement. In this purpose, behavioural economists have started questioning standard economic theories. They combine finding from economics and psychology with the purpose of improving empirical projections and policy decisions. Behavioural economists believe in boundedly rational individuals that lack the necessary information to make optimal decisions. When faced with difficult decisions, individuals simply adopt rules of thumbs or heuristics and this is why they incur in systematic cognitive biases that affect their capability to make informed and optimal decisions. A line of thought that aims to exploit individuals’ biases in order to help them in making the right and preferred decision (i.e. to nudge people) is labelled as “Libertarian Paternalism” and it has its roots in Thaler and Sunstein (2008) work.

In the saving context, two main policy tools have been developed and tested by behavioural economists in order to help people boosting retirement savings: automatic enrolment and the Save More Tomorrow program. The results of these studies have been striking, with people

joining pension plans sooner and more people joining pension plans eventually. More recently, other behavioural economic policies have been proposed. The results have been less impressive but still interesting. However, further research is needed in order to prove their wider and concrete applicability.

Nowadays, more and more employers are adopting and offering automatic enrolment plans. However, given the low default rates (i.e. usually 3 percent) of most of these plans and the reluctance and inertia of employees to increase their contribution above the default level, the potential to increase retirement savings is still a utopia. In the years ahead, the challenge will be that of rising the default savings rate of automatic enrolment plans while continuing to increase the percentage of employers that offer these plans. On top of that, since auto-escalation plans have proven to be great tools to increase contribution rates, their utilization has to be increased. One way could consist in adopting auto escalation as the default. Lastly, in an attempt to make saving for retirement available also to people who did not have access to employer-sponsored plans, the Obama Administration has applied auto-enrolment to IRAs. Wider availability of retirement plans could have had a great impact on the savings' level of the economy. Nonetheless, the Trump administration has managed to dismantle the policy and take a step back on building retirement security.



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*“Choose your team carefully.  
So much of your success is due to the people who you surround yourself with.  
Your friends, your family, and the people that you work with. They all play an  
important role in inspiring you and supporting you and giving you stability.  
These are the people in your life who will be honest with you”*

*Tom Ford*

First and foremost, I would like to thank my grandfather Elio and my cousin Diego together with Dorothee. Thank you for being my life models, my inspiration and those that have taught me the art of living. This achievement would not have been the same without your support, even though the physical distance between us has sometimes made things tougher. In particular, thanks to Diego for having become a valuable economist in my support throughout the writing of this dissertation.

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