

**IBN HALDUN UNIVERSITY
SCHOOL OF GRADUATE STUDIES
DEPARTMENT OF ECONOMICS**

MASTER THESIS

**ANALYSIS OF THE PRECAUTIONARY SAVING
MOTIVE USING INCOME RISK AS A MEASURE OF
UNCERTAINTY: EVIDENCE FROM TURKEY**

LAMIN DIBBA

THESIS SUPERVISOR: ASSIST. PROF. ŞERİFE GENÇ İLERİ

ISTANBUL, 2020

**IBN HALDUN UNIVERSITY
SCHOOL OF GRADUATE STUDIES
DEPARTMENT OF ECONOMICS**

MASTER THESIS

**ANALYSIS OF THE PRECAUTIONARY SAVING
MOTIVE USING INCOME RISK AS A MEASURE OF
UNCERTAINTY: EVIDENCE FROM TURKEY**

by

LAMIN DIBBA

**A thesis submitted to the School of Graduate Studies in partial
fulfillment of the requirements for the degree of Master of Arts in
Economics**

THESIS SUPERVISOR: ASSIST PROF. ŞERİFE GENÇ İLERİ

ISTANBUL, 2020

APPROVAL PAGE

This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Arts in Economics.

Thesis Jury Members

Title - Name Surname	Opinion	Signature
_____	_____	_____
_____	_____	_____
_____	_____	_____

This is to confirm that this thesis complies with all the standards set by the School of Graduate Studies of Ibn Haldun University.

Date of Submission

Seal/Signature

ACADEMIC HONESTY ATTESTATION

I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

Name Surname: Lamin Dibba

Signature:

A handwritten signature in black ink, appearing to be 'Lamin Dibba', written in a cursive style.

ÖZ

BELİRSİZLİK VE İHTİYAT GÜDÜSÜYLE TASARRUF ANALİZİ: TÜRKİYE ÖRNEĞİ

Yazar Dibba, Lamin

İktisat Yüksek Lisans Programı

Tez Danışmanı: Dr. Öğretim Üyesi Şerife Genç İleri

Haziran 2020, 81 Sayfa

İhtiyat güdüsüyle tasarruf, tüketicilerin gelecekteki gelir belirsizlikler veya beklenmedik olaylar nedeniyle gelecek gelirlerinin düşmesine karşı önlem almak niyetiyle para veya varlık biriktirmesi olarak tanımlanmaktadır (Warneryd, 1999; Keynes, 1936). Bu tezin amacı Türk hanehalkının ihtiyat güdüsüyle tasarruf edip etmediğini araştırmaktır. Araştırmayı yürütmek için, 2011 ile 2017 yılları arasındaki Türk Hanehalkı Bütçe Anketi veri setini kullanarak sentetik veya sanal panel veriyi oluşturmaktayım. Ayrıca, sentetik kohort analizini yaparak gelir artışı varyansı ile tasarruf ve toplam net varlık arasındaki ilişkiyi incelemekteyim. Böylece, gelir artışı varyansı, gelir riskini ölçen bir değişken olarak kullanarak en küçük kareler yöntemiyle gelir artışı varyansının tasarruf ve toplam net varlık üzerindeki etkisini incelemekteyim. Bulgularına göre, gelir artışı varyansının hem tasarruf hemde toplam net varlık üzerindeki etkisi pozitif olup Türk hanehalkının ihtiyat güdüsüyle tasarruf ettiğini kanıtlamaktadır.

Anahtar Kelimeler: Doğum Yılı Aralığı, Kohort, Hanehalkı Geliri, İhtiyati Tasarruf, Sentetik Panel Veri, Gelir Belirsizliği

ABSTRACT

ANALYSIS OF THE PRECAUTIONARY SAVING MOTIVE USING INCOME RISK AS A MEASURE OF UNCERTAINTY: EVIDENCE FROM TURKEY

Student Name Dibba, Lamin

MA in Economics

Thesis Supervisor: Assist. Prof. Şerife Genç İleri

June 2020, 81 Pages

The precautionary saving motive is when consumers save money or accumulate more wealth to insure themselves against future income uncertainties or unforeseen events which may lead to any unexpected decrements in their future income (Warneryd, 1999; Keynes, 1936). This thesis aims to investigate the precautionary saving motive of Turkish households. I investigate this issue by constructing a pseudo panel data set from the Turkish Household Budget Survey data between 2011 and 2017. Then, I conduct a cohort-level analysis and explore the relationship between the variance of income growth and saving as well as total net-worth. So I use the variance of income growth as my measure of income risk and apply a pooled OLS regression to determine the impact of income growth variance on saving and total net-worth. The results show a positive impact of the variance of income growth on saving and total net-worth, thereby leading me to conclude that there is a precautionary saving motive among Turkish households.

Keywords: Birth-year Interval, Cohort, Household Income, Precautionary Saving, Pseudo Panel Data, Income Uncertainty

DEDICATION

It is dedicated to my mom, dad, and siblings.

ACKNOWLEDGEMENT

I would like to, first of all, thank Allah for keeping me healthy and for giving me the patience, resilience, and the strength to prepare this thesis. I also send my utmost appreciation to my thesis supervisor Dr. Şerife Genç İleri for her enormous intellectual support, guidance, assistance, encouragement.

Lamin DIBBA
ISTANBUL, 2020

TABLE OF CONTENTS

ÖZ	iv
ABSTRACT	v
DEDICATION	vi
ACKNOWLEDGEMENT	vii
TABLE OF CONTENTS	viii
LIST OF TABLE	ix
LIST OF FIGURES	x
LIST OF SYMBOLS AND ABBREVIATIONS	xi
CHAPTER I INTRODUCTION	1
1.1. Household Saving in Turkey	4
1.2. Precautionary saving	5
CHAPTER II LITERATURE REVIEW	7
2.1. Determinants of Saving	7
2.2. Unemployment Risk, Job-Loss Risk, and Precautionary Saving	11
2.3. Consumption Risk and Precautionary Saving	13
2.4. Income Risk and Precautionary Saving.....	15
CHAPTER III THEORETICAL FRAMEWORK	21
CHAPTER IV EMPIRICAL FRAMEWORK	29
4.1. Data Description.....	29
4.2. Methodology	32
4.2.1. Construction of the Sample	34
4.2.2. Empirical Models	40
4.3. Empirical Results	44
CHAPTER V CONCLUSION	54
REFERENCES	56
APPENDIXES APPENDIX 1	63

APPENDIX 2.....	69
APPENDIX 3.....	75
CURRICULUM VITAE.....	81

LIST OF TABLES

Table 4.1. Data Description	32
Table 4.2. Cohort Cell Sizes with Respect to the Survey Years	35
Table 4.3.1. OLS Regressions for the Whole Sample.....	47
Table 4.3.2. OLS Regressions for Retirees	49
Table 4.3.3. OLS Regressions for Mature Workers.....	50
Table 4.3.4. OLS Regressions for Young Workers	53
Table A1.1. Descriptive Statistics for Cohort 1 (1938 - 1942)	63
Table A1.2. Descriptive Statistics for Cohort 2 (1943 - 1947)	63
Table A1.3. Descriptive Statistics for Cohort 3 (1948 - 1952)	64
Table A1.4. Descriptive Statistics for Cohort 4 (1953 - 1957).....	64
Table A1.5. Descriptive Statistics for Cohort 5 (1958 - 1962)	65
Table A1.6. Descriptive Statistics for Cohort 6 (1962 - 1967)	65
Table A1.7. Descriptive Statistics for Cohort 7 (1968 - 1972)	66
Table A1.8. Descriptive Statistics for Cohort 8 (1973 - 1977)	66
Table A1.9. Descriptive Statistics for Cohort 9 (1978 - 1982)	67
Table A1.10. Descriptive Statistics for Cohort 10 (1983 - 1987)	67
Table A1.11. Descriptive Statistics for Cohort 11 (1988 - 1992)	68
Table A3.5. Regression results from Ceritoglu's (2017) model.....	80

LIST OF FIGURES

Figure 3.1. Graphical Representations of Precautionary Saving (Baley, 2016).....	28
Figure A2.1. Graph of Cohort Income and Cohort Saving for Cohort 1.....	69
Figure A2.2. Graph of Cohort Income and Cohort Saving for Cohort 2.....	69
Figure A2.3. Graph of Cohort Income and Cohort Saving for Cohort 3.....	70
Figure A2.4. Graph of Cohort Income and Cohort Saving for Cohort 4.....	70
Figure A2.5. Graph of Cohort Income and Cohort Saving for Cohort 5.....	71
Figure A2.6. Graph of Cohort Income and Cohort Saving for Cohort 6.....	71
Figure A2.7. Graph of Cohort Income and Cohort Saving for Cohort 7.....	72
Figure A2.8. Graph of Cohort Income and Cohort Saving for Cohort 8.....	72
Figure A2.9. Graph of Cohort Income and Cohort Saving for Cohort 9.....	73
Figure A2.10. Graph of Cohort Income and Cohort Saving for Cohort 10.....	73
Figure A2.11. Graph of Cohort Income and Cohort Saving for Cohort 11.....	74
Figure A3.1. Graph of Cohort Income and Cohort Net-worth for Cohort 1.....	75
Figure A3.2. Graph of Cohort Income and Cohort Net-worth for Cohort 2.....	75
Figure A3.3. Graph of Cohort Income and Cohort Net-worth for Cohort 3.....	76
Figure A3.4. Graph of Cohort Income and Cohort Net-worth for Cohort 4.....	76
Figure A3.5. Graph of Cohort Income and Cohort Net-worth for Cohort 5.....	77
Figure A3.6. Graph of Cohort Income and Cohort Net-worth for Cohort 6.....	77
Figure A3.7. Graph of Cohort Income and Cohort Net-worth for Cohort 7.....	78
Figure A3.8. Graph of Cohort Income and Cohort Net-worth for Cohort 8.....	78
Figure A3.9. Graph of Cohort Income and Cohort Net-worth for Cohort 9.....	79
Figure A3.10. Graph of Cohort Income and Cohort Net-worth for Cohort 10.....	79
Figure A3.11. Graph of Cohort Income and Cohort Net-worth for Cohort 11.....	80

LIST OF SYMBOLS AND ABBREVIATIONS

ARMA	Autoregressive Moving Average
GDP	Gross Domestic Product
GNP	Gross National Product
ID	Identity
LREPP	Log of Relative Equivalent Precautionary Premium
LVARLY	Log of the Variance of the Log of Income
Max.	Maximum
NHNBW	Non-Housing Non-Business Wealth
NW/TNW	Net Worth/Total Net Worth
OECD	Organization for Economic Co-operation and Development
OLS	Ordinary Least Squares
Ph.D.	Explanation of Symbols and Abbreviations
TURKSTAT	Turkish Statistical Institutes
uniedu	University Education
U.K.	United Kingdom
U.S./U.S.A.	United States/United States of America
Var.	Variance
FED	The Federal Reserve
Cons.	Consumption

CHAPTER I

INTRODUCTION

There are various definitions of saving in the literature. Lugilde, Bande, & Riveiro (2018) define saving as “the way to optimally allocate life-long income to a life-long consumption.” According to Dovbrovolsky (1951), it is “the difference between income and consumption.” Also, Williamson’s (2018) definition of saving is similar to that of Dovbrovolsky. Based on his definition saving is “the portion of income not spent on current consumption expenditure.”

In the literature, saving is divided into three main components, namely, private saving, government saving, and national saving. Private saving refers to saving at the household level or saving done by the private sector. It is the difference between the disposable income of a consumer and his or her consumption expenditure. The disposable income consists of components such as the total worth of finished goods and services manufactured within a country at a specific point in time (GDP), supports from the government, the amount of interest paid by the government for taking a loan from private citizens or firms, net overseas factor income (the difference between factor income received from abroad and factor income sent abroad), and taxes levied by the government. Saving is calculated by adding all the aforementioned components (except taxes) together and subtracting taxes and consumption from the added amount. It might also be added that GDP is the sum of consumption, investment, government expenditure, and net exports (Williamson, 2018).

Government saving on the other hand is the amount that remains after transfers, interest paid by the government, and government expenditure have been deducted from the tax revenue. If the remaining amount is positive, then the government is said to have surplus; however, if it is negative, the government is said to have a deficit. The government’s only source of finance or spending, for simplification

purposes, is the tax revenue it collects from the private sector. So the more tax revenue the government collects, the more spending it can make (Williamson, 2018).

The last but not the least type of saving is national saving, and it refers to the savings of the whole nation. In other words, it is the sum of savings done by the private sector and the government sector (private saving plus government saving). In detail, it is the amount that remains after subtracting consumption expenditure and government expenditure from the gross national output. It should be stated that gross national output is the sum of GDP and net overseas factor income (Williamson, 2018). Having defined different types of savings, we will focus on the savings of households. Households save a certain portion of their income due to various reasons or motives. 4 major saving motives have been frequently touched upon; however, it should be noted that these saving motives are not completely independent of one another. People could save for more than one reason at a point in time (Warneryd, 1999).

One of the four major saving motives is the precautionary motive for saving. It is the kind of saving motive in which the consumers save money or accumulate more wealth to insure themselves against future income uncertainties or unforeseen events which may lead to any unexpected decrements in their future income (Warneryd, 1999; Keynes 1937). Keynes (1937) terms precautionary motive for saving as a way to protect oneself in light of future unexpected circumstances whereas Lugilde, Bande, & Riveiro (2018) define it as “A positive extra savings generated by uncertainty on future income.” Precautionary saving also extends to uncertainty about life-span. For instance, Abel (1985) explains the motive behind precautionary saving by giving an example about a person’s inability to know for sure when he or she will die and his or her tendency to save because of the uncertainty which lies ahead. As a result, he or she will resort to saving for an uncertain future so that when death takes longer than anticipated, the saved sum can be used to smooth expenditure.

Another saving motive mentioned in the literature is the life-cycle motive. This motive refers to the “willingness” of individuals to save money to use during their

retirement. Saving for other anticipated occasions like buying a house, marriage ceremonies, naming ceremonies, education, as well as saving for children (unborn or otherwise) are also included as part of life-cycle saving (see Modigliani & Brumberg, 1954; Modigliani, 1986). Modigliani & Brumberg (1954) show that retirement saving is among the top priorities among the United States households and that the amount saved for retirement is positively correlated with certain age levels. Retirement saving mostly starts when an individual is young and of working age and ceases when an individual is old and has stopped working (Modigliani & Brumberg, 1954; Deaton, 2005).

Bequest motive is also another form of saving motive, and Friedman (1957) is one of the first to formally express it as a motive which is driven by a person's desire to set aside some fund for the family, relatives, and friends after his or her passing. Bernheim (1991) examines U.S. households and tries to identify their bequest motive for saving. His study reveals significant presence of bequest motive. Abel (1985) also shows the existence of bequest motive for saving; however, he called it "accidental bequest", and his reason for such naming was based on the logical analysis that when people save because they are not certain about when they would die, in as much as it is true that they may live longer than anticipated, they may also get to live shorter than anticipated. If the latter happens, they accidentally leave some funds behind which are given to their close relatives and friends as an inheritance.

The fourth saving motive is the inter-temporal saving motive, and it is the type consumers engage in, intending to make a profit or more money. That is to say, consumers save money for the purpose of investing it and earning extra wealth or interest on saving. This topic is first brought to light by Fisher (1930) while examining the role of interest rates in determining investment. In his view, the inter-temporal saving motive arises when a consumer, who receives more money than he or she needs to cover current consumption expenditure, saves money with the intention of investing it when interest rate rises so as to earn more returns. Keynes (1937 p.107) refers to this form of saving motive as 'calculation' and also explains it as saving to attain a profit. He further expresses that consumers with inter-temporal saving motive prefer more future consumption as opposed to present consumption.

Another term he coined for keeping money to earn a profit is ‘speculation’. According to him keeping money for speculative reason is “the object of securing profit from knowing better than the market what the future will bring forth.” (Keynes, 1937 p.166).

This thesis aims to investigate the existence of a precautionary saving motive among households in Turkey at a micro-level. The reason is that precautionary saving greatly affects household savings in a number of developed countries such as the Netherlands, Sweden, and the U.S.A., etc. For instance, Kotlikoff (1989); Katona (1975) each conclude in their research that precautionary saving motive is one of the major motives behind household saving in the U.S.A. Moreover, according to Alessie, Lusardi, & Aldershof (1997), a large number of households in the Netherlands engage in saving to insure themselves against future income uncertainties, and the same goes for Sweden (Lindqvist, Julander, & Fjaestad, 1978). As such, I try to find out if a similar incentive exists for Turkish households, too. An examination of the precautionary saving motive of Turkish households is of interest since the total private savings in the economy have remained low during the last 20 years. According to the 2011 synthesis report of World Bank on sustainable growth in Turkey, domestic saving on average declined from 23.5 percent (% of GNP) to 17 percent between 2000 and 2008. In 2010 however, it decreased all the way down to 12.7 percent. These reductions in domestic savings were mainly due to the reduction in private saving which began after 2001. The decline in private saving was also due to factors such as the improvement of the Turkish credit system, etc. The Turkish economy after the 2001 crisis underwent structural reforms that improved the country’s economic conditions; however, due to other factors such as unstable income sources, unemployment risk, and health risk, etc., precautionary saving among Turkish households is rather significant (World Bank, 2011).

1.1. Household Saving in Turkey

Household saving refers to “a postponed current consumption to future consumption and it is the difference between household disposable income and household consumption expenditure.” In other words, households decide not to spend all of

their disposable income on current consumption expenditure and keep part of the income for their future consumption expenditure. There are two types of household saving. The first one is the difference between household disposable income and consumption expenditure (on durable and non-durable goods). The other type is the difference between household disposable income and consumption expenditure on non-durable goods only, and consumption on durable goods, in this case, is included in saving. According to the 10th development plan of the Turkish Ministry of Development, there had been a decrease in both types of saving from 2003 to 2008, and both recorded their lowest in the year 2008. However, savings in which consumption on durable goods is treated as consumption expenditure recorded its highest in 2003, and the type of saving which includes consumption on durable goods recorded its highest in 2004 (Ministry of Development, 2014).

1.2. Precautionary saving

My main goal is to test whether or not Turkish households engage in precautionary saving. To explore this, I investigate how Turkish households behave as their disposable income levels become uncertain.

Turkish Ministry of Development published a report which includes important observations about Turkish households' saving behavior. According to this report, precautionary saving among households in Turkey has been shown to be of importance. The level of precautionary saving in Turkey, however, is determined by certain factors such as being an employer or a sole proprietor, an aging population with green card, and the job sector. Business or company owners who are risk-averse tend to save more in order to ensure their businesses and families against future income risks. If a particular household's head is a business or company owner whose business flourishes, that household's precautionary saving is usually high (Ministry of Development, 2014).

It is also stated in the report that households which consist of aging members who do not have health insurance usually engage in more precautionary saving against the increasing health risks and health expenses as opposed to households whose aging

members have strong health insurance coverage. On the other hand, aging members with old-age benefits, health benefits, or retirement benefits could help reduce a particular household's level of precautionary saving. Also, low income or average income level households that do not have the green card (this card enables households to benefit from health services for free.) engage in precautionary saving more than households who have the green card. Private sector workers in Turkey do not usually have as much assurance as to the public sector workers when it comes to job security. This is why private-sector workers engage more in precautionary saving than public sector workers (Ministry of Development, 2014).

My empirical analysis regarding Turkey indicates that precautionary saving exists among Turkish households between the periods 2011 and 2017. My findings coincide with the findings of Hahm & Steigerwald (1999); Lusardi (1997); Guariglia (2003); Menegatti (2010); Mody, Ohnsorge, & Sandri (2012); Carroll & Samwick (1998); Ceritoglu (2013, 2018), etc. Moreover, precautionary saving behavior in Turkey is manifested not only among the people in the labor force but also among retired people who are expected to be consuming their retirement savings. However, in Ceritoglu (2018), households whose heads are in the labor force, only, exhibit precautionary saving behavior. Such differences in our findings could be because of the different measures of income risk used.

This thesis is divided into 5 chapters. The first chapter entails the introduction which sheds light on the general definitions of saving, saving motives as well as household saving and precautionary saving in Turkey. The second chapter gives a comprehensive literature review on the macro and micro determinants of saving and a comprehensive literature review on the precautionary saving motive. Chapter three talks about the theoretical framework of precautionary saving; chapter four explains the empirical framework of the thesis which includes the methodology I follow and the empirical results obtained. Then in chapter five, I give conclusions regarding my findings on the precautionary saving motive in Turkey.

CHAPTER II

LITERATURE REVIEW

2.1. Determinants of Saving

The determinants of saving are the factors that determine how much money consumers are willing to save at a point in time. There are both macro and micro determinants of saving. Macro determinants of saving, listed in the literature, include real interest rate, inflation, GDP or GNP growth rate and volatility, political unrest, foreign loan, etc. and the micro determinants consist of household disposable income growth and volatility, age, gender, education, house ownership, etc. One of the determinants is the growth rate of income, and its impact on saving has been analyzed both at the macro and micro levels. For instance, Modigliani & Brumberg (1954) show that at the macro level, a nation's saving is determined by its GNP growth rate. At the micro-level too, their work indicates that an increase in individuals' saving is also due to a rise in the growth rate of their income. Moreover, Mahzan & Victorian (2013) show in their study that as the disposable income of families rises, so do their savings. Perry & Morris (2005) also confirm the same result that income growth leads to increased household savings, and they further indicate that this is even frequent among rich households as they not only save but also invest to accumulate wealth. Also, Ceritoglu (2018) shows empirically that Turkish households (rural or urban) increase their saving as their income growth rate and aggregate income growth rate rise, and according to Carroll & Samwick (1998) there exists a positive relationship between income growth and wealth accumulation, at the micro-level.

Another determinant of saving is the growth rate of income volatility. At the macro level, as GDP growth rate increases, aggregate saving increases, too. For example, Menegatti (2010); Mody, Ohnsorge, & Sandri (2012) show proof of this by conducting a macro-level analysis of whether or not aggregate saving increases due

to a rise in the volatility of GDP growth rate, and they find positive relationships between the two. The growth rate of household income volatility also has a positive impact on household savings or wealth accumulation. This happens when households' level of certainty regarding their future income is on a decreasing trend. Consequently, risk-averse households resort to saving or accumulate more wealth as opposed to when the uncertainty level is lower (Hahm & Steigerwald, 1999; Lusardi, 1997; Guariglia, 2003). Furthermore, Carroll & Samwick (1998) analyzed the level of different components of precautionary wealth and how they changed with respect to uncertainty. They conclude that as the volatility of income growth rate increases, so does the precautionary wealth.

The other determinant of saving is the real interest rate. It is a macro determinant of saving and it plays a major role in determining the price of future consumption in relation to the price of current consumption. For a non-borrower, a rise in the real interest rate has two separate effects on saving. These are the "substitution effect" and "income effect". For the "substitution effect", a rise in the real interest rate translates into increased profit from saving since tomorrow's consumption becomes cheaper than today's consumption. Consequently, today's consumption drops causing saving to increase. In the case of the "income effect", a rise in the real interest rate can lead to a low level of saving or a high level of saving based on a person's preference or the strength of income effect over substitution effect. Since the returns on saving increase with a rise in real interest rate, a person's desired future consumption bundle can be achieved even after decreasing his or her saving and increasing his or her current consumption to a certain level. So as far as the income effect is concerned, saving can increase or decrease as real interest rate rises (Williamson, 2018; Edwards, 1996). Also, both negative and positive impacts of the real interest rate on saving exist in the empirical literature. For instance, while Balassa (1990) shows a positive relationship between real interest rate and saving, Thanoon & Baharumshah (2005), on the other hand, show a negative relationship between the real interest rate and saving.

Borrowing constraints or limited foreign loans is also another factor that affects saving. An economy in which borrowing is limited tends to have more domestic savings than the economy in which individuals and firms have access to unlimited

loans from domestic or international sources. One reason for this is because consumers with no borrowing constraints whatsoever tend to save less in the current period as they can always gain financial support to take care of their consumption expenditures when they run out of money by borrowing from their lenders. On the other hand, consumers who depend only on their income tend to save more. The same case applies to economies that cannot obtain loans from their counter-parts (see Van Rijckeghem & Ucer, 2009; Ozcan, Günay, & Ertac, 2003). Additionally, a government's imposition of direct income taxes on its citizens harms their private savings. This is because increasing income or wealth tax leads to a fall in both the financial assets of firms and the disposable income of individual consumers. Consequently, domestic saving falls (Edwards, 1995). Inflation rate and political unrest also affect saving. For instance, Van Rijckeghem & Ucer (2009) study the association between the inflation rate and private saving, their finding indicates a positive association. There's also a positive association between political unrest and private saving.

Age also plays a role in determining the level of saving individuals or households undertake. An economy that has more of a young and mature working population tends to save more compared to an economy with more young and retired populations who can't work. This is because the young and mature working populations save more compared to the non-working population of young citizens and retirees (Edwards, 1995). Modigliani & Brumberg (1954) also come up with similar findings by showing a positive relationship between certain ages and saving in their study. Due to the retirement saving motive, most young people start saving while young and of working age and stop saving when they grow old and stop working (Modigliani & Brumberg, 1954; Deaton, 2005).

Another determinant of personal or household saving is the size of a household. In other words, saving depends on the number of individuals that dwell in a household. However, this is true mostly for developed countries. For example, while Cornia & Jerger (1982) find no significant positive relationship between family size and saving for third world countries, they find the opposite for developed countries. In addition, families in the U.S. with many kids tend to have lower savings due to their high level of consumption expenditures (Carroll & Samwick, 1998). Tansel (1992) also

examined the relationship between the growth of population and saving and found that the size of a household did not have any significant effects on saving among Turkish households between 1964 and 1965. Ceritoglu (2013) also highlights the need to take into account the size of a household to estimate precisely the level of caution households take while deciding how much to save against risk or uncertainty. Based on his explanation, the larger the size of a household the more uncertainty it faces with regards to its future consumption and the more it saves.

Gender also plays an important role in determining household saving. Although both males and females can be risk-averse, females are more risk-averse and as a result, tend to save more than men especially when they have children and are faced with uncertainty. However, men are less risk-averse and prone to saving mostly when they have a family (Croson & Gneezy, 2009). If the expenditure relating to education and marriage is taken into account, being male hurts savings. However, since men get higher wages as opposed to women, they can accumulate more wealth than women and for that reason, they usually have more savings or more accumulated wealth than women have on a general basis (Bashir et. al., 2013).

Saving can also increase or decrease depending on a person's level of education. Families whose heads have attained a higher degree in education save less whereas families with heads who have secondary school certificates tend to save more (Jong-Youn Rha, Catherine & Sherman, 2006). Even though a family head with a higher degree certificate usually has a higher pay than a family head with a low level of education, the former tends to spend more and save less and the latter tends to save more and consume less. In other words, less educated family heads are more uncertain about their future income than more educated family heads and because of that, they are highly likely to save more (Kelly & Williamson, 1968; Burney & Khan, 1992). However, Cilasun & Kırdar (2009) study the relationship between education level and saving in Turkey and concludes that saving has a positive relationship with education level although to a certain limit.

Another determinant of household saving is house ownership. There is a positive relationship between house ownership and the total saving of a household. In other words, a household head that has ownership over his or her place of residence saves

more than a household head that is renting. This relationship is studied empirically by Krumm & Kelly (1989), and they reach the same conclusion as exactly mentioned above. Furthermore, the desire to own a house is a major influence on saving as people save more when they have a plan to buy a house (Ministry of Development, 2014). However, Chen, Hu, & Lin (2018b) investigates the effect of house ownership on savings and concludes that because of the decrease in uncertainty house ownership brings, people tend to save less.

Since my focus is mainly on precautionary saving motive and its relation to income uncertainty, detailed literature review on precautionary saving and different measures of income uncertainty/ risk used in the literature is also important to discuss. There is a vast literature on the precautionary motive for saving concerning developed nations like UK, U.S.A., Germany, and Italy. However, the same cannot be said for developing countries such as Turkey especially in terms of a micro-level analysis of precautionary saving motive. Based on the existing literature, there are 3 major ways to measure income uncertainty to determine the impact of precautionary saving on households' saving decisions. These three measures of income uncertainty are income variance, consumption variance, and unemployment risk. Also, the three measures of income uncertainty have been utilized both at the micro and macro levels of analysis. While macro-level analyses of precautionary saving motive relate to the association between macro-economic measures of income uncertainty and saving or net-worth, micro-level analyses focus on the relationship between microeconomic measures of income uncertainty and saving or net-worth.¹

2.2. Unemployment Risk, Job-Loss Risk, and Precautionary Saving

Most studies that employ unemployment risk (the likelihood of a family head being unemployed in the future) and/or job loss risk (the likelihood of a family head losing his/her job in the future) as a measure of income risk show that increased risk leads to increased saving. Any household head whose future probability of being unemployed is high tends to save more in order to insure him or herself against

¹ Uncertainty, risk and volatility, variability, and variance are synonymous. The most commonly applied macro-economic measures of income uncertainty in the literature are unemployment rate, GDP volatility, and GDP growth rate volatility whereas the most commonly applied micro-economic measures are household disposable income risk, consumption risk, unemployment risk and job loss.

future income loss and also to smooth the household's future consumption, and in an economy where unemployment rate increases, private saving increases as well (Modigliani & Brumberg, 1954; Ceritoglu, 2013). For instance, Bande & Riveiro (2013) conducted a macro-level study, using time series macro data on 17 regions in Spain for the period 1980 – 2007, to estimate the effects of the unemployment rate and conditional variance of output growth on saving. Their theory was that households increased their precautionary saving when uncertainty, for instance, financial crisis, increased, and their empirical results supported their theory by indicating a significant positive impact of unemployment rate and output growth risk on saving between 1980 and 2007.

At a micro level, Barcelo & Villanueva (2010) too analyzed Spanish labor markets intending to explore the links a likelihood of job loss had with wealth and consumption in Spanish households from 2002 to 2005. They employed pooled micro datasets obtained from the 2002 and 2005 surveys of wealth and consumption to explore these links and used various types of labor contracts of household heads to measure the probability of job loss. Based on their empirical findings, employees with fixed contracts had more wealth, and a high job loss risk led to reduced consumption and increased precautionary saving. In addition, Lugilde, Bande, & Riveiro (2018) used unemployment risk and job loss risk as measures of income risk and explored their relationships with the consumption level of Spanish households between 2007 and 2016. They too found a motive for precautionary saving.

Furthermore, Lusardi (1998) did a cross-sectional analysis of U.S. households by measuring the probability of job loss as a proxy for income uncertainty, and checking for its impact on wealth in 1992. Based on the empirical findings, there was a significant amount of precautionary saving among U.S. households. Engen & Gruber (2001) also used U.S. panel microdata on unemployment insurance and wealth to assess the effects of the variance of unemployment insurance benefits and unemployment risk on wealth keeping among U.S. households from 1984 to 1990. Their empirical results indicated a decrease in unemployment insurance benefits leading to a rise in financial wealth keeping and a larger increment in financial wealth keeping among workers facing higher unemployment risk thereby showing a precautionary saving motive. On the other hand, Carroll, Dynan, & Krane (2003)

conducted a research on the relationship between job loss risk and total net-worth among the U.S. households, using survey data from 1983, 1989, and 1992. Their results indicated precautionary saving only among average income households and rich families.

The relationship between precautionary saving and unemployment risk and or job loss risk has also been investigated in countries such as France, Turkey and U.K. For instance, Antonin (2020) used French household pooled microdata on approximately 13,300 households to determine the impact of unemployment uncertainty on the saving behavior of French households between 2010 and 2011. By following the permanent income theory and applying the OLS method, the empirical findings indicated a positive link between unemployment uncertainty and wealth increment thereby confirming the presence of precautionary saving which constituted 6.4% of the total savings of French households. Ceritoglu (2013) did a study regarding the relationship between labor income uncertainty and saving in Turkey between 2003 and 2009 using yearly household budget survey data. In addition to measuring the probability of a family head being unemployed in the future (unemployment risk), he also measured the probability of a family head losing his/her job in the future (job loss risk) and used these two risk terms as proxies for labor income risk. By regressing household saving on the labor income risk terms, while controlling for the social and demographic characteristics, his findings showed a positive impact of labor income risk on households' saving behavior thereby concluding that there's a motive for precautionary saving in Turkey between 2003 and 2009. Moreover, Benito (2006) tried to examine the relationship between job insecurity and consumption, using the panel microdata on U.K. households from 1991 to 1998. By conducting a maximum likelihood probit analysis on the predicted probabilities of job loss, while controlling for investment income and demographic characteristics, it was concluded that increased job loss risk for household heads led to a significant reduction in households' consumption expenditure.

2.3. Consumption Risk and Precautionary Saving

Theoretically, Abel (1985) tries to create a connection between precautionary saving and life-time consumption by using an individual consumer's uncertainty about his

or her life-span as a common factor between the two. He argues that individual consumers always desire to save due to their uncertainty about how long they would live so that in the event their actual lifespan is more than their expected lifespan, they get to spend the money saved. Empirically, Dynan (1993) conducted a test on the strength of precautionary saving among U.S. households using cross-sectional microdata of the 1985 Consumer Expenditure Survey. By regressing the variance of consumption growth on consumption growth, while controlling for the demographic characteristics, his empirical results showed evidence of a precautionary motive for saving but it was a relatively small estimate. Guariglia & Kim (2003) also used cross-sectional microdata of 1996 on Muscovite households to examine consumption variability on food and spirits as well as consumption variability on non-durables and services expenditure, and how these variances affected household saving in Moscow in 1996. Their empirical results showed that both consumption variances had a statistically significant positive impact on household saving.

Using the Dutch panel micro data on household assets and demographics, Christelis, Geogarakos, Jappelli, & Rooij (2019) conducted a micro-level analysis on the effect of consumption risk on consumption growth while controlling for demographic variables such as the age of the household head, gender of the household head, marital status of the household head, household size, and regional dummies. By applying the OLS method, robust regressions, and instrumental variables method in estimating the Euler equation for consumption, their findings showed a significant precautionary motive for saving among Dutch households from 2014 to 2015. Guariglia & Rossi (2002) also employed similar data to determine the effects lagged values of consumption and labor income uncertainty had on current consumption growth between 1992 and 1997. Their empirical findings indicated evidence of precautionary saving which confirms Geogarakos, Jappelli and Rooij's findings for Dutch households. On the other hand, Ceritoglu (2018) used repeated cross-sectional microdata, with no panel dimension, to examine the relationship between consumption growth risk and consumption growth in Turkey, in general, and also in urban and rural households as well as among retirees, young and mature working populations, in particular between 2003 and 2014. He applied the OLS regressions method, and his findings showed a statistically insignificant positive impact of consumption growth risk on consumption growth for Turkey and retirees and a

statistically significant positive impact for both urban and rural households as well as young and mature working people.²

2.4. Income Risk and Precautionary Saving

Using macro-economic variables, Hahm & Steigerwald (1999) determined the relationship between the conditional variance of labor income and consumption growth rates as well as aggregate saving rates using time series macro data on U.S. households from 1981 to 1994. They reached a conclusion that a rise in labor income risk led to increased consumption growth and aggregate saving. Another macro-level analysis of 27 advanced countries between 1980 and 2010 was carried out by Mody, Ohnsorge, & Sandri (2012), and their findings indicated that GDP volatility had a significant impact on savings thereby supporting the findings of Hahm & Steigerwald (1999). Moreover, Baiardi, Manera, & Menegatti (2013) did a macro-level analysis on whether or not financial uncertainty and environmental risk had an impact on consumption growth, by focusing on developed nations such as the U.S., U.K., Canada, France, Italy, and Spain. Their estimated results revealed a significant positive effect of financial uncertainty and environmental risk on consumption growth in these respective countries between 1965 and 2007, thereby confirming precautionary saving.

Menegatti (2007, 2010) are two panel macro studies to determine precautionary saving. In the first study, he examined the effect income risk had on consumption growth in the regions of Italy from 1981 to 2000. He used two proxies for the income risk; one was the variance of GDP growth rates and the other, conditional variance, or expectation of GDP growth rates. By regressing the average growth of consumption of each region on the variance of regional GDP growth rates as well as the conditional variance of GDP growth rates, having controlled for average GDP growth and initial GDP, he reached a conclusion that there was a positive impact of uncertainty on consumption growth hence confirming the presence of precautionary saving motive in Italian regions. The second panel data analysis was for 24 OECD countries, from 1950 to 2000. His aim, as before, was to assess the effect of income

² A positive relationship between consumption growth variance and saving, wealth or consumption growth is an indication of precautionary saving motive.

uncertainty on savings and consumption growth at a larger scale. However, his findings varied from that of his previous findings since uncertainty led to increased savings while its impact on consumption growth was ambiguous.

Aside from the macro-level analyses regarding income risk and precautionary saving, there are micro-level studies as well, both in theory and empirically. For example, Leland (1978) conducts a theoretical examination of the impact of future income uncertainty on saving by making use of the two-period consumption models. According to him assumptions such as no quadratic utility function, additive utility function, and/ or diminishing risk aversion are crucial to finding a precautionary saving motive. By introducing a risk term into a two-period consumption model and maintaining the aforementioned assumptions, his conclusion indicates that saving can increase with future income uncertainty. Also, Kimball & Weil (1992) carry out a similar study on how and to what extent risk aversion or aversion with respect to inter-temporal substitution alone affects saving under uncertainty. Based on their conclusion, risk aversion increases with saving when there is uncertainty. However, aversion in relation to inter-temporal substitution leads to a decrease in saving in the presence of uncertainty.

Empirically, Kazarosian, (1997) conducted a micro-level analysis regarding the effect of income risk on the precautionary saving motive of U.S. households, using panel microdata from 1966 to 1981. By interacting household wealth with income risk, it was concluded that increased income risk led to precautionary saving. Additionally, Carroll & Samwick (1998) used similar data on U.S. households to conduct a study on the importance of precautionary saving between 1981 and 1987. The study involved exploring the relationships between various household wealth components, and various uncertainty measures. The wealth measures are “very liquid assets (VLA)”, “non-housing non-business wealth (NHNBW)”, “total net-worth (NW)”, and the uncertainty measures are “log of the variance of the log of income (LVARLY)” and “log of relative equivalent precautionary premium (LREPP)”. Controls such as age, race, sex, marital status, number of children, education, occupation, and industry of the household heads were also accounted for. The

empirical results too indicated evidence of precautionary saving among U.S. households.

Hurst, Lusardi, Kennickell, & Torralba (2010) also conducted a panel microdata analysis on the significance of business owners as opposed to non-business owners in the U.S. on the basis of their contribution to the total wealth in the 1980s and 1990s, using labor income risk as a measure of uncertainty. The empirical results indicated evidence of precautionary saving among business and non-business owners; however, neither accounted for much. But when both groups were combined, the amount of precautionary saving from household total wealth became significantly large. In addition to income risk being used to test for a precautionary saving motive among U.S. households, Kennickell & Lusardi (2005) used several other measures of risk namely longevity risk, health risk, and business risk. They used household survey data (micro) from 1995 to 1998 and based on their findings, each of the four types of risk necessitated precautionary saving, but business risk stood out as it cause more to precautionary saving behavior than the rest.

Regarding cross-sectional analyses, Skinner (1988) used cross-sectional microdata on U.S. households to examine the impact of income uncertainty on saving between 1972 and 1973. Kopecky & Koreshkova (2014) also used similar data on U.S. households to determine the effect of different risk components such as “earnings risk” and “out-of-pocket nursing home risk” on wealth holdings among U.S. households in 2002, 2004, 2006. They all found evidence of a strong precautionary saving motive. Moreover, while Mishra & Dedah (2009) conducted a cross-sectional microdata analysis on the effect of future income uncertainty on saving among farmers in the U.S. by using wealth as a dependent variable and income risk as an independent variable while controlling for age and other socio-economic variables, thereby finding a positive relationship between income risk and wealth, Jensen & Pope’s (2004) study of 262 Kansas farms in the U.S. between the periods 1973-1999, where the impact of income variance on saving was determined, showed no

precautionary saving. Such a result might have been due to the size of data being too small.³

Also, there is a literature on the relationship between household income risk and precautionary saving in other developed nations such as France, U.K., Germany, Italy, etc. as well as developing countries such as China, etc. For example, Arrondel, (2002) used French household micro data of 10,207 observations to analyze the impact of income uncertainty on saving in the year 1997. He applied the life-cycle theory and OLS method to explore this relationship, and their results indicated the presence of precautionary saving among the households in France; however, it constituted just five percent of the total wealth accumulation.

Banks, Blundell, & Brugiavini (2001) analyzed the impact of income uncertainty on consumption growth in British households using the British household micro data sets on income, expenditure, demographic and labor market characteristics between 1968 and 1992. In order to measure income risk/uncertainty, they took the conditional variance of household income and separated it into aggregate risk, common to all cohorts, for measuring consumption risk pooling and cohort-specific risk, common to birth year cohorts, for determining precautionary saving motive, following ARMA model. The results obtained indicated evidence of significant precautionary saving but no evidence of consumption risk pooling among British households. Dardononi (1991) also used a different approach to investigate whether or not U.K. households engaged in precautionary saving in 1984. For estimation purposes, household heads were grouped with respect to their economic occupations, and the variance of their labor income levels was estimated on consumption. The empirical outcome revealed that precautionary saving constituted more than half of the percentage of household savings in the U.K. Moreover, Guariglia (2003) used U.K. panel microdata on households to examine the effect of households' earnings variability on saving between 1991 and 1998, inclusive. He applied three different measures to estimating earnings variability namely the probability of job loss, income variance, and variance of income growth rate. His findings coincided with that of Banks, Blundell, & Brugiavini (2001) and Dardononi (1991).

³ A positive relationship between income risk and saving or wealth is an indication of precautionary saving motive.

Furthermore, Kolerus, Koske, & Hufner (2012) used German micro-level household data to test how income variability affected precautionary savings among German households between 1991 and 2008. By multiplying the risk aversion term with the variance of household income and regressing it on the savings rate, while controlling for demographic variables, the results showed that risk-averse households who are faced with more future income uncertainty saved more, thereby confirming precautionary saving.

As for Italy, Deidda (2013) examined the relationship households' choice of asset portfolio had with the motive for precautionary saving in 2002, using the Italian cross-sectional survey data. He hypothesized that an increase in the number of risky assets in a household's asset portfolio would increase the households' motive for precautionary saving. The empirical results proved his theory correct by indicating a significant negative relationship between the amounts of precautionary saving households were willing to make and the level of riskiness of the asset portfolios. Lusardi (1997) too conducted micro-level cross-sectional data analysis on the impact of the variance of income on wealth accumulation among Italian households in 1989. He used OLS regressions and instrumental variables estimates, and based on his findings, precautionary saving constituted just 3% of total wealth accumulation in Italian households when estimated with OLS. However, the rate was between 20% and 24% when estimated with the instrumental variables estimates.

Regarding developing countries, Chamon, Liu, & Prasad (2013) worked on trying to understand the reason behind China's increased household saving, using the Chinese household panel micro dataset from 1989 to 2009. They followed the theory of buffer stock model to estimate the variance in Chinese urban household income as a proxy for uncertainty. They also took into account changes in the pension systems made during the 1990s, and based on their empirical outcome, variance in the urban household income and pension changes resulted in an approximately 67% increment in the saving rate of Chinese urban settlers.

My contribution to the literature, concerning Turkey, is in two aspects which are, time frame, and methodology. Regarding the precautionary saving motive in Turkey,

only Duygan-Bump (2006) analyzed the impact of uncertainty on durable goods purchases during the 1994 crisis in Turkey.⁴ Moreover, Ceritoglu (2013) covered periods 2003-2009 in his analysis of precautionary saving, and Ceritoglu (2018) covered 2003-2014 in his analysis of “self-insurance and consumption risk-sharing”. However, none of these three articles captured the periods 2015, 2016, and 2017, which I have captured in this thesis. In terms of methodology, I mostly adopt the method employed by Ceritoglu (2018) as he used household budget survey data to construct a pseudo panel, which I have also done. However, he regressed consumption growth on the variance of consumption growth, whereas I regress saving and total net-worth on the variance of disposable income growth to show evidence of precautionary saving among Turkish households.

The period covered in this study is interesting since it corresponds to the second phase of the aftermath of global financial crisis for emerging economies where expectations of a slow down in the capital flowing into these economies started rising after Ben Bernanke had announced that the FED would slow down its bond purchases. The so-called “taper tantrum” period implied the beginning of tighter monetary policy by FED, which was expected to reverse the capital flows to emerging economies. Turkey being one of the economies receiving huge capital inflow was to be affected by this announcement. In addition, there were increased use of macroprudential policies in Turkey to control the credit growth rate in the country which jumped up to high levels in the aftermath of the global financial crisis. These issues arising at the global and country level might have affected household’s future income risk as well as their perceptions about how much to save for rainy days. Therefore it is important to explore this period using an alternative measure of risk and compare the results with similar studies on Turkey.

⁴ Durable goods purchase is sometimes seen as a form of saving. See (Duygan-Bump, 2006) for more on this.

CHAPTER III

THEORETICAL FRAMEWORK

Before examining empirically the precautionary saving motive, it is useful to provide the theoretical framework for precautionary saving. In this theoretical framework, I follow Modigliani & Brumberg's (1954) life-cycle model to show evidence of a precautionary saving motive in a "two-period consumption model". Firstly, let's suppose that we are examining a single individual consumer, in a "closed-economy" with no tax system, who is both prudent and risk-averse and he or she is faced with a utility function from a single consumption good and a budget limit which is dictated by his or her current and future consumption, c_2 and c_3 , respectively, as illustrated in equations (3.1) to (3.3) just like in Leland (1978); Dreze & Modigliani (1972); Lugilde, Bande, & Riveiro (2018), among others.

The individual consumer's only aim is to maximize the utility function in equation (3.1), which is driven by preference, not the resources at his or her disposal, and the preference is also guided by three basic features. One of the features is that the individual consumer always chooses more of the consumption good than less of it. The other feature is that the individual consumer prefers a consumption level that is as smooth as possible; that is, both current and future consumptions should not be very different from each other. That way, consumption follows a "steady-state" pattern whereas income is volatile which basically means income is more volatile than consumption, making it possible for the consumer to have positive savings. The third feature is that an increase in the lifetime resources of the individual consumer should lead to an equal increase in both the current and future consumption. This means that the individual consumer is not only focused on the present utility gained from his or her current consumption but also on the future utility to be gained from his or her future consumption ("lifetime perspective") (see Modigliani & Brumberg, 1954; Williamson, 2018).

$$\mathbf{Max.} \quad U(c_2) + \beta E[U(c_3)] \quad (3.1)$$

Subject to the budget constraint:

$$c_2 = I_2 - S_3 \quad (3.2)$$

$$c_3 = AS_3 + I_3 \quad (3.3)$$

Where $U(c_2)$ is the utility obtained from current consumption, $\beta = 1/(1 + b)$ represents the discount factor, $U(c_3)$ is the utility derived from future consumption, in equation (1), and while I_2 represents the current income or net-worth, S_3 is saving in equations (3.2) and (3.3). As for equation (3.3) again, $A = (1 + a)$ is the interest rate factor, and I_3 is the future income or net-worth.⁵ It's supposed that current income or net-worth, I_2 , is known, future income or net-worth, I_3 , is unknown, and $E(I_3) = \emptyset_I$ while $\text{Var}(I_3) = \sigma_I$.

The individual consumer's saving is the amount left after subtracting current period consumption from current period income (Dovbrovolsky. 1951; Williamson, 2018).

$$S_3 = I_2 - c_2 \quad (3.4)$$

Additionally, I assume that there is no bequest saving motive. This is because the individual consumer lives for only two periods and plans his or her total consumption in such a way that at the time of death, his or her saving equals zero. This also means that the individual consumer consumes all the available resources he or she has earned in a lifetime before passing. Moreover, the individual consumer will not be given any wealth by a dead parent or relative. There's also no borrowing from the

⁵ Note: $1 / (1 + a)$ is the "relative price of future consumption goods in terms of current consumption good, because a consumer can give up 1 unit of current consumption goods and obtain $1 + a$ units of future consumption goods by saving for one period." 'a' refers to the real interest rate. 'b' refers to 'time preference rate'. (see Williamson, 2018).

side of the consumer since he or she cannot have negative savings, and this assumption is important because it ensures that the consumer depends only on his or her resources (Modigliani & Brumberg, 1954; Freidman, 1957). Based on these two additional assumptions, the individual consumer's "lifetime budget constraint" in equation (3.10) is such that his or her "present value of lifetime consumption", $c_2 + \frac{c_3}{(1+a)}$, equals that of the "present value of lifetime resources.", $I_2 + \frac{I_3}{(1+a)}$, (Williamson, 2018).

$$c_2 + S_3 = I_2 \quad (3.5)$$

$$c_3 = I_3 + (1+a)S_3 \quad (3.6)$$

$$(1+a)S_3 = c_3 - I_3 \quad (3.7)$$

$$S_3 = \frac{c_3 - I_3}{(1+a)} \quad (3.8)$$

$$c_2 + \frac{c_3 - I_3}{(1+a)} = I_2 \quad (3.9)$$

$$c_2 + \frac{c_3}{(1+a)} = I_2 + \frac{I_3}{(1+a)} \quad (3.10)$$

Also, returns on wealth or savings are fixed throughout the individual consumer's lifespan and the discount factor is constant, too. Consequently, the discount factor is the same as the interest rate factor, and "the relative price of future consumption good in terms of current consumption good" is equal to one as portrayed in equation (3.11). The price of the consumption good is assumed to be \$1 and there are no inflations in both periods (Leland, 1978; Dreze & Modigliani, 1972).

$$\beta A = \frac{(1+a)}{(1+b)} = 1 \quad (3.11)$$

Provided that $\beta A = 1$, the first partial derivative of the utility function in equation (3.1) gives us the Euler equation (3.13) in which $U' > 0$.

$$U'(c_2) = E[U'(c_3)] \quad (3.12)$$

$$U'(I_2 - S_3) = E_{I_3}[U'(AS_3 + I_3)] \quad (3.13)$$

Let's now suppose that the individual consumer faces a diminishing marginal utility where more utility is attained from an extra consumption unit when consumption is at a minimal level and less utility is achieved when consumption is high. This means that the second-order partial derivative of the individual consumer's utility function (which is rising and concave) is less than zero ($u'' < 0$) (Leland, 1978). It makes sense for a risk-averse consumer in terms of Arrow-Pratt's concept of "absolute risk aversion" which states that the first partial derivative has to be greater than zero and the second partial derivative, less than zero, to consider the individual consumer risk-averse. Equation (3.14) shows Arrow-Pratt's calculation of the "coefficient of absolute risk aversion", $R(c)$, which is shown to be greater than zero if the individual consumer is risk-averse (Pratt, 1964; Arrow, 1965).

$$R(c) = - \frac{U''(c)}{U'(c)} > 0 \quad (3.14)$$

Furthermore, the individual consumer's utility function in equation (3.1) has a convex marginal utility with a third partial derivative which is greater than zero ($u''' > 0$), instead of a quadratic utility function which has a third-order condition of zero ($u''' = 0$) and a linear marginal utility. For quadratic utility functions, marginal utility is constant whether the individual consumer's consumption level is high or low and even when uncertainty affects consumers, it doesn't threaten them well enough for them to engage in precautionary saving (Leland, 1978; Dreze & Modigliani, 1972; Edwards, 1996). In other words, if the assumption of no quadratic utility function is not enforced, it will not be possible to prove the individual consumer's motive for precautionary saving. Additionally, this is what Lugilde, Bande, & Riveiro (2018, p. 6) has to say about the convex marginal utility assumption:

An increase in uncertainty increases the expected variance of consumption, which in turn implies higher expected marginal utility when it is convex, $U'''(\cdot) > 0$. When the third derivative of utility is positive, greater uncertainty is linked to greater savings, the current consumption level decreases (causing further growth of future consumption), and the extra saving is precautionary saving.⁶

Let's now assume that there's a "mean-preserving spread" of I_3 (I_3^*) which is the sum of future income and an uninsurable random component, ε_3 as shown in equation (3.15). The "mean-preserving spread" of I_3 results in an increase in uncertainty with respect to the future income I_3 and since increased future income uncertainty means increased marginal utility (Lugilde, Bande, Riveiro, 2018, p. 6), the right-side of the Euler equation (3.13) will be more than the left side which can be illustrated by making use of Jensen's inequality (Baley, 2016).

$$I_3^* = I_3 + \varepsilon_3 \tag{3.15}$$

Where the expected value of ε_3 is zero [$E(\varepsilon_3) = 0$] and the variance of ε_3 , [$\text{Var}(\varepsilon_3) = \sigma_\varepsilon$].

Jensen's inequality assumes that if for instance h is a function and x is any random number, the expected value of the function, h , always equals or exceeds the function of the expected value of x with the condition that the function, h , is convex (Jensen, 1906).

$$E[h(x)] \geq h[E(x)] \tag{3.16}$$

In other words, the average of the function of x is greater than or equal to the function of the average of x . For example, for any convex function $h(x)$, and any two

⁶ (Lugilde, Bande, Riveiro, 2018, p. 6) owes this idea to (Dydan, 1993)

random numbers b and d with a probability of $p = 0.5$ such that $0 < p < 1$, the results are as shown in equations (3.17) and (3.18) (Jensen, 1906).

$$E[h(x)] > h[E(x)] \quad (3.17)$$

$$p * h(b) + (1 - p) * h(d) > h [p * b + (1 - p) * d] \quad (3.18)$$

To illustrate that the right-side of the Euler equation (3.13) is more than the left-side, we apply the same concept in equations (3.17) and (3.18) to the uninsurable unknown component of the future income, ε_3 , as depicted in equation (3.20) after introducing it in the Euler equation (3.13).

$$U' (I_2 - S_3) = E_{I_3}[U'(AS_3 + I_3 + E(\varepsilon_3))] \quad (3.19)$$

$$E_{\varepsilon_3}[U'(\varepsilon_3)] > U'[E(\varepsilon_3)] \quad (3.20)$$

By applying equation (3.20) to the modified Euler equation (3.19),

$$E_{I_3, \varepsilon_3} [U' (AS_3 + I_3 + \varepsilon_3)] > E_{I_3}[U' (AS_3 + I_3 + E(\varepsilon_3))] \quad (3.21)$$

$$E_{I_3, \varepsilon_3} [U' (AS_3 + I_3 + \varepsilon_3)] > E_{I_3}[U' (AS_3 + I_3 + E(\varepsilon_3))] = U'(I_2 - S_3) \quad (3.22)$$

$$U' (I_2 - S_3) < E_{I_3, \varepsilon_3} [U' (AS_3 + I_3 + \varepsilon_3)] \quad (3.23)$$

The Increased uncertainty has caused the left side of the Euler equation to be less than the right side. As a result, saving will increase and current consumption will decline due to the future income uncertainty as illustrated in Figure 3.1. However, if the individual consumer's utility function and marginal utility function were quadratic and linear, respectively, the marginal utility from today is equal to the expected marginal utility from tomorrow with or without the random component.

(Baley, 2016; Leland, 1978; Lugalde, Bande, & Riveiro, 2018; Dreze & Modigliani, 1972).

$$U'(c_2) = E[U'(c_3)] \quad (3.24)$$

$$U'(I_2 - S_3) = E_{I_3, \varepsilon_3}[U'(AS_3 + I_3 + \varepsilon_3)] \quad (3.25)$$

There's certainty equivalence and as such, there's no motive for precautionary saving,

$$E_{I_3, \varepsilon_3}[U'(AS_3 + I_3 + \varepsilon_3)] = U'[E_{I_3, \varepsilon_3}(AS_3 + I_3 + \varepsilon_3)] \quad (3.26)$$

Thus,

$$U'(I_2 - S_3) = E_{I_3, \varepsilon_3}[U'(AS_3 + I_3 + \varepsilon_3)] = U'[E_{I_3, \varepsilon_3}(AS_3 + I_3 + \varepsilon_3)] \quad (3.27)$$

$$\frac{U'}{U'}(I_2 - S_3) = \frac{U'}{U'}[E_{I_3, \varepsilon_3}(AS_3 + I_3 + \varepsilon_3)] \quad (3.28)$$

$$(I_2 - S_3) = E_{I_3, \varepsilon_3}(AS_3 + I_3 + \varepsilon_3) \quad (3.29)$$

$$(c_2) = E[(c_3)] \quad (3.30)$$

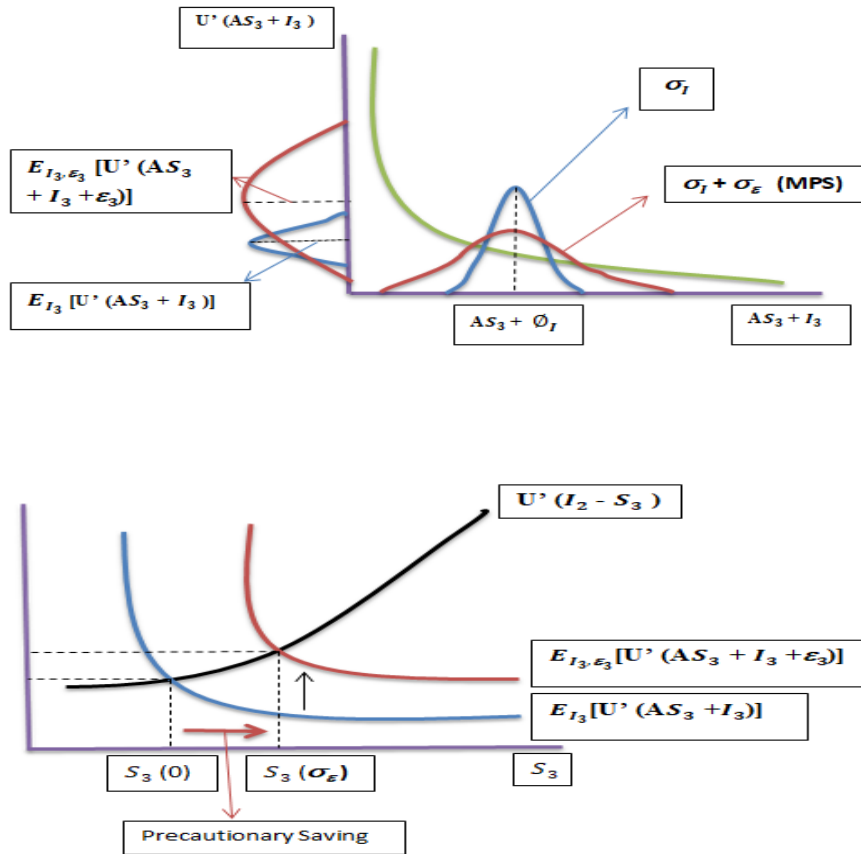


Figure 3.1. Graphical Representations of Precautionary Saving (Baley, 2016)

Figure 3.1 illustrates the graphical representations of precautionary saving. Before introducing the unknown random component, ε_3 , in the future income, saving is $S_3(0)$ and the expected marginal utility is $E[U'(AS_3 + I_3)]$ and there is a closeness between the expected future income and the actual future income levels as the variance is less. However, after adding ε_3 to the equation, the individual consumer's future income becomes more uncertain since its variance has increased. Furthermore, the expected marginal utility from future consumption has shifted from $E_{I_3}[U'(AS_3 + I_3)]$ to $E_{I_3, \varepsilon_3}[U'(AS_3 + I_3 + \varepsilon_3)]$. As a result, the individual consumer's saving increases from $S_3(0)$ to $S_3(\sigma_\varepsilon)$, and this increase in saving indicates precautionary saving which means that as the future income becomes more uncertain, the consumer increases his or her saving level.

CHAPTER IV

EMPIRICAL FRAMEWORK

4.1. Data Description

The data used in the empirical analysis is the Turkish Household Budget Survey data obtained from the Turkish Statistical Institute (TURKSTAT). It contains 7 consecutive waves of Turkish annual household budget surveys from 2011 to 2017, inclusive. The surveys provide annual information at both the individual and household level and these two separate data sets can be linked to each other via a bulletin number identifying each household separately. The folder named “Individuals” contains 7 files each of which belongs to one survey year from 2011 to 2017. The individual data provides information about the actual individuals upon which the annual surveys were conducted. Such include information on gender, age, relation to the family head, education, marital status, occupation, monthly and yearly income figures on wage, real estate, agriculture, land, entrepreneurship, tangible assets, intangibles assets, etc. of each individual who per-took in the survey. It needs to be made clear that different individuals were selected for each survey year and consequently, the data has no true panel dimension but rather an independent cross-sectional dimension.

The household-level data contains files that provide information on the households of individuals in each repeated cross-sectional annual survey from 2011 to 2017. As in the case of “Individuals” files, each annual survey provides information on the same socio-economic characteristics but regarding different households. So each file in the folder named “Household” has information on household type or size, house ownership status, monthly rental income, home market value, apartment ownership, field ownership, field market value, location (urban or rural), annual household disposable income, etc. of the surveyed households. The data set also provides separate files for consumption. These files provide information on durable and non-durable individual monthly consumption expenditures.

Each file for a particular year in the “Household” folder corresponds to a file for the same year in the “Individuals” folder and the “Consumption” folder. In other words, all the files in each folder are connected by common bulletin IDs and the survey years. The bulletin IDs and the survey years make it possible to figure out which consumption figure belongs to which individuals and which individuals belong to which households. I append all the data files in each folder and then merge the Individuals, Households, and Consumption files into one big file using the bulletin IDs and survey years. Then, I use the combined data to look for evidence of precautionary saving among Turkish households between 2011 and 2017, inclusive. Precisely, I make use of the data on annual household disposable income, annual household consumption expenditure, the market value of a field, home, and the socio-demographic variables such as family size, house ownership, gender, and university education to determine the impact of the variance of income growth on saving and total net-worth while controlling for income growth, and the aforementioned socio-demographic variables.

According to TURKSTAT’s definition, Annual household disposable income is the sum of the annual wage and salary income (cash and non-cash), annual entrepreneurship income (cash and non-cash), annual income from a second job (cash and non-cash), annual income from a previous job (cash and non-cash), annual real estate income (cash and non-cash), annual asset income (cash), annual transfer income (cash and non-cash), and annual relative rent income of a household, minus annual non-consumption expenditure, and household financial support offered to other households. On the other hand, annual household consumption expenditure is the sum of all the annual consumption expenditure on durable goods and services and annual consumption expenditure on non-durable goods and services. As for the annual saving, which is not specified in the surveys, I calculate it based on Dovbrovolsky (1951) and Williamson’s (2018) theoretical definitions of saving and also based on Ceritoglu’s (2013) calculations. It is the difference between annual household disposable income, and annual household consumption expenditure (but only on non-durable goods and services). Total net-worth, which is also not specified in the surveys, is calculated based on Carroll & Samwick’s (1998) calculation. It is

the sum of annual household disposable income, field market value, and home market value.⁷

The socio-demographic variables used in the empirical analysis, as mentioned earlier, are household size, house ownership, gender, and university education of household heads, only. Each of these socio-demographic variables (except house ownership which is either yes or no) has different categories. For instance, there are 6 different categories of household size which are, a nuclear household with two parents and one child, only; a nuclear household with two parents and two children; a nuclear household with two parents and three or more kids; a nuclear household with two parents but no kids; an extended family, and a single-parent household.⁸ Regarding gender, there are two categories, male and female. Also, Higher education is of three types, a two-year vocational school, 4 years of undergraduate studies, master's degree, and Ph.D. degree (TURKSTAT, 2011).

Based on TURKSTAT's categorization, I generate dummy variables for each of the household socio-demographic characteristics. For example, I generate 6 dummies from the household size variable which are hhsized1, hhsized2, hhsized3, hhsized4, hhsized5, and hhsized6. hhsized1 takes one if a household consists of both parents with one child, and zero if otherwise; hhsized2 takes one if a household consists of both parents with two kids, and zero if otherwise; hhsized3 takes one if a household comprises two parents with three or more kids, and zero if otherwise; hhsized4 takes one if a household comprises two parents but no kids, and zero if otherwise; hhsized5 takes one if a household is an extended family, and zero if not; hhsized6 takes one if a household contains one parent, and zero if not.⁹

Also, the male dummy is assigned one if a household head is a male, and zero if otherwise, while the female dummy is also assigned one if a household head is a female, and zero if otherwise. The house ownership dummy takes one if a household head owns a house and zero if not. Furthermore, I create a dummy from the higher

⁷ Income, consumption, and savings values are controlled for inflation and are in 2003 lira prices (see TURKSTAT,2011)

⁸ Household and family are used interchangeably.

⁹ An extended family refers to a household which is not limited to two parents and their kids , but also includes the parents' parents or siblings or other relatives

education variable which takes one if a household head has attained at least one of the degrees such as a degree from a two-year vocational school, an undergraduate degree, a master’s degree or a Ph.D. degree, and zero for household heads with none of the 4 degrees.

Table 4.1. Data Descriptions

Variable	Abbreviation	Description	Frequency	Source
Consumption expenditure	Consumption expenditure	household consumption expenditure on non-durable goods and services	Yearly	TURKSTAT
Saving	save	Disposable income minus Consumption expenditure on non-durable goods	Yearly	TURKSTAT
Household size	hhsized1, hhsized2, hhsized3, hhsized4, hhsized5, hhsized6	hhsized1- 1 for nuclear family, 2parents, 1 kid; 0 for otherwise. hhsized2- 1 for nuclear family, 2 parents, 2 kids; 0 for otherwise. hhsized3- 1 for nuclear family, 2 parents, 3 or more kids; 0 for otherwise. hhsized4- 1 for nuclear family, two parents, no kids; 0 for otherwise. hhsized5- 1 for extended family; 0 for otherwise. hhsized6- 1 for single-parent family; 0 for otherwise	Dummy	TURKSTAT
House ownership	House ownership	1 for house ownership; 0 for otherwise.	Dummy	TURKSTAT
Higher Education	Higher_edu	1 for a 2-yr vocational school degree, 4-year undergraduate degree master’s degree, or a Ph.D. degree; 0 for otherwise.	Dummy	TURKSTAT
Gender	Male, female	1 for male; 0 for otherwise. 1 for female; 0 for otherwise	Dummy	TURKSTAT
Disposable income	income	household disposable income	Yearly	TURKSTAT
Total Net-worth	Total net-worth	Sum of household disposable income, field market value, and home market value	Yearly	TURKSTAT

Source: TURKSTAT, Household Budget Surveys.

4.2. Methodology

I construct a synthetic or pseudo panel data to conduct my empirical analysis. This is because the Turkish household budget survey data lacks panel dimension as it contains solely repeated or independent cross-sections that do not keep track of the same individuals and the same households over time. With such data, Deaton (1985), Moffitt (1993), and Verbeck & Nijman (1992) propose constructing a synthetic panel data to put the data to use and measure consistent estimators. Deaton (1985) first came up with the idea of constructing a pseudo panel and was the first to do a pseudo panel data analysis. In pseudo panel data, individuals are grouped with respect to a

shared characteristic (eg. year of birth) which is fixed and does not change over time. He referred to the groups as “cohorts”.¹⁰ Each individual belongs to one and only one cohort irrespective of time. Cohort aggregates are used as observations and the unit of analysis is based on cohorts, not individuals. Although individuals in the repeated cross-sections are not tracked over time, the birth year intervals to which they belong could be tracked over time since each year of birth is fixed and does not change over time. This is one of the benefits of a pseudo panel. There is also a possibility that in the repeated cross-sections, a correlation exists between individual fixed effects and the independent variables. In such cases, constructing a pseudo panel will lead to consistent estimators (Deaton, 1985).

According to Deaton (1985), constructing a pseudo panel requires many observations. The number of cohorts in a pseudo panel and the birth-year intervals are structured based on the number of individual observations available because each cohort has to have large enough observations for consistent estimation. Browning, Deaton, & Irish (1985), Verbeek & Nijman (1992), and Devereux (2007) also agree with Deaton (1985) by indicating that each cohort in a pseudo panel data analysis must have large enough observations so as to ignore possible sampling or measurement errors. However, there is no single agreement on the number of individual observations each cohort must contain to be considered large enough. According to Verbeek & Nijman (1992), a large enough cohort size means 100-200 individual observations; however, Devereux (2007) refutes this claim by stating that sampling errors cannot be ignored if each cohort in a pseudo panel has a sample size of 100-200 observations. Browning, Deaton, & Irish (1985) however, mention in their research that at least 300 individual observations per cohort are required to ignore measurement errors. Each cohort in the pseudo panel I have constructed has at least 300 observations.

I apply the pooled OLS method to estimate the cohorts I have constructed. I choose this method because most empirical analyses that construct a pseudo panel data often apply the OLS method (see Carroll & Samwick, 1998; Ceritoglu, 2018; Deaton, 1985). Also, I conduct a model selection test between the fixed effect and pooled

¹⁰ (Deaton, 1985, p. 109) defines ‘cohort’ as “a group with fixed membership, individuals of which can be identified as they show up in the surveys.”

OLS models, the random effect and pooled OLS models, and the fixed and random effect models using the “F-test”, the “Breusch-Pagan Lagrangian Multiplier Test”, and the “Hausman Test”, respectively (see Katchova, 2013; Wooldridge & Jefferey, 2002). My results in the regressions show that pooled OLS produces the best estimates, compared to the fixed effect and random effect models, and as such, it is the best method to apply.

Based on the literature, Browning, Deaton, & Irish (1985) constructed a pseudo panel of 16 cohorts with 5-year birth intervals, for each cohort, in their analysis of consumption and labor supply using the British household budget survey data. Ceritoglu (2013) also constructed a pseudo panel of 11 cohorts with 5-year birth. Blundell, Duncan, & Meghir (1998) constructed a pseudo panel of 8 cohorts with a 10-year birth interval for each cohort, and Banks, Blundell, & Brugiavini (2001) generated 7 cohorts with a 5-year birth interval for each cohort. I follow Ceritoglu’s (2018) method in constructing a pseudo panel which consists of 11 cohorts with at least 300 observations per cohort. The individuals in each cohort have at least one common characteristic which is the birth year intervals. Each cohort in the analysis has five birth years starting from 1938 to 1992 in order to restrict the data to household heads aged from 19 to 73 in the year 2011. The aim of restricting the data between 19 and 73, inclusive, is to capture young-working, mature-working, and retired Turkish citizens in the empirical analysis (Ceritoglu, 2018).

4.2.1. Construction of the Sample

From the dataset, I exclude households that comprise of just roommates since such are not actual households, as well as households with unemployed or unpaid household heads. I also exclude household consumption expenditure on durable goods and services due to its long effect and since such expenditure make it difficult to separate consumption over time. Also, for saving to take place, consumption has to be less volatile than income; however, consumption on durable goods and services can sometimes be more volatile than income (Williamson, 2018). I also exclude the outliers that are below the first one percentile and above the ninety-nine percentile amount of annual disposable income, consumption, saving, and total net-worth from the data.

Moreover, I divide the figures for household consumption expenditure on non-durable goods and services by the OECD equivalence scales for each household. I also divide the figures for annual household disposable income and total net-worth by the same OECD equivalence scales. The scales attach weights to individuals in a household, serving as proxies for actual individuals in that household, and dividing the income, total net-worth, and expenditure values by them help in accounting for “intra-household resource allocation” as well as obtain the consumption expenditure value for each individual in a household. Then, I calculate the annual saving figures by subtracting annual consumption expenditure on non-durable goods and services from the annual disposable income. However, negative savings are excluded from the data in order to ensure strict borrowing constraint (Ceritoglu, 2018). Having done all the above, 25, 178 observations remain to conduct empirical analysis. These observations are divided across the cohorts as shown in table 4.2.

Table 4.2. Cohort Cell Sizes with Respect to the Survey Years

Cohort/Year	2011	2012	2013	2014	2015	2016	2017	Total Cell Size
1: 1938-1942	52	69	49	46	27	43	37	323
2: 1943-1947	134	104	85	90	51	81	89	634
3: 1948-1952	185	199	161	180	126	185	159	1,195
4: 1953-1957	329	350	332	296	217	340	281	2,145
5: 1958-1962	443	430	416	409	282	426	447	2,853
6: 1963-1967	539	497	535	536	336	614	551	3,608
7: 1968-1972	522	563	563	610	428	630	615	3,931
8: 1973-1977	547	557	593	577	442	613	583	3,912
9: 1978-1982	444	476	537	543	440	601	615	3,656
10: 1983-1987	186	234	300	359	288	377	455	2,199
11: 1988-1992	13	30	66	78	128	183	224	722

Source: TURKSTAT, Household Budget Surveys and Author’s Calculations

Appendix 1 entails all the descriptive statistical tables (A1.1 to A1.11) which give information about the household disposable income, saving, total net-worth, and the socio-demographic variables (age, household size, house ownership, gender, and university education) of each cohort. Starting with Table A1.1, which reports the descriptive statistics of individuals born between 1938 and 1942, also referred to as

cohort 1, there are 323 individual households, and on average, household disposable income, saving and total net-worth are 17312.3, 7615.5, and 60187.3, with standard deviations of 11983.9, 9201.9, and 87962.92, respectively. The average age of household heads in cohort 1 is 73.3; the youngest household head is 69 years old, and the oldest household head is 79 years old. More than half of the households in cohort 1 consist of two parents and no kids since hhsz4 carries, on average, more than 50% of the whole household size characteristics. Also, more than 90% of the family heads own a house, and more than 90% of the family heads are males. However, around 2.47% of family heads in cohort 1 have received higher education, which is reasonable considering the time in which they were born.

Table A1.2 on the other hand represents the summary statistics of cohort 2 which includes 634 individuals born between 1943 and 1947. The average disposable income, average saving, and average total net-worth of cohort 2 are 17684.9, 7854.9, and 52495.2, with standard deviations of 13207.9, 9761.7, and 46497.8, respectively. The average age is 68.3 and the youngest and oldest household heads are 64 and 74, respectively. Almost half of the household heads in cohort 2 belong to a household with two parents and no kids since 45% of the total average household size belongs to hhsz4. On average, house ownership is 91% and more than two-thirds of the family heads are male, 94% on average. Moreover, about 4.2% of the household heads have received higher education which is good considering the previous percentage.

Table A1.3 also reports the summary statistics of cohort 3 which consists of 1,195 household heads born between 1948 and 1952. Average disposable income, average saving, and average total net-worth for cohort 3 are 20002.9, 8526.9, and 63256.6, with standard deviations of 13784.8, 9312.0, and 72899.5, respectively. The average age is 63.6 which is little less than that of cohort 1 and cohort 2. The youngest and oldest household heads are 59 and 69, respectively, which is also less than that of cohorts 1 and 2. Again, almost half of the household heads, 41% on average, in cohort 2 belong to a household with two parents and no kids, hhsz4. Aggregate house ownership is 90% and more than two-thirds of the family heads, 95% on

average, are male. Moreover, 5.9% of the family heads have attained higher education, which seems to be increasing so far.

In addition, Table A1.4 shows the summary statistics of cohort 4, which comprises household heads born between 1953 and 1957. The mean figures for household disposable income, household saving, and household total net-worth are 20975.0, 8479.1, and 63480.4, whose standard deviations are 13619.4, 9087.2, and 57770.9, respectively. The average age is 58.6, and the youngest and oldest members are 54 and 64 years old, respectively. Households with two parents and no kids, *hhsz4*, are still more than any other household types (30% on average), but the percentage has declined compared to the previous cohorts. Average house ownership is 88% which means that more than two-thirds of the family heads own a house, but it is declining as well. Still, on average, males are 95%, females are just 5%, and 9.8% of the individuals in cohort 4 have received higher education.

As for Table A1.5, which reports the descriptive statistics of individuals born between 1958 and 1962 (i.e. cohort 5), there are 2853 individual households, and on average household disposable income, saving and total net-worth are 21542.6, 8576.9, and 64664.4, with standard deviations of 13312.1, 8922.3, and 59498.3, respectively. The average age of household heads in cohort 5 is 53.8; the youngest household head is 49 years old and the oldest household head is 59 years old. 26% of households in cohort 5 consist of two parents and one kid. Average house ownership is 84% which has once again decreased. Male family heads are still dominant with a mean average of 96% and 9.3% of the 2853 individuals have earned a higher education degree.

Table A1.6 as well shows a report on the descriptive statistics of cohort 6, which consists of the 3608 household heads born between 1963 and 1967. Average disposable income, saving, and total net-worth are 20335.2, 7445.4, and 60293.9, with standard deviations of 13324.2, 8428.8, and 60612.6, respectively. The average age of a family head in cohort 6 is 49, and the youngest and oldest family heads are 44 and 54 years old, respectively; the ages decrease with time. This time around, households consisting of two parents and two kids dominate the rest with a mean of

25%. Average house ownership is 80% which also decreases with time. The average male and female are 96% and 4%, and both of them have the same standard deviation throughout. 10.8% of the household heads have received higher education, which is mostly increasing.

Additionally, Table A1.7 illustrates the descriptive statistics of cohort 7, which includes 3,931 family heads born between 1968 and 1972. Averages of the disposable income, saving, and total net-worth are calculated to be 19923.9, 7100.3, and 58855.1, with standard deviations of 13604.1, 8048.7, and 61020.3, respectively. The average age of a household head belonging to cohort 7 is 44, and the smallest and highest age figures are 39 and 49, respectively. The number of households, which comprise two parents and two kids, `hhsz2`, is the highest with an average of 31%. Average house ownership has decreased to 75%; the number of male household heads is again more than the number of female household heads, 95% against 5% on average, and 15.1% of cohort 7 members have gotten a higher education degree.

Table A1.8 also illustrates a descriptive statistics of cohort 8 that includes 3,912 family heads born between 1973 and 1977. Averages of the disposable income, saving, and total net-worth are also calculated to be 20310.6, 7481.1, and 58312.61, with standard deviations of 14201.2, 8906.4, and 64437.0, respectively. The average age of a household head belonging to cohort 8 however is 39.1, while the smallest and highest age figures are 34 and 44, respectively. Again, the number of households which comprise two parents and two kids, `hhsz2`, is the highest with an average of 33%. Average house ownership is now 67%; the number of male household heads is still quite more than the number of female household heads, 95% against 5% on average, and the percentage of family heads that have gotten a higher education degree has increased to 19.1%, for cohort 8.

The other descriptive statistics depicted by Table A1.9 are for cohort 9, which contains 3,656 household heads born between 1978 and 1982. It also contains the highest number of household heads. Averages of disposable income, saving, and total net-worth are 21061.8, 7752.9, and 55916.7, and their standard deviations are

14559.7, 8957.2, and 58994.2, respectively. The average age is 34.3, and the lowest and highest age figures are 29 and 39, respectively. hhsiz2 is again the most common among the different types of household size with a mean of 31%. Aggregate house ownership is 58%; aggregate male is 96% while the aggregate female is just 4%, and the university degree holders (2 years or more) make up 20.9%.

Table A1.10 reports the descriptive statistics for cohort 10, which on the other hand contains 2, 199 household heads born between 1983 and 1987. Averages of disposable income, saving, and total net-worth are 2263.6, 8276.4, and 54963.4, with standard deviations of 15066.3, 9010.7, and 61938.0, respectively. The average age is 29.8; the lowest and highest age figures are 24 and 34, respectively, while hhsiz1, with a mean of 30%, is the most common household type for cohort 10. Aggregate house ownership has declined to 48%; aggregate male is still 96% whereas the aggregate female is 4%, and the degree holders are now 21.4% of cohort 10 members.

Finally, Table A1.11 depicts the summary statistics of cohort 11, which includes the youngest household heads who are born between 1988 and 1992. Cohort 11's average disposable income, average saving, and average total net-worth are 23356.9, 9178.0, and 51414.9, and the standard deviations of these averages are 15555.3, 10180.7, and 53741.4, respectively. The lowest average age, 26, and the youngest household head of all the cohorts, aged 20, are in cohort 11. hhsiz4, with a mean of 27%, has the highest number among all the types of household size in cohort 11. Average house ownership is 44% which is also the lowest percentage for house ownership. The mean gender is 93% for males and 7% for females. Moreover, 13.9% of cohort 11 members have received higher education.

Overall, aggregate household disposable income is highest in cohort 11, 23356.9, with the highest standard deviation as well, 15555.3. This means that income inequality is highest among the youngest individuals. Cohort 1, on the other hand, has the lowest aggregate household disposable income, 17312.3, with the lowest standard deviation, 11983.9, among all the cohorts, indicating that income inequality is lowest among the oldest family heads. Cohorts 3 and 6 record the minimum and

the maximum household disposable income figures, 1693.9 and 137420.5, respectively. For saving, aggregate household saving and standard deviation are also both highest in cohort 11, 9178.0 and 10180.7, respectively, making it to be the highest in terms of savings inequality. They are both lowest in cohort 7, 7100.3, and 8048.7, respectively. Cohort 5 records the minimum saving level, 150.7, and cohort 6 records the maximum saving level, 116833.6. However, cohort 11 records the lowest aggregate total net-worth, 51414.9, while cohort 5 records the highest aggregate total net-worth, 64664.4. The lowest and the highest standard deviations are from cohorts 2 and 1, 46497, and 887962.9, respectively. Cohort 10 records the lowest net-worth, 2206.6, and cohort 8 records the highest net-worth, 1128207.

Concerning the household characteristics, cohorts 1 to 3 are dominated by households consisting of two parents and no kids, `hhsz4`, which is reasonable since most of the family heads in these respective cohorts are aging people whose children probably have families of their own. Households with two parents and a kid, `hhsz2`, are predominant for most of the other cohorts. The percentage average house ownership decreases while the percentage higher education increases with time. In detail, house ownership is highest among the oldest cohorts (cohorts 1-3) while it is lowest among the youngest cohorts (cohorts 8-11). Also, cohort 1 records the lowest number of family heads who have attained higher education (2.4% of the family heads, precisely), whereas cohort 10 has the highest number of family heads who have received higher education (21.4% of the family heads, precisely). Also, household heads mostly constitute between 93-97% of males and 4-7% of females across all cohorts.

4.2.2. Empirical Models

The empirical models aim at capturing the precautionary saving behavior among Turkish households from 2011 to 2017 by analyzing the association between income uncertainty and saving or wealth (eg total net-worth). To conduct the empirical analyses, I adopt the method used by Ceritoglu (2018) to measure income growth, and income growth uncertainty. I also calculate saving just like in Ceritoglu (2013), and total net-worth just like in Carroll & Samwick (1998) since they are not available

in the survey data. Saving is the difference between annual household disposable income and annual household consumption expenditure (Ceritoglu, 2013, Dovbrovolsky. 1951, Williamson, 2018). The consumption expenditure figures are monthly figures so I multiply them by 12 to obtain the annual figures before subtracting them from the annual disposable income figures to get the saving figures. Moreover, I use only the consumption expenditure on non-durable goods and exclude the consumption expenditure on durable goods since such consumption expenditures have extending effects making it difficult to separate consumption over time. Moreover, they are occasionally treated as part of investment or saving (Carroll & Samwick, 1998; Ceritoglu, 2018). Total net-worth, on the other hand, is the sum of annual household disposable income, field market value, and home market value (see Carroll & Samwick, 1998).

In addition, in a pseudo panel data analysis, the unit of analysis is the cohort average (Deaton, 1985). Therefore, I take the aggregates of the annual disposable income, annual saving, and annual total net-worth of households with respect to cohorts and the survey years to obtain the average yearly income, saving, and total net-worth figures for each individual cohort. Besides that, the logarithm values of cohort income, cohort saving, and cohort net-worth are calculated. I also calculate the first differences of cohort log income and the variance of the first differences of cohort log income to obtain cohort income growth and the variance of cohort income growth. I use the variance of cohort income growth as my measure of income uncertainty.

Furthermore, I apply pooled OLS and regress cohort saving on the variance of cohort income growth (income risk) while controlling for the cohort income growth, and socio-demographic factors such as gender, higher education, family size, and house ownership as illustrated in the model specification (1).¹¹ I further apply this model to the different sub-categories, created based on the job status and ages of household heads, to examine which sub-category engages in precautionary saving (see Ceritoglu, 2018). These sub-categories are young family heads in the labor force,

¹¹ I choose OLS because most empirical analyses that construct a pseudo panel also apply the OLS method (see Carroll & Samwick, 1998; Ceritoglu, 2018; Deaton, 1985). Also, I conduct a model selection test among fixed effect, random effect, and pooled OLS models, and my results show that pooled OLS is the best method to apply.

middle-aged family heads in the labor force, and retired family heads. Based on Ceritoglu's (2018) definition, young family heads in the labor force are the young-working household heads between the ages of 19 and 38 (cohorts 8-11); middle-aged family heads in the labor force are the mature-working household heads between the ages of 39 and 58 (cohorts 4-7), and retirees are the retired family heads between the ages of 59 and 73 (cohorts 1-3), as of 2011. Equation (1) below represents the first model specification.

$$\ln save_t^c = \mu + \alpha \Delta \ln income_t^c + \theta Var(\Delta \ln income_t^c) + \beta D_T^c + \varepsilon_t \quad (1)$$

$\Delta \ln save_t^c$ is the log of cohort saving, $\alpha \Delta \ln income_t^c$ is the log of cohort income growth, $\theta Var(\Delta \ln income_t^c)$ is the variance of the log of cohort income growth, βD_T^c represents the socio-demographic factors, and ε_t is the error term for the model specification (1).

I also regress cohort total net-worth on the variance of cohort income growth (income risk) while controlling for the cohort income growth, and socio-demographic factors such as gender, university education, family size, and house ownership as shown in the model specification (2), (i.e. equation (2) below). The second model is also applied to the different sub-categories of the job status of household heads to examine which sub-category has a precautionary saving motive.

$$\ln TNW_t^c = m + n \Delta \ln income_t^c + r Var(\Delta \ln income_t^c) + z D_T^c + \varepsilon_t \quad (2)$$

$\Delta \ln TNW_t^c$ is the log of cohort total net-worth, $n \Delta \ln income_t^c$ is the log of cohort income growth, $r Var(\Delta \ln income_t^c)$ is the variance of the log of cohort income growth, $z D_T^c$ represents the socio-demographic factors, and ε_t is the error term for the model specification (2).

Appendix 2 contains the graphical representations of the relationship between the cohort disposable income and cohort saving for each cohort, from 2011 to 2017. There are 11 separate graphs each representing one of the 11 birth year cohorts. As clearly portrayed in the cohort graphs, both cohort income and cohort saving have increasing trends in the long-run. There is a positive correlation between the two; meaning, as cohort income goes up, cohort saving goes up too and ‘vice versa’. From each of the cohort graphs, it can be seen that cohort income lies above the cohort saving. This is because cohort saving comes from the cohort income and can only be either equal to or less than income.

While log incomes of cohorts fluctuate between 9.33 and 10.22, inclusive, log saving figures fluctuate between 8 and 9.34, inclusive. For all the cohort graphs, from Figure A2.1 – Figure A2.11, income hits its minimum points in 2011 except for Figure A2.2, where income reaches its minimum in 2012. Saving too reaches its minimum points in 2011 except for that of Figure A2.3 (cohort 3), Figure A2.4 (cohort 4), and Figure A2.5 (cohort 5), for they attain their lowest saving points in 2012. But the lowest of the minimum points is seen in Figure A2.11 (cohort 11). This is reasonable considering that most household heads in cohort 11 are very young as of 2011, and according to the life-cycle approach, the young generally earn less and save less, too. However, the income and savings of cohort 11 increase in the long-run, and both the cohort income and cohort saving reach their highest in 2015 for most of the cohorts, not all.

Appendix 3, on the other hand, consists of the graphical illustrations of the relationship between the cohort total net-worth and cohort income for all the eleven cohorts. In all the graphs, there is a positive association between the cohort total net-worth and cohort income; both the cohort total net-worth and cohort income increase and decrease in the short-run, but both have increasing trends in the long-run. Cohort income lies below the cohort total net-worth in all the graphs. This is because total net-worth is the combination of income and the market value of other valuable real assets. The gap between the cohort total net-worth and cohort income is small for Figure A3.9 (cohort 9), Figure A3.10 (cohort 10), and especially for Figure A3.11 (cohort 11). This is because these cohorts comprise younger family heads that do not possess so much wealth, as shown in the descriptive statistics for the household total

net-worth. From Figure A3.1 to Figure A3.8 (cohorts 1 to 8), however, the gap is bigger. Furthermore, cohort net-worth and cohort income hit their lowest in 2011 except for the cohort net-worth and cohort income in Figure A3.1 (cohorts 1) and Figure A3.2 (cohort 2), which reach their lowest in 2013 and 2012, respectively. In each of the 11 cohort graphs however, cohort net-worth and the cohort income reach their highest in 2015.

4.3. Empirical Results

Table 4.3.1 consists of three separate pooled OLS regression results, of the whole sample, in which cohort saving is the dependent variable, and three other separate pooled OLS regression results, of the whole sample, in which the cohort net-worth is the dependent variable. What we are mainly looking for in each of the regression results in Table 4.3.1 is a positive relationship between cohort saving and the variance of cohort income growth or a positive association between cohort net-worth and the variance of cohort income growth to confirm the presence of precautionary saving among Turkish households. In the first 3 regressions, cohort saving is regressed on the variance of cohort income growth while controlling for the cohort income growth and demographics such as household size, house ownership, gender, and higher education. The results in all the three regressions indicate that both cohort income growth and the variance of cohort income growth have a significant positive impact on saving at a 1% significance level. A significant positive impact of cohort income growth variance on cohort saving implies precautionary saving motive among cohorts between 2011 and 2017. This result confirms the empirical conclusions obtained in Hahm & Steigerwald (1999), Lusardi (1997), Guariglia (2003), Menegatti (2010), Mody, Ohnsorge, & Sandri (2012), Carroll & Samwick (1998), etc. who use different approaches to show evidence of precautionary saving for different countries. My findings are also in line with Ceritoglu's (2018) findings which indicate evidence of a precautionary saving motive among the rural and urban households in Turkey between 2003 and 2013. His findings however show no significant evidence of precautionary saving in Turkey (whole sample) even though Ceritoglu (2013) shows evidence of precautionary saving for the whole Turkey between 2003 and 2009.

From the regression output (1) in Table 4.3.1, higher education has a statistically significant negative impact on cohort saving at a 1% significance level, which is more or less what Kelly & Williamson (1968) and Burney & Khan (1992) imply since according to them the higher the degree of education attained by a family head the lesser he or she saves. The rest of the socio-demographic variables in regression (1) do not have any significant impact on cohort saving.

Regression (2) in Table 4.3.1 excludes the following family size variables (hhsizel, hhsizel2, hhsizel3, and hhsizel4) because they lead to a multi-collinearity problem in regression (1) as well as in the subsequent regressions. Multi-collinearity causes the coefficients not to be reliable (Dougherty, 2011). Moreover, I check for the joint significance of the four dummies, in order to avoid omitted variable bias, and I fail to reject the null hypothesis of ‘no significant impact’. The same case applies to the regressions in Table 4.3.2, Table 4.3.3, and Table 4.3.4. From regression (2) in Table 4.3.1, cohort income growth and the variance of cohort income growth each have a strong positive impact, while higher education has a strong negative impact on cohort saving, at a 1% significance level, again. In addition, an extended family (hhsizel5) has a negative impact on cohort saving at a 1% significance level that coincides with the findings of Carroll & Samwick (1998) whose study shows that families with many kids tend to have lower savings due to their high level of consumption expenditures. I also check for the effect of a single-parent family (hhsizel6), and the female dummies on cohort saving in regression (3). House ownership has a negative impact on cohort saving, at 1% significance level, which is the same result found in Chen, Hu, & Lin (2018b). On the other hand, being a female has no significant effect on cohort saving.

In the last three regressions in Table 4.3.1, I regress cohort net-worth, a proxy for total wealth, on the variance of cohort income growth while controlling for the cohort income growth and the demographic variables (household size, house ownership, gender, and higher education). Again, all the three regression results indicate a positive effect of cohort income growth on cohort net-worth, at a 1% significance level. Moreover, from regression outputs (5) and (6), the variance of cohort income growth has a positive effect on cohort net-worth at a 1% significance

level, which confirms the precautionary saving behavior of the cohorts. The regression results from column (4) too show evidence of precautionary saving but at a significance level of 5%. Furthermore, household size dummies *hhsizel* and *hhsizel2* each have a positive impact on cohort saving at a 5% significance level. The higher education dummy, on the other hand, has a significant negative impact at a 1% significance level. But then again, *hhsizel*, *hhsizel2*, *hhsizel3*, and *hhsizel4* dummies jointly cause a multi-collinearity problem and as a result I exclude them from the subsequent regressions. From the regression output (5), *hhsizel5* and higher education dummies each have a negative impact on cohort net-worth at a 1% significance level, whereas the male dummy has a positive impact on cohort net-worth at significance level of 10%. From regression (6), *hhsizel6* and higher education dummies both have a significant negative effect on cohort net-worth while the rest of the dummy variables do not have any statistical significance.

Based on Ceritoglu's (2018) empirical findings, a 1% increase in cohort income risk leads to an approximately 2% percent increase, although insignificant, in cohort saving, "ceteris paribus", and based on my findings, a 1% rise in cohort income risk leads to an approximately 15% increase in cohort saving and an 8% increase in cohort total wealth "ceteris paribus". Both the uncertainty coefficients in my findings are greater than that of Ceritoglu (2018) which leads me to conclude that the magnitude of precautionary saving in Turkey is higher between 2011 and 2017 than between 2003 and 2014.

Table 4.3.1. OLS Regressions for the Whole Sample

	(1)	(2)	(3)	(4)	(5)	(6)
	Saving	Saving	Saving	Net-worth	Net-worth	Net-worth
Cohort Income	0.784*** (0.101)	0.768*** (0.0757)	0.795*** (0.0712)	0.608*** (0.0894)	0.581*** (0.114)	0.635*** (0.0999)
Var. of Cohort Income	15.38*** (3.044)	15.21*** (2.475)	14.90*** (1.998)	7.701** (2.97)	8.296*** (2.394)	8.089*** (2.195)
Household Size:						
hhsizel	1.432 (1.295)			2.190** (0.861)		
hhsizel2	2.743 (1.934)			3.052** (1.276)		
hhsizel3	-0.165 (1.297)			1.437 (1.278)		
hhsizel4	1.519 (1.342)			2.130 (1.001)		
hhsizel5	0.00672 (1.752)	-2.129*** (0.67)		-0.0203 (1.33)	-3.212*** (0.713)	
hhsizel6			-1.713 (1.607)			-3.297*** (0.97)
House Ownership	-0.267 (0.196)	-0.167 (0.242)	-0.486*** (0.0962)	0.214 (0.227)	0.458 (0.273)	-0.12 (0.143)
Gender:						
Male	0.46 (2.58)	1.941 (1.844)		0.48 (1.465)	3.168* (1.577)	
Female			0.197 (2.494)			0.63 (1.345)
Higher Education	-2.488*** (0.442)	-2.350*** (0.372)	-2.245*** (0.336)	-2.255*** (0.322)	-1.977*** (0.348)	-1.901*** (0.25)
R-squared	0.753	0.707	0.685	0.789	0.695	0.678
Observations	77	77	77	77	77	77
No. of Cohorts	11	11	11	11	11	11

Notes: (1) Robust standard errors are in parentheses. The 3 asterisks (***), 2 asterisks (**), and 1 asterisk (*) refer to coefficients that are significant at 1%, 5%, and 10% significance levels, respectively.

(2) The household size dummies are hhsizel (1 for a family of 2 parents, 1 child; 0 for otherwise), hhsizel2 (1 for a family of 2 parents, 2 children; 0 for otherwise), hhsizel3 (1 for a family of 2 parents, 3 or more children; 0 for otherwise), hhsizel4 (1 for a family of 2 parents, no children; 0 for otherwise), hhsizel5 (1 for an extended family; 0 for otherwise), and hhsizel6 (1 for a single-parent family; 0 for otherwise). The gender dummies are male (1 for male; 0 for otherwise) and female (1 for female; 0 for otherwise). The higher education dummy is 1 for family heads with a 2-year vocational school certificate, undergraduate degree, master's degree or a Ph.D. degree; 0 for otherwise.

Table 4.3.2 contains four different OLS regression results of, again, the relationship between cohort saving, or cohort net-worth, and the variance of cohort income growth while controlling for the cohort income growth and the socio-demographic variables (hhsizel5, hhsizel6, male, female, and higher education). However, these regressions aim to test for a precautionary saving behavior among the retirees in Turkey (family heads at the ages of 59-73 as of 2011). From the first regression results in column (1), there is a positive effect of the variance of cohort income

growth on cohort saving at a significance level of 5% which is interpreted as a precautionary saving behavior among retired cohorts. Based on the second regression results also, column (2), the variance of cohort income growth has a positive effect on cohort saving but it is not statistically significant. Cohort income growth also has a positive effect on cohort saving from the regression results in columns (1) and (2), at a significance level of 5% and 10%, respectively. While the *hhsz5* and higher education dummies each have a significant negative impact on cohort saving, the male dummy, on the other hand, has a significant positive impact on cohort saving in column (1). In column (2), however, only the house ownership dummy (among all the dummies) has a significant effect on cohort saving which is negative.

The last two regression results in Table 4.3.2 depict the impact of income risk (the variance of cohort income growth) on cohort net-worth (wealth). In the third and fourth regression outcomes, columns (3) and (4), there are evidence of precautionary saving among retired cohorts at 5% and 10% significance levels, respectively. Cohort income growth also has a statistically significant positive impact on cohort net-worth both in column (3) and column (4), at a significance level of 5% and 10%, respectively. As for the socio-demographic dummy coefficients in (3), *hhsz5* has a significant negative effect on cohort net-worth whereas the male and house ownership dummies both have significant positive impacts on cohort net-worth. The relationship between house ownership and wealth accumulation is also positive in Krumm & Kelly (1989). In column (4) however, none of the socio-demographic variables has a statistical significance.

While Ceritoglu (2018) finds no statistically significant impact of cohort income risk on saving or wealth accumulation among retired cohorts, my findings, however, show a significant positive relationship between cohort income risk and cohort saving or cohort wealth accumulation. Based on my findings, a 1% rise in income risk leads to an approximately 36% rise in cohort saving and a 28% rise in cohort wealth accumulation, “*ceteris paribus*”, at a 5% significance level.

Table 4.3.2. OLS Regressions for Retirees

	(1)	(2)	(3)	(4)
	Saving	Saving	Net-worth	Net-worth
Cohort Income	0.759*** (0.0451)	0.791** (0.179)	0.809** (0.084)	0.850* (0.203)
Variance of Cohort Income	36.85** (8.379)	22.85 (10.58)	28.46** (4.925)	14.86* (4.461)
Household Size:				
hhsiz5	-3.312* (0.896)		-4.452** (0.733)	
hhsiz6		3.221 (3.426)		1.373 (2.435)
House Ownership	0.309 (0.232)	-0.397* (0.114)	1.120** (0.163)	0.56 (0.207)
Gender:				
Male	9.463* (3.054)		6.841* (1.613)	
Female		-9.142 (5.755)		-4.971 (4.449)
Higher Education	-4.997*** (0.156)	-5.655 (2.498)	-0.934 (1.184)	-3.5 (3.268)
R-squared	0.877	0.811	0.908	0.659
No. of Observations	21	21	21	21
No. of Cohorts	3	3	3	3

Notes: (1) Robust standard errors are in parentheses. The 3 asterisks (***), 2 asterisks (**), and 1 asterisk (*) refer to coefficients that are significant at 1%, 5%, and 10% significance levels, respectively.

(2) The household size dummies are hhsiz5 (1 for an extended family; 0 for otherwise) and hhsiz6 (1 for a single-parent family; 0 for otherwise). The gender dummies are male (1 for being a male; 0 for otherwise) and female (1 for being a female; 0 for otherwise), and the higher education dummy is assigned 1 for family heads with a 2-year vocational school certificate, undergraduate degree, master's degree or a Ph.D. degree; 0 for otherwise. The other household size dummies (hhsiz1, hhsiz2, hhsiz3, and hhsiz4) are excluded from the regressions because they cause multi-collinearity.

(3) Cohorts 1, 2, and 3 include solely retirees (people aged 59-73 as of 2011), hence only the three cohorts are analyzed in the regressions presented in Table 4.3.2.

The OLS regression results in Table 4.3.3, on the other hand, explain the impact the variance of cohort income growth has on cohort saving and cohort net-worth among the mature-working cohorts that consist of family heads at ages between 39 and 58 in 2011, after controlling for cohort income growth and the socio-demographic characteristics. From the first regression results in columns (1), the variance of cohort income growth coefficient indicate a statistically significant positive impact on cohort saving meaning there is precautionary saving among mature workers. However, there is statistical insignificance regarding the effect of income uncertainty on cohort saving and cohort net-worth in the second, third, and fourth columns. Cohort income growth also has a statistically significant positive impact on cohort saving but no significant impact on cohort net-worth.

As for the socio-demographic variables in the first regression, column (1), only the higher education dummy has a significant negative impact on cohort saving. It has a significant negative impact on cohort saving in column (2) as well, together with *hhsized6*, which has a significant positive impact. In columns (3) and (4) again, only the higher education dummy has a significant negative impact, while the rest of the socio-demographic dummies have no significant impact on cohort net-worth. From Ceritoglu's (2018) findings, a 1% increase in income risk leads to an approximately 5% growth in cohort saving, and from my findings, a 1% increase in cohort income risk causes and approximately 6% growth in saving among the mature-working cohorts, "ceteris paribus". This also means that precautionary saving is higher in 2011 - 2017 than in 2003 - 2014.

Table 4.3.3. OLS Regressions for Mature Workers

	(1) Saving	(2) Saving	(3) Net-worth	(4) Net-worth
Cohort Income	0.787** (0.224)	0.490* (0.187)	0.34 (0.173)	0.159 (0.219)
Variance of Cohort Income	6.713** (1.804)	1.897 (1.225)	0.923 (2.311)	-2.363 (2.766)
Household Size:				
<i>hhsized5</i>	0.997 (0.899)		-0.698 (0.65)	
<i>hhsized6</i>		4.977** (0.92)		2.425 (1.2)
House Ownership	-0.514 (0.383)	-0.0371 (0.123)	-0.0543 (0.26)	-0.258 (0.142)
Gender:				
Male	-1.142 (1.838)		0.773 (2.328)	
Female		-1.406 (2.015)		-1.973 (1.977)
Higher Education	-3.762*** (0.524)	-3.805*** (0.477)	-3.167*** (0.189)	-3.087*** (0.143)
R-squared	0.919	0.948	0.908	0.921
No. of Observations	28	28	28	28
No. of Cohorts	4	4	4	4

Notes: (1) Robust standard errors are in parentheses. The 3 asterisks (***), 2 asterisks (**), and 1 asterisk (*) refer to coefficients that are significant at 1%, 5%, and 10% significance levels, respectively.

(2) The household size dummies are *hhsized5* (1 for an extended family; 0 for otherwise) and *hhsized6* (1 for a single-parent family; 0 for otherwise). The gender dummies are male (1 for being a male; 0 for otherwise) and female (1 for being a female; 0 for otherwise), and the higher education dummy is assigned 1 for family heads with a 2-year vocational school certificate, undergraduate degree, master's degree or a Ph.D. degree; 0 for otherwise. The other household size dummies (*hhsized1*, *hhsized2*, *hhsized3*, and *hhsized4*) are excluded from the regressions because they cause multi-collinearity.

(3) Cohorts 4, 5, 6, and 7 include solely mature workers (people aged 39-58 in 2011) hence only the 4 cohorts are used in the regressions presented in Table 4.3.3.

Table 4.3.4 also consists of four regression results that aim to test for the presence of precautionary saving behavior among the young-working cohorts which only comprise family heads between the ages of 19 and 38 as of 2011. In the first two regressions, cohort saving is the dependent variable and in the last two regressions, cohort net-worth is the dependent variable. Again, in columns (1), (2), and (4), the variance of cohort income growth has a statistically significant positive impact on cohort saving depicting a precautionary saving behavior among the young cohorts. However, there is statistical insignificance regarding the effect of the variance of income growth on cohort net-worth in the third column. Cohort income growth also has a statistically significant positive impact on cohort saving but no significant impact on cohort net-worth.

From the socio-demographic variables in the first regression results in Table 4.3.4, column (1), both the *hhszie5* dummy and the higher education dummy have a significant negative impact on cohort saving. The higher education dummy also has a significant negative impact on cohort saving and cohort net-worth in columns (2), (3), and (4). Furthermore, *hhszie6* has a significant negative impact on both cohort saving and cohort net-worth in columns (2) and (4). In column (3) also, house ownership has a significant positive impact on cohort net-worth. Again, From Ceritoglu's (2018) findings, a 1% rise in cohort income risk causes an approximately 4% growth in cohort saving, "ceteris paribus". From my findings, however, a 1% increase in cohort income risk leads to at least a 12% growth in saving among the young-working cohorts. Again, the magnitude of precautionary saving is greater in 2011 - 2017 than in 2003 - 2014.

To summarize, household size mostly has a significant negative impact on saving or net-worth; house ownership has both negative and positive significant impacts on saving and net-worth, respectively, and higher education always has a significant negative effect on saving or net-worth. There is evidence of precautionary saving for the whole sample; meaning that, all the Turkish household heads in each cohort engage in precautionary saving behavior between 2011 and 2017 which is also what Ceritoglu (2018) found for rural and urban households, separately, between 2003 and 2013 (even though he found no precautionary saving behavior after combining the

rural and urban households), but the magnitude of precautionary saving is higher between 2011 and 2017. The reason for more precautionary saving could be due to the less capital inflows accompanied by “tighter monetary policy” and “credit growth control” which the Turkish central bank had undertaken, starting in 2013.

At the sub-categorical levels, cohorts in the labor force (cohorts 4-11) engage in saving as their future incomes become more uncertain (precautionary saving) and so do retired cohorts (cohorts 1-3). However, the size of precautionary saving is greatest among the retired cohorts. It’s not a shock that retired cohorts save the most as income uncertainty increases considering that they mostly depend on retirement savings and pensions which usually do not account for much in developing countries. Most jobs in Turkey do not pay well enough to allow family heads (especially the ones with kids) to save abundantly and most pensioners usually receive less than half of what they make before retiring. As a result, they end up looking for other sources of income to smooth consumption, but they don’t have so many options when it comes to jobs since most of them are old and can’t keep up with the changing technology. So basically, the odds are not in their favor, yet they have expenses to take care of, which is why it makes sense that they save the most as their future income becomes more uncertain.

Ceritoglu (2018), on the other hand, shows that only cohorts in the labor force (young and mature cohorts, not retired cohorts) engage in precautionary saving and the magnitude is greater among the mature cohorts. The reason for such differences in our findings for Turkey could be because of the different measures of income risk we each use (his work uses consumption growth variance while mine uses income growth variance). Moreover, when I use Ceritoglu’s (2018) model (which is regressing cohort consumption growth on the variance of cohort consumption growth while controlling for cohort income growth and socio-demographic variables) to test for precautionary saving motive among young workers, mature workers, and retirees as displayed in table A3.5, appendix 3, I find no significant evidence of precautionary saving motive for any of the aforementioned sub-categories which shows that different models can lead to different findings. I find no evidence of precautionary saving for the whole sample either, and the regressions have very low

R-squared values (less than 0.50) which means the independent variables do not have much power to explain the dependent variable.

Table 4.3.4. OLS Regressions for Young Workers

	(1) Saving	(2) Saving	(3) Net-worth	(4) Net-worth
Cohort Income	0.766** (0.164)	0.928** (0.185)	0.172 (0.216)	0.324 (0.237)
Variance of Cohort Income	12.11* (5.055)	18.28*** (2.476)	1.146 (4.542)	6.390* (2.373)
Household Size:				
hhsiz5	-2.148* (0.693)		-1.608 (1.493)	
hhsiz6		-3.613* (1.337)		-3.037** (0.651)
House Ownership	0.505 (0.494)	-0.374 (0.447)	1.449* (0.549)	0.694 (0.354)
Gender:				
Male	-0.691 (1.384)		0.826 (0.989)	
Female		2.24 (1.643)		0.459 (0.846)
Higher Education	-1.731** (0.315)	-1.806*** (0.257)	-1.522** (0.466)	-1.617*** (0.23)
R-squared	0.773	0.832	0.849	0.889
No. of Observations	28	28	28	28
No. of Cohorts	4	4	4	4

Notes: (1) Robust standard errors are in parentheses. The 3 asterisks (***), 2 asterisks (**), and 1 asterisk (*) refer to coefficients that are significant at 1%, 5%, and 10% significance levels, respectively.

(2) The household size dummies are hhsiz5 (1 for an extended family; 0 for otherwise) and hhsiz6 (1 for a single-parent family; 0 for otherwise). The gender dummies are male (1 for being a male; 0 for otherwise) and female (1 for being a female; 0 for otherwise), and the higher education dummy is assigned 1 for family heads with a 2-year vocational school certificate, undergraduate degree, master's degree or a Ph.D. degree; 0 for otherwise. The other household size dummies (hhsiz1, hhsiz2, hhsiz3, and hhsiz4) are excluded from the regressions because they cause multi-collinearity.

(4) Cohorts 8, 9, 10, and 11 include solely young workers (people aged 19-38), hence only the 4 cohorts are used in the regressions presented in Table 4.3.4.

CHAPTER V

CONCLUSION

This thesis aims to investigate the empirical evidence of savings that take place due to future income uncertainty among households in Turkey. To conduct my empirical analyses, I use independent cross-sectional data sets between 2011 and 2017, inclusive. The data sets are obtained from the annual Turkish Household Budget Surveys conducted by the Turkish Statistical Institute (TURKSTAT). My research question is “do Turkish households engage in precautionary saving?” and my research methodology involves constructing a pseudo panel data since the data consists of a series of repeated cross-sections which do not have a true panel dimension and do not keep track of the same individuals and the same households over time.

According to (Warneryd, 1999; Keynes 1937), the precautionary motive for saving is when a consumer insures him or herself against future uncertainties or unforeseen events. It’s the kind of saving motive whereby a consumer is just not exactly certain about what may happen in the future, yet he or she prepares for its negative consequences.

Using the independent cross-sections of TURKSTAT between 2011 and 2017, inclusive, I investigate, empirically, the existence of a precautionary saving motive among households in Turkey. So precisely, I make use of the data on the annual household disposable income, annual household consumption expenditure on non-durable goods and services, field market value, dwelling market value, and socio-demographic variables such as family size, house ownership, gender, and university education. Then, I construct a pseudo panel, calculate the household saving and household total net-worth, take their averages, logs, and first differences (as well as that of the annual household disposable income) with respect to the cohorts and time in order to determine the impact of the variance of cohort income growth (a measure

of income risk) on cohort saving or cohort net-worth while controlling for the cohort income growth and the aforementioned socio-demographic variables. The empirical analyses confirm the presence of a precautionary saving motive among households in general and the retired, young-working, and mature-working family heads in particular, between 2011 and 2017. In other words, I find that as the uncertainty relating to future income increases, so does precautionary saving among households in Turkey, and the magnitude is greater between 2011 and 2017 compared to the magnitude in the previous years, 2003 – 2014. Furthermore, in comparison to the mature and young household heads, retired household heads save the most as their future income levels become more uncertain.

From 2008 to 2012, the FED engaged in buying securities (bonds, equities, etc.) to stimulate economic growth which led to huge capital inflows to emerging economies, and Turkey happened to be one of these emerging economies that benefited from the inflows. With the capital inflows, Turkey tried to solve its current account deficit problem (Sahay et. al., 2014). However, after the FED had announced its intention to put a stop to quantitative easing in 2013, Turkey faced more current account deficit, higher inflation rates, and depreciation in the Turkish Lira, among other things. As a result, the central bank of Turkey introduced a tighter monetary policy and decreased credit growth rate in the country (Spiro, 2014). The poor economic conditions, accompanied by credit constraints, could be among the reasons which led to the increased precautionary saving among Turkish households between 2011 and 2017.

REFERENCES

- Abel, A. B. (1985). Precautionary saving and accidental bequests. *The American Economic Review*, 75(4), 777-791.
- Alessie, R., Lusardi, A., & Aldershof, T. (1997). Income and wealth over the life cycle evidence from panel data. *The Review of Income and Wealth*, 43(1), 1-32. doi:10.1111/j.1475-4991.1997.tb00198.x
- Antonin, C. (2020). The links between saving rates, income and uncertainty: An analysis based on the 2011 household budget survey. *Economie & Statistique*, (513), 47-68. doi:10.24187/ecostat.2019.513.2000
- Arrondel, L. (2002). Risk management and wealth accumulation behavior in france. *Economics Letters*, 74(2), 187-194. doi:10.1016/S0165-1765(01)00528-6
- Arrow, K. J. (1965). *Aspects of the theory of risk-bearing*. Helsinki: Yrjö Jahnssoinin säätiö.
- Baiardi, D., Manera, M., & Menegatti, M. (2013). Consumption and precautionary saving: An empirical analysis under both financial and environmental risks. *Economic Modelling*, 30, 157-166. doi:10.1016/j.econmod.2012.09.006
- Balassa, B. (1990). The effects of interest rates on savings in developing countries. *Banca Nazionale Del Lavoro Quarterly Review*, (172), 101.
- Baley Isaac. (2016). Advanced macroeconomics II, consumption: Precautionary savings.(UPF & Barcelona GSE), 1-50.
- Bande, R., & Riveiro, D. (2013). Private saving rates and macroeconomic uncertainty: evidence from Spanish regional data. *The Economic and Social Review*, 44(3, Autumn), 323-349.
- Bank, W. (2011). *Turkey - country economic memorandum (CEM) : Sustaining high growth - the role of domestic savings : Synthesis report* Washington, DC.
- Banks, J., Blundell, R., & Brugiavini, A. (2001). Risk pooling, precautionary saving and consumption growth. *The Review of Economic Studies*, 68(4), 757-779. doi:10.1111/1467-937x.00189
- Barcelo, C., & Villanueva, E. (2010). The response of household wealth to the risk of losing the job: Evidence from differences in firing costs. *SSRN Electronic Journal*, doi:10.2139/ssrn.1555614
- Benito, A. (2006). Does job insecurity affect household consumption? *Oxford Economic Papers*, 58(1), 157-181. doi:10.1093/oeq/gpi041

- Blundell, R., Duncan, A., & Meghir, C. (1998). Estimating labor supply responses using tax reforms. *Econometrica*, 66(4), 827-861. doi:10.2307/2999575
- Browning, M., Deaton, A., & Irish, M. (1985). A profitable approach to labor supply and commodity demands over the life-cycle. *Econometrica*, 53(3), 503-543. doi:10.2307/1911653
- Burney, N. A., & Khan, A. H. (1992). Socio-economic characteristics and household savings: An analysis of the households' saving behaviour in pakistan. *Pakistan Development Review*, 31(1), 31-48. doi:10.30541/v31i1pp.31-48
- Carroll, C. D., Dynan, K. E., & Krane, S. D. (2003). Unemployment risk and precautionary wealth: Evidence from households' balance sheets. *The Review of Economics and Statistics*, 85(3), 586-604. doi:10.1162/003465303322369740
- Carroll, C. D., & Samwick, A. A. (1998). How important is precautionary saving? *The Review of Economics and Statistics*, 80(3), 410-419. doi:10.1162/003465398557645
- Ceritoğlu, E. (2013). The impact of labour income risk on household saving decisions in turkey. *Review of Economics of the Household*, 11(1), 109-129. doi:10.1007/s11150-011-9137-2
- Ceritoğlu, E. (2018). Self-insurance and consumption risk-sharing between birth-year cohorts in turkey. *Review of Economics of the Household*, 16(4), 1085-1118. doi:10.1007/s11150-018-9411-7
- Chamon, M., Liu, K., & Prasad, E. (2013). Income uncertainty and household savings in china.
- Chen, J., Hu, M., & Lin, Z. (2018b). Does housing unaffordability crowd out elites in Chinese superstar cities? *Journal of Housing Economics*. <https://doi.org/10.1016/j.jhe.2018.03.003>. (forthcoming).
- Christelis, D., Georgarakos, D., Jappelli, T., & Van Rooij, M. (2019). *Trust in the Central Bank and Inflation Expectations* (No. 14202). CEPR Discussion Papers.
- CILASUN, S., & Kirdar, M. U. R. A. T. (2009). A cross-sectional analysis of income, consumption and saving behavior of Turkish household.
- Cornia, G., & Jerger, G. (1982). Rural vs urban saving behaviour: Evidence from an ILO collection of household surveys. *Development and Change*, 13(1), 123-157. doi:10.1111/j.1467-7660.1982.tb00115.x
- Croson, R., & Gneezy, U. (2009). Gender differences in preferences. *Journal of Economic Literature*, 47(2), 448-474. doi:10.1257/jel.47.2.448
- Dardanoni, V. (1991). Precautionary savings under income uncertainty: A cross-sectional analysis. *Applied Economics*, 23(1), 153-160. doi:10.1080/00036849108841059
- Deaton, A. (1985). Panel data from time series of cross-sections. *Journal of Econometrics*, 30(1-2), 109-126. doi:10.1016/0304-4076(85)90134-4

- Deaton, A. (2005). Franco modigliani and the life-cycle theory of consumption. *PSL Quarterly Review*, 58(233-234), 91-107.
- Dedah, C. O., & Mishra, A. K. (2009). No title. *Permanent Income and the Importance of Precautionary Savings: An Instrumental Variable Approach*,
- Deidda, M. (2013). Precautionary saving, financial risk, and portfolio choice. *The Review of Income and Wealth*, 59(1), 133-156. doi:10.1111/roiw.12001
- Devereux, P. J. (2007). Small-sample bias in synthetic cohort models of labor supply. *Journal of Applied Econometrics (Chichester, England)*, 22(4), 839-848. doi:10.1002/jae.938
- Dobrovolsky, S. P. (1951). Corporate income retention, 1915-43. *NBER Books*,
- Dougherty, C. (2011). *Introduction to econometrics* Oxford University Press.
- Douglas Bernheim, B. (1991). How strong are bequest motives? evidence based on estimates of the demand for life insurance and annuities. *The Journal of Political Economy*, 99(5), 899-927. doi:10.1086/261783
- Drèze, J.,H., & Modigliani, F. (1972). Consumption decisions under uncertainty. *Journal of Economic Theory*, 5(3), 308-335. doi:10.1016/0022-0531(72)90044-0
- Duygan-Bump, B. (2006). Welfare cost of financial crises when risk-sharing is imperfect: Evidence from turkey. *EUI Finance and Consumption Program Working Paper*,
- Dynan, K. E. (1993). How prudent are consumers? *The Journal of Political Economy*, 101(6), 1104-1113. doi:10.1086/261916
- Edwards, S. (1996). Why are latin america's savings rates so low? an international comparative analysis. *Journal of Development Economics*, 51(1), 5-44. doi:10.1016/S0304-3878(96)00424-5
- Engen, E. M., & Gruber, J. (2001). Unemployment insurance and precautionary saving. *Journal of Monetary Economics*, 47(3), 545-579. doi:10.1016/s0304-3932(01)00051-4
- Fisher, I. (1930). *The theory of interest*. new york: M.
- Freidman, M. (1957). *A theory of the consumption function*, princeton.
- Guariglia, A. (2003). Saving behaviour and earnings uncertainty: Evidence from the british household panel survey. *Family, household and work* (pp. 135-150) Springer.
- Guariglia, A., & Kim, B. (2003). The effects of consumption variability on saving: Evidence from a panel of muscovite households. *Oxford Bulletin of Economics and Statistics*, 65(3), 357-377.
- Guariglia, A., & Rossi, M. (2002). Consumption, habit formation, and precautionary saving: Evidence from the british household panel survey. *Oxford Economic Papers*, 54(1), 1-19.

- Guiso, L., Jappelli, T., & Terlizzese, D. (1992). Earnings uncertainty and precautionary saving. *Journal of Monetary Economics*, 30(2), 307-337.
- Hahm, J., & Steigerwald, D. G. (1999). Consumption adjustment under time-varying income uncertainty. *Review of Economics and Statistics*, 81(1), 32-40.
- Hurst, E., Lusardi, A., Kennickell, A., & Torralba, F. (2010). The importance of business owners in assessing the size of precautionary savings. *The Review of Economics and Statistics*, 92(1), 61-69.
- Jensen, F. E., & Pope, R. D. (2004). Agricultural precautionary wealth. *Journal of Agricultural and Resource Economics*, , 17-30.
- Jensen, Johan Ludwig William Valdemar. (1906). Sur les fonctions convexes et les inégalités entre les valeurs moyennes. *Acta Mathematica*, 30, 175-193.
- Jong-Youn Rha, Catherine, P. M., & Sherman, D. H. (2006). The effect of self-control mechanisms on household saving behavior. *Financial Counseling and Planning*, 17(2), 3.
- Katona, G. (1975). Psychological economics, new york. NY: Elsevier [Google Scholar],
- Katchova, Ani L. (2013). Panel Data Models Example. Econometrics Academy. Retrieved from <https://www.youtube.com/watch?v=aUVZWnVnjxs>
- Kazarosian, M. (1997). Precautionary savings—a panel study. *Review of Economics and Statistics*, 79(2), 241-247.
- Kelley, A. C., & Williamson, J. G. (1968). Household saving behavior in the developing economies: The Indonesian case. *Economic Development and Cultural Change*, 16(3), 385-403.
- Kennickell, A., & Lusardi, A. (2005). Disentangling the importance of the precautionary saving motive (CFS working paper no. 2006/15). Frankfurt, Germany: Center for Financial Studies,
- Keynes, J. M. (1937). The general theory of employment. *The quarterly journal of economics*, 51(2), 209-223.
- Kimball, M., & Weil, P. (1992). No title. *Precautionary Saving and Consumption Smoothing Across Time and Possibilities*,
- Kolerus, C., Koske, I., & Hüfner, F. (2012). Selected aspects of household savings in Germany: Evidence from micro-data.
- Kopecky, K. A., & Koreshkova, T. (2014). The impact of medical and nursing home expenses on savings. *American Economic Journal: Macroeconomics*, 6(3), 29-72.
- Kotlikoff, L. J. (1989). What determines savings? *MIT Press Books*, 1
- Krumm, R., & Kelly, A. (1989). Effects of homeownership on household savings. *Journal of Urban Economics*, 26(3), 281-294.

- Leland, H. E. (1978). Saving and uncertainty: The precautionary demand for saving. *Uncertainty in economics* (pp. 127-139) Elsevier.
- Lindqvist, A., Julander, C. R., & Fjaestad, B. (1978). Development of behavioral scientific indicators on saving.
- Lugilde, A., Bande, R., & Riveiro, D. (2018). Precautionary saving in Spain during the great recession: Evidence from a panel of uncertainty indicators. *Review of Economics of the Household*, 16(4), 1151-1179.
- Lusardi, A. (1997). Precautionary saving and subjective earnings variance. *Economics Letters*, 57(3), 319-326.
- Lusardi, A. (1998). On the importance of the precautionary saving motive. *The American Economic Review*, 88(2), 449-453.
- Mahdzan, N. S., & Victorian, S. M. P. (2013). The determinants of life insurance demand: A focus on saving motives and financial literacy. *Asian Social Science*, 9(5), 274.
- Menegatti, M. (2007). Consumption and uncertainty: A panel analysis in Italian regions. *Applied Economics Letters*, 14(1), 39-42.
- Menegatti, M. (2010). Uncertainty and consumption: New evidence in OECD countries. *Bulletin of Economic Research*, 62(3), 227-242.
- Miles, D. (1997). A household level study of the determinants of incomes and consumption. *The Economic Journal*, 107(440), 1-25.
- MoD (Ministry of Development). (2014). 10th national development plan-specialization commission report on sustainable forest management.
- Modigliani, F. (1986). Life cycle, individual thrift, and the wealth of nations. *Science*, 234(4777), 704-712.
- Modigliani, F., & Brumberg, R. (1954). Utility analysis and the consumption function: An interpretation of cross-section data. *Franco Modigliani*, 1(1), 388-436.
- Mody, A., Ohnsorge, F., & Sandri, D. (2012). Precautionary savings in the great recession. *IMF Economic Review*, 60(1), 114-138.
- Moffitt, R. (1993). Identification and estimation of dynamic models with a time series of repeated cross-sections. *Journal of Econometrics*, 59(1-2), 99-123.
- Ozcan, K. M., Gunay, A., & Ertac, S. (2003). Determinants of private savings behaviour in Turkey. *Applied Economics*, 35(12), 1405-1416. doi:10.1080/0003684032000100373
- Perry, V. G., & Morris, M. D. (2005). Who is in control? The role of self-perception, knowledge, and income in explaining consumer financial behavior. *Journal of Consumer Affairs*, 39(2), 299-313.
- Pratt, J. W. (1964). Risk aversion in the small and in the large, *Econometrica* 32, Jan.

- Sahay, R., Arora, V., Arvanitis, A., Faruquee, H., N'Diaye, P., & Mancini Griffoli, T. (2014). *Emerging market volatility: Lessons from the taper tantrum* doi:10.5089/9781498318204.006
- Skinner, J. (1988). Risky income, life cycle consumption, and precautionary savings. *Journal of Monetary Economics*, 22(2), 237-255. doi:10.1016/0304-3932(88)90021-9
- Spiro, N. (2014). Turkey and the Taper Tantrum. *Foreign Affairs (Snapshot)*, 14.
- Taqadus Bashir, T. B. (2013). Gender differences in saving behavior and its determinants: Patron from pakistan. *IOSR Journal of Business and Management*, 9(6), 74-86. doi:10.9790/487X-0967486
- Tansel, A. (1992). HOUSEHOLD SAVING, INCOME AND DEMOGRAPHIC. *METU studies in Development*, 19(1), 91-114.
- Thanoon, M. A., & Baharumshah, A. Z. (2005). What happened to savings during the financial crisis—a dynamic panel analysis of asian-5 countries. *Economic Change and Restructuring*, 38(3), 257-275. doi:10.1007/s10644-006-9006-9
- TURKSTAT, Household Budget Survey. (2011). Retrieved from <http://www.turkstat.gov.tr/Start.do>
- TURKSTAT, Household Budget Survey. (2012). Retrieved from <http://www.turkstat.gov.tr/Start.do>
- TURKSTAT, Household Budget Survey. (2013). Retrieved from <http://www.turkstat.gov.tr/Start.do>
- TURKSTAT, Household Budget Survey. (2014). Retrieved from <http://www.turkstat.gov.tr/Start.do>
- TURKSTAT, Household Budget Survey. (2015). Retrieved from <http://www.turkstat.gov.tr/Start.do>
- TURKSTAT, Household Budget Survey. (2016). Retrieved from <http://www.turkstat.gov.tr/Start.do>
- TURKSTAT, Household Budget Survey. (2017). Retrieved from <http://www.turkstat.gov.tr/Start.do>
- Van Rijckeghem, C., & Üçer, M. (2009). The evolution and determinants of the Turkish private saving rate: What lessons for policy?. *Koç University-TÜSİAD Economic Research Forum*.
- Verbeek, M., & Nijman, T. (1992). Can cohort data be treated as genuine panel data? *Empirical Economics*, 17(1), 9-23. doi:10.1007/bf01192471
- Warneryd, K. E. (1999). *The Psychology of Saving: A Study of Economic Psychology*. Cheltenham: Edward Elgar Publishing.
- Williamson, S. D. (2018). *Macroeconomics* 6th Global ed.

Wooldridge, & Jeffrey, M. (2002). *Econometric analysis of cross section and panel data*. Cambridge, Mass: MIT Press.,

World Bank (2011). Turkey –Country Economic Memorandum (CEM): Sustaining High Growth - The Role of Domestic savings: Synthesis Report. Washington, DC

APPENDIXES

APPENDIX 1

Table A1.1. Descriptive Statistics for Cohort 1 (1938 – 1942)

	No. of obs.	Mean	Standard Dev.	Minimum	Maximum
Household Disposable Income	323	17312.34	11983.88	2636.389	98561.84
Household Saving	323	7615.467	9201.922	209.1992	84886.09
Household Total Net-worth	323	60187.25	87962.92	6091.944	1012187
Household Head's Age	323	73.3	2.39	69	79
Household Size					
hhsizel	323	.102	.303	0	1
hhsizel2	323	.061	.241	0	1
hhsizel3	323	.019	.135	0	1
hhsizel4	323	.514	.501	0	1
hhsizel5	323	.192	.394	0	1
hhsizel6	323	.111	.315	0	1
House Ownership	323	.94		0	1
Gender					
Male	323	.93	.22	0	1
Female	323	.07	.26	0	1
Higher Education	323	.025	.156	0	1

Table A1.2. Descriptive Statistics for Cohort 2 (1943 – 1947)

	No. of obs.	Mean	Standard Dev.	Minimum	Maximum
Household Disposable Income	634	17684.86	13207.87	2400.833	105600
Household Saving	634	7854.907	9761.704	151.8203	78339.28
Household Total Net-worth	634	52495.16	46497.82	2916.793	457024.5
Household Head's Age	634	68.3	2.54	64	74
Household Size					
hhsizel	634	.145	.352	0	1
hhsizel2	634	.043	.202	0	1
hhsizel3	634	.027	.162	0	1
hhsizel4	634	.454	.498	0	1
hhsizel5	634	.235	.424	0	1
hhsizel6	634	.096	.295	0	1
House Ownership	634	.91	.29	0	1
Gender					
Male	634	.94	.24	0	1
Female	634	.06	.24	0	1
Higher Education	634	.043	.202	0	1

Table A1.3. Descriptive Statistics for Cohort 3 (1948 – 1952)

	No. of obs.	Mean	Standard Dev.	Minimum	Maximum
Household Disposable Income	1,195	20002.85	13784.75	1693.878	100360
Household Saving	1,195	8526.943	9312.024	156.1357	82308.88
Household Total Net-worth	1,195	63256.56	72899.48	2619.804	1073796
Household Head's Age	1,195	63.6	2.42	59	69
Household Size					
hhsizel	1,195	.184	.388	0	1
hhsizel2	1,195	.085	.280	0	1
hhsizel3	1,195	.037	.188	0	1
hhsizel4	1,195	.414	.493	0	1
hhsizel5	1,195	.214	.410	0	1
hhsizel6	1,195	.065	.247	0	1
House Ownership	1,195	.90	.30	0	1
Gender					
Male	1,195	.95	.21	0	1
Female	1,195	.05	.21	0	1
Higher Education	1,195	.059	.236	0	1

Table A1.4. Descriptive Statistics for Cohort 4 (1953 – 1957)

	No. of obs.	Mean	Standard Dev.	Minimum	Maximum
Household Disposable Income	2,145	20975.02	13619.35	2723.838	106418.9
Household Saving	2,145	8479.083	9087.231	150.8032	84751.95
Household Total Net-worth	2,145	63480.35	57770.94	3939.084	561618
Household Head's Age	2,145	58.6	2.46	54	64
Household Size					
hhsizel	2,145	.231	.422	0	1
hhsizel2	2,145	.119	.324	0	1
hhsizel3	2,145	.071	.257	0	1
hhsizel4	2,145	.304	.460	0	1
hhsizel5	2,145	.220	.414	0	1
hhsizel6	2,145	.054	.226	0	1
House Ownership	2,145	.88	.32	0	1
Gender					
Male	2,145	.95	.21	0	1
Female	2,145	.05	.21	0	1
Higher Education	2,145	.098	.298	0	1

Table A1.5. Descriptive Statistics for Cohort 5 (1958 – 1962)

	No. of obs.	Mean	Standard Dev.	Minimum	Maximum
Household Disposable Income	2,853	21542.58	13312.06	2465.168	126564.7
Household Saving	2,853	8576.895	8922.309	150.7197	73253.53
Household Total Net-worth	2,853	64664.37	59498.3	3525.2	750938
Household Head's Age	2,853	53.8	2.47	49	59
Household Size					
hhsizel	2,853	.260	.439	0	1
hhsizel2	2,853	.180	.384	0	1
hhsizel3	2,853	.102	.303	0	1
hhsizel4	2,853	.198	.398	0	1
hhsizel5	2,853	.206	.405	0	1
hhsizel6	2,853	.054	.227	0	1
House Ownership	2,853	.84	.36	0	1
Gender					
Male	2,853	.96	.20	0	1
Female	2,853	.04	.20	0	1
Higher Education	2,853	.094	.291	0	1

Table A1.6. Descriptive Statistics for Cohort 6 (1963 – 1967)

	No. of obs.	Mean	Standard Dev.	Minimum	Maximum
Household Disposable Income	3,608	20335.23	13324.19	2189.213	137420.5
Household Saving	3,608	7445.384	8428.825	152.4766	116833.6
Household Total Net-worth	3,608	60293.89	60612.59	2650.34	1110846
Household Head's Age	3,608	49.0	2.46	44	54
Household Size					
hhsizel	3,608	.223	.416	0	1
hhsizel2	3,608	.248	.432	0	1
hhsizel3	3,608	.184	.388	0	1
hhsizel4	3,608	.108	.310	0	1
hhsizel5	3,608	.186	.389	0	1
hhsizel6	3,608	.051	.220	0	1
House Ownership	3,608	.80	.40	0	1
Gender					
Male	3,608	.96	.21	0	1
Female	3,608	.04	.21	0	1
Higher Education	3,608	.109	.311	0	1

Table A1.7. Descriptive Statistics for Cohort 7 (1968 – 1972)

	No. of obs.	Mean	Standard Dev.	Minimum	Maximum
Household Disposable Income	3,931	19923.94	13604.08	2467.143	120057
Household Saving	3,931	7100.284	8048.746	153.3335	83878.18
Household Total Net-worth	3,931	58855.13	61020.33	2579.191	849501.8
Household Head's Age	3,931	44.0	2.40	39	49
Household Size					
hhsizel	3,931	.171	.376	0	1
hhsizel2	3,931	.314	.464	0	1
hhsizel3	3,931	.241	.428	0	1
hhsizel4	3,931	.065	.246	0	1
hhsizel5	3,931	.155	.362	0	1
hhsizel6	3,931	.055	.228	0	1
House Ownership	3,931	.75	.43	0	1
Gender					
Male	3,931	.95	.22	0	1
Female	3,931	.05	.22	0	1
Higher Education	3,931	.151	.358	0	1

Table A1.8. Descriptive Statistics for Cohort 8 (1973 – 1977)

	No. of obs.	Mean	Standard Dev.	Minimum	Maximum
Household Disposable Income	3,912	20310.59	14201.23	2240.278	128207.1
Household Saving	3,912	7481.121	8906.437	151.5996	109809.9
Household Total Net-worth	3,912	58312.61	64437.04	2240.278	1128207
Household Head's Age	3,912	39.1	2.43	34	44
Household Size					
hhsizel	3,912	.161	.368	0	1
hhsizel2	3,912	.330	.470	0	1
hhsizel3	3,912	.240	.427	0	1
hhsizel4	3,912	.058	.234	0	1
hhsizel5	3,912	.143	.351	0	1
hhsizel6	3,912	.067	.250	0	1
House Ownership	3,912	.67	.47	0	1
Gender					
Male	3,912	.95	.22	0	1
Female	3,912	.05	.22	0	1
Higher Education	3,912	.191	.393	0	1

Table A1.9. Descriptive Statistics for Cohort 9 (1978 – 1982)

	No. of obs.	Mean	Standard Dev.	Minimum	Maximum
Household Disposable Income	3,656	21061.8	14559.71	2400.556	124982.5
Household Saving	3,656	7752.909	8957.175	150.8193	90888.32
Household Total Net-worth	3,656	55916.66	58994.23	2542.661	750958.8
Household Head's Age	3,656	34.3	2.41	29	39
Household Size					
hhsizel	3,656	.243	.429	0	1
hhsizel2	3,656	.307	.461	0	1
hhsizel3	3,656	.141	.348	0	1
hhsizel4	3,656	.090	.286	0	1
hhsizel5	3,656	.151	.358	0	1
hhsizel6	3,656	.068	.251	0	1
House Ownership	3,656	.58	.49	0	1
Gender					
Male	3,656	.96	.19	0	1
Female	3,656	.04	.19	0	1
Higher Education	3,656	.209	.407	0	1

Table A1.10. Descriptive Statistics for Cohort 10 (1983 – 1987)

	No. of obs.	Mean	Standard Dev.	Minimum	Maximum
Household Disposable Income	2,199	22563.61	15066.29	2206.645	103895.8
Household Saving	2,199	8276.443	9010.676	157.7778	68828.25
Household Total Net-worth	2,199	54963.43	61937.99	2206.645	662139.4
Household Head's Age	2,199	29.8	2.27	24	34
Household Size					
hhsizel	2,199	.302	.459	0	1
hhsizel2	2,199	.200	.400	0	1
hhsizel3	2,199	.066	.249	0	1
hhsizel4	2,199	.188	.391	0	1
hhsizel5	2,199	.145	.352	0	1
hhsizel6	2,199	.098	.298	0	1
House Ownership	2,199	.48	.50	0	1
Gender					
Male	2,199	.96	.21	0	1
Female	2,199	.04	.21	0	1
Higher Education	2,199	.214	.410	0	1

Table A1.11. Descriptive Statistics for Cohort 11 (1988 – 1992)

	No. of obs.	Mean	Standard Dev.	Minimum	Maximum
Household Disposable Income	722	23356.89	15555.29	3383.855	106359.3
Household Saving	722	9177.998	10180.66	152	82194
Household Total Net-worth	722	51414.9	53741.42	3826.667	383174.3
Household Head's Age	722	26.0	1.85	20	29
Household Size					
hhsizel	722	.260	.439	0	1
hhsizel2	722	.115	.319	0	1
hhsizel3	722	.033	.179	0	1
hhsizel4	722	.266	.442	0	1
hhsizel5	722	.186	.389	0	1
hhsizel6	722	.140	.347	0	1
House Ownership	722	.44	.50	0	1
Gender					
Male	722	.93	.25	0	1
Female	722	.06	.25	0	1
Higher Education	722	.139	.346	0	1

APPENDIX 2

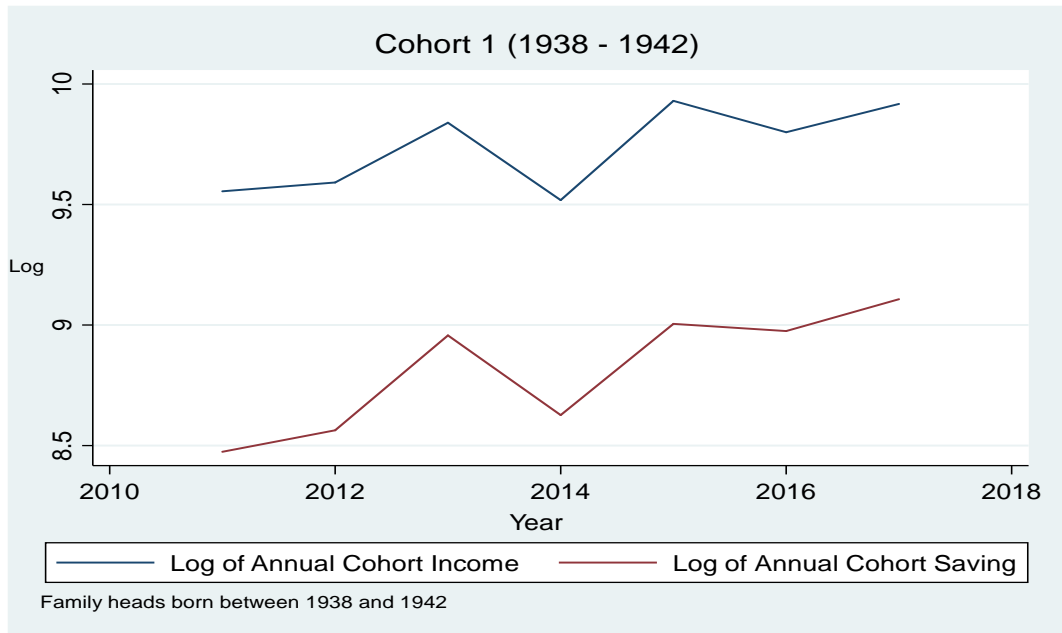


Figure A2.1. Graph of Cohort Income and Cohort Saving for Cohort 1

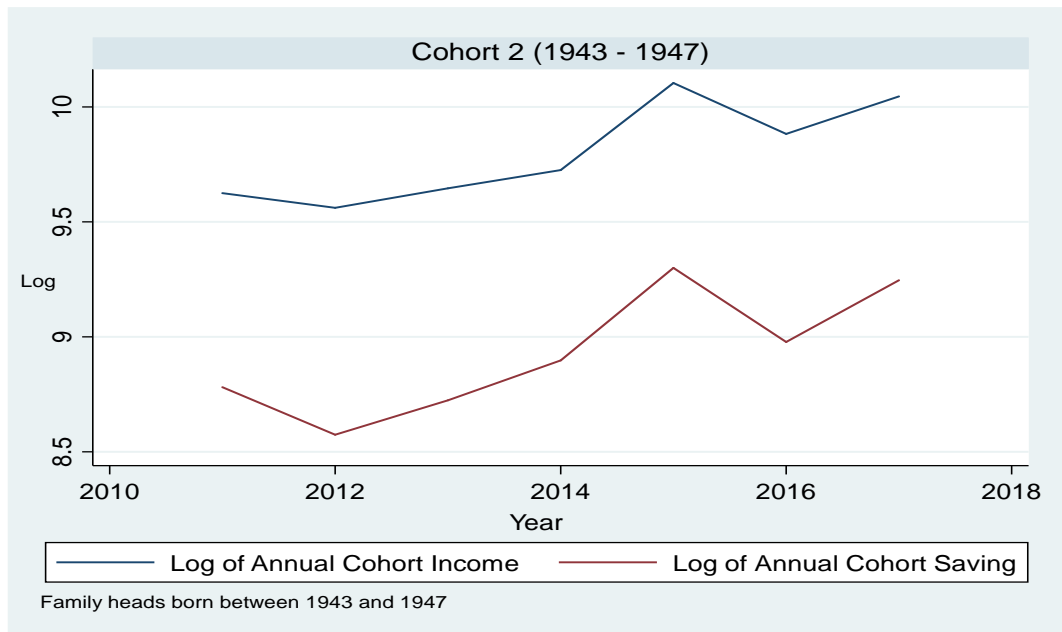


Figure A2.2. Graph of Cohort Income and Cohort Saving for Cohort 2

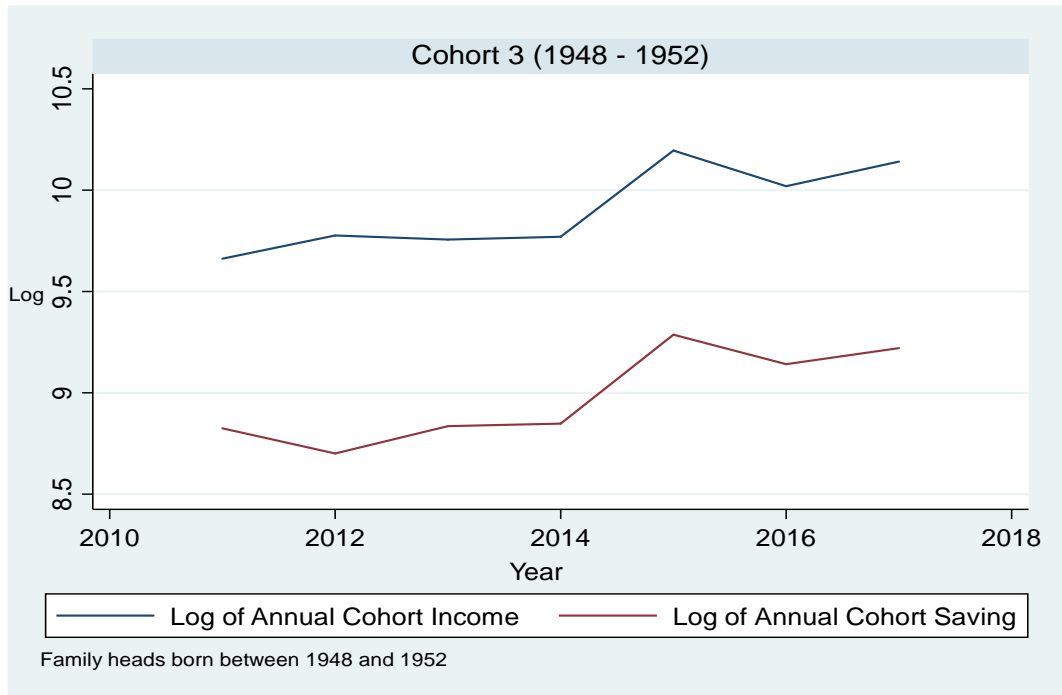


Figure A2.3. Graph of Cohort Income and Cohort Saving for Cohort 3

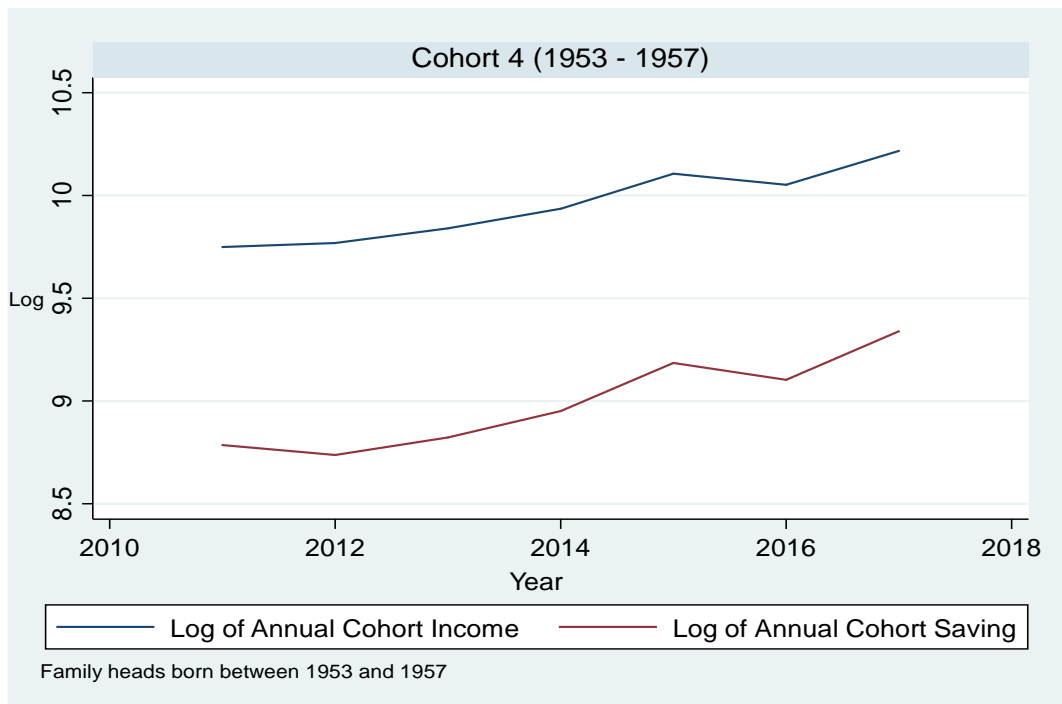


Figure A2.4. Graph of Cohort Income and Cohort Saving for Cohort 4

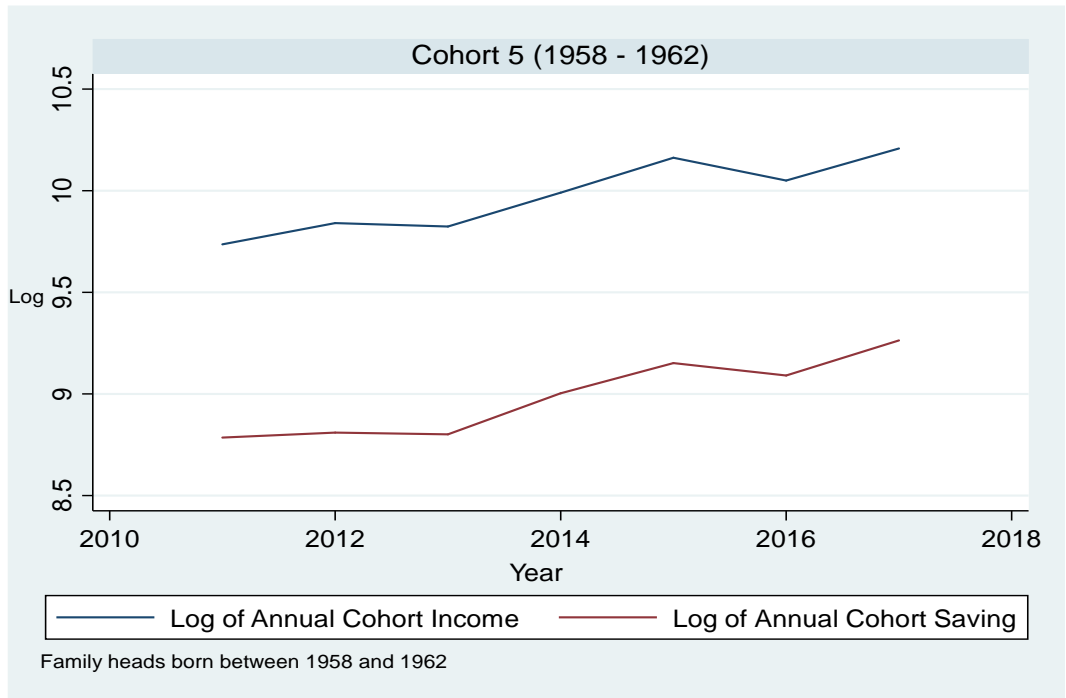


Figure A2.5. Graph of Cohort Income and Cohort Saving for Cohort 5

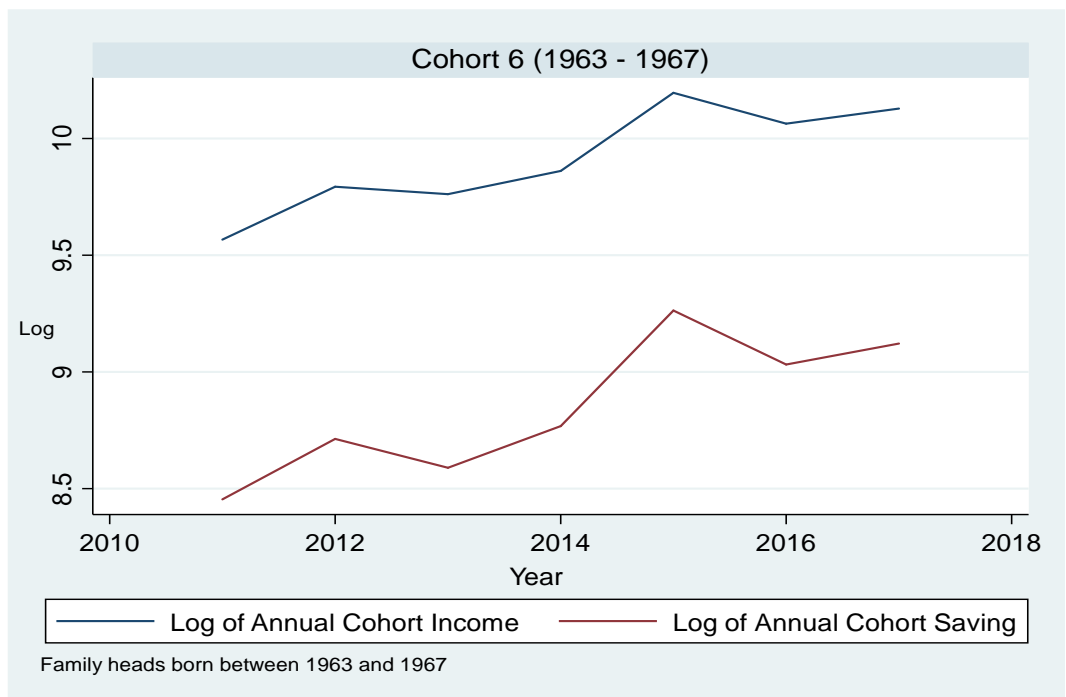


Figure A2.6. Graph of Cohort Income and Cohort Saving for Cohort 6

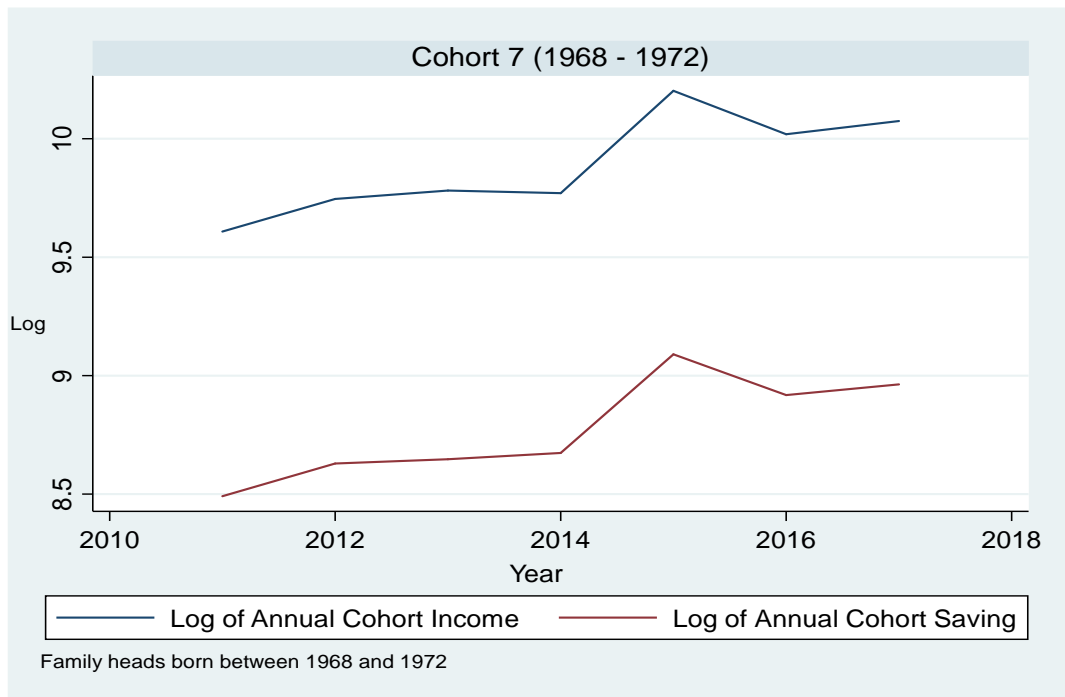


Figure A2.7. Graph of Cohort Income and Cohort Saving for Cohort 7

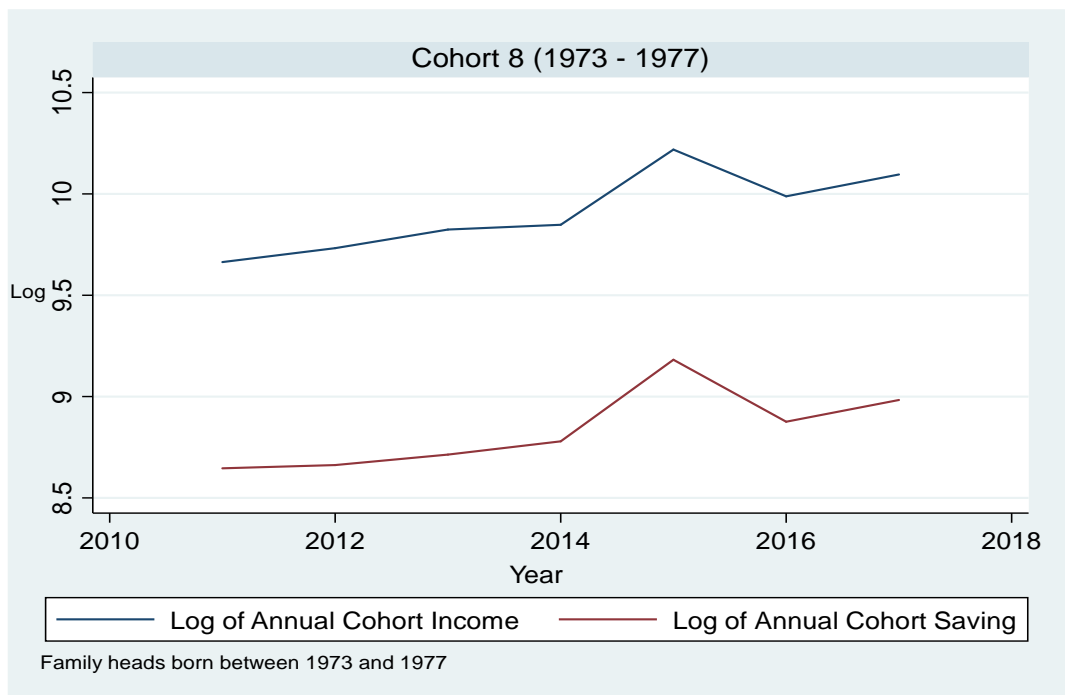


Figure A2.8. Graph of Cohort Income and Cohort Saving for Cohort 8

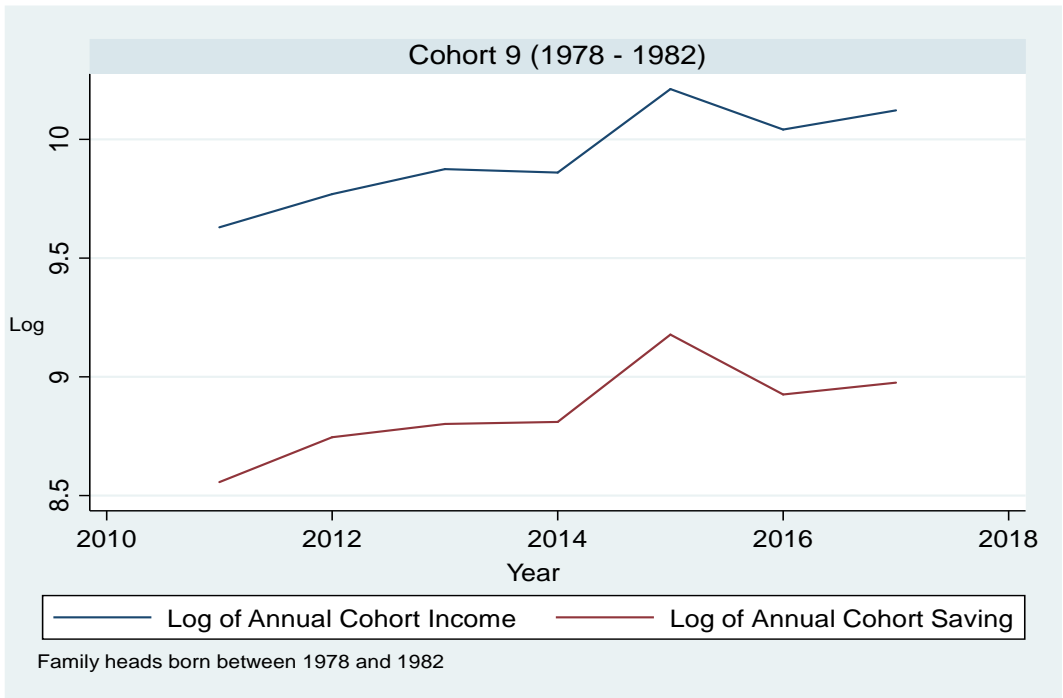


Figure A2.9. Graph of Cohort Income and Cohort Saving for Cohort 9

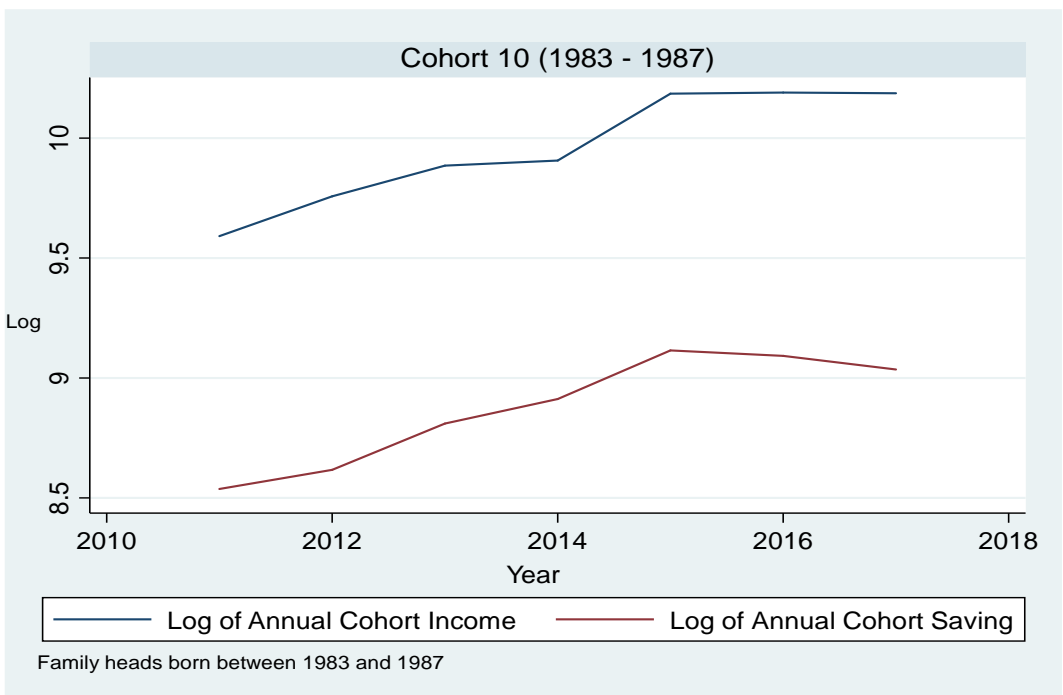


Figure A2.10. Graph of Cohort Income and Cohort Saving for Cohort 10

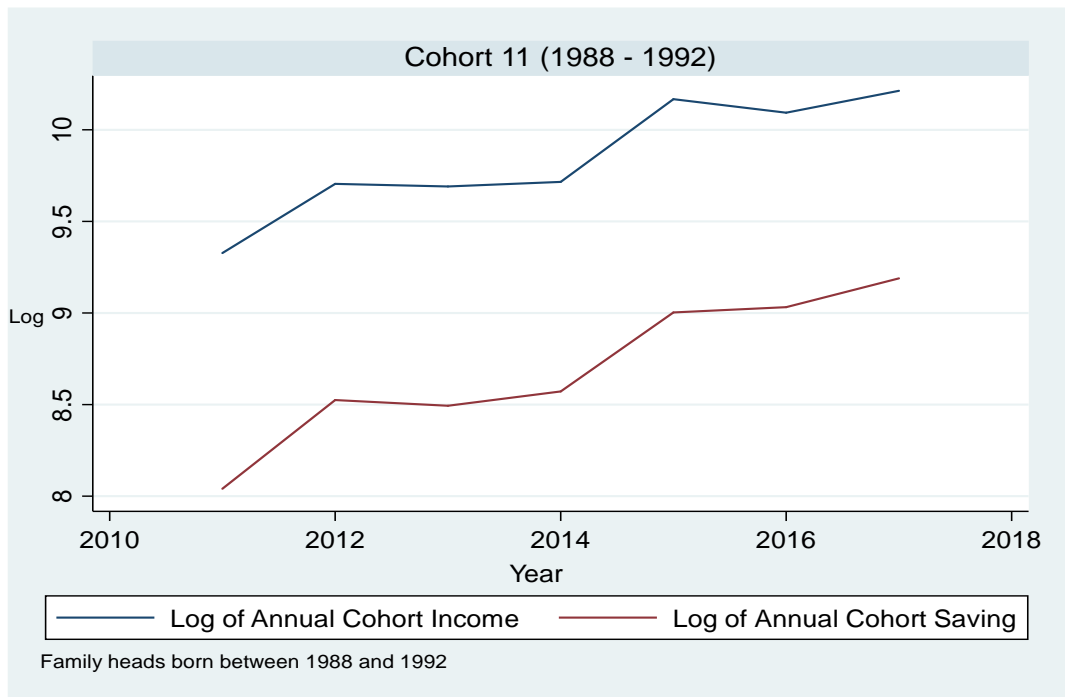


Figure A2.11. Graph of Cohort Income and Cohort Saving for cohort 11

APPENDIX 3

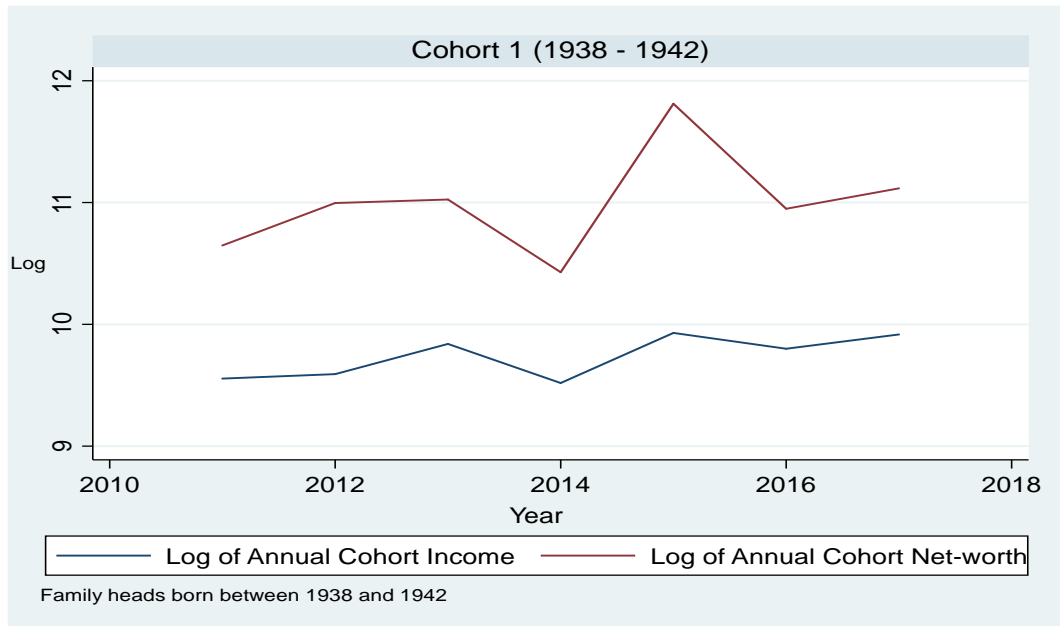


Figure A3.1. Graph of Cohort Income and Cohort Net-worth for Cohort 1

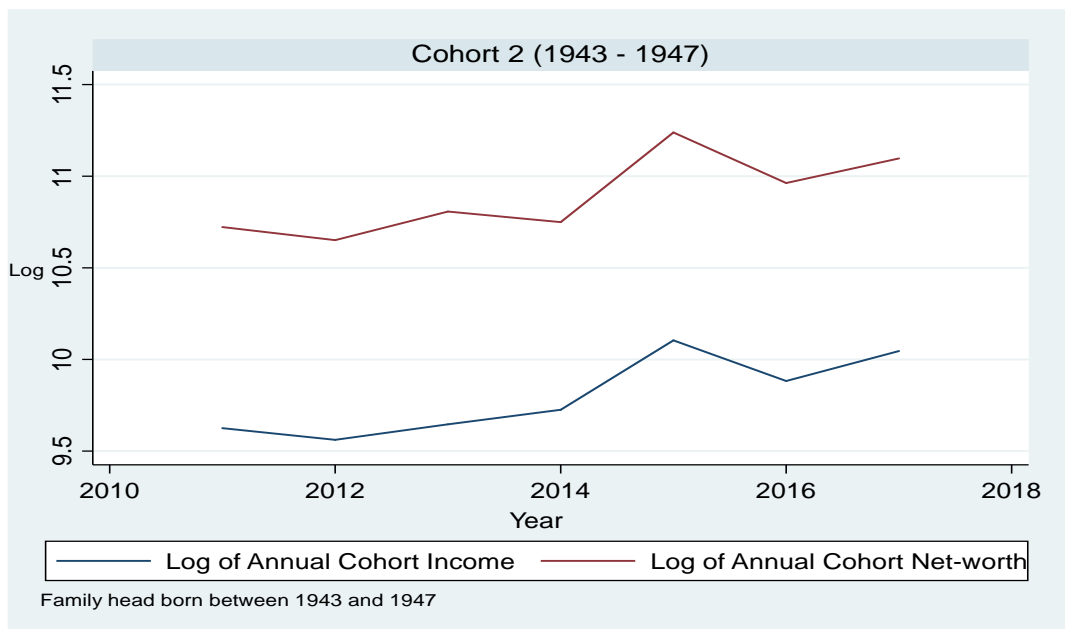


Figure A3.2. Graph of Cohort Income and Cohort Net-worth for Cohort 2

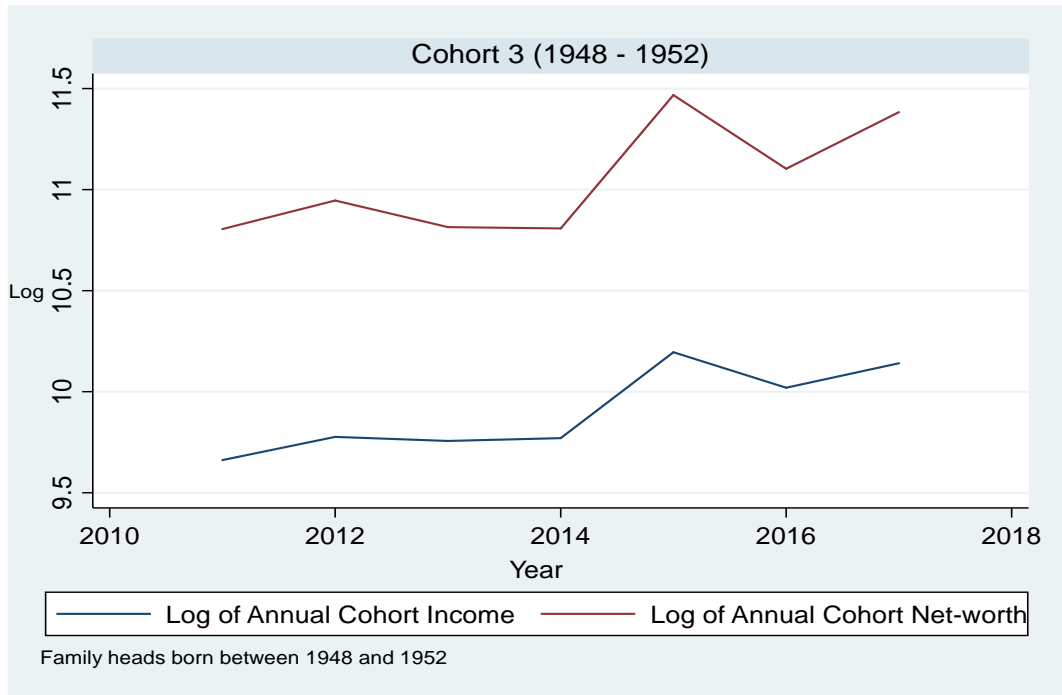


Figure A3.3. Graph of Cohort Income and Cohort Net-worth for Cohort 3

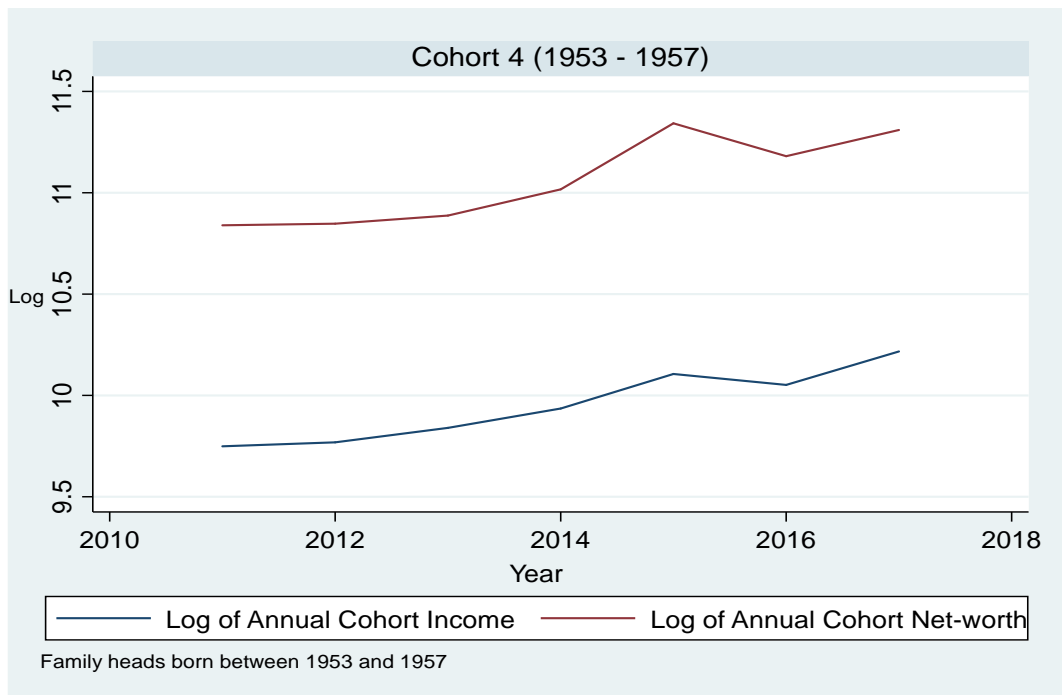


Figure A3.4. Graph of Cohort Income and Cohort Net-worth for Cohort 4

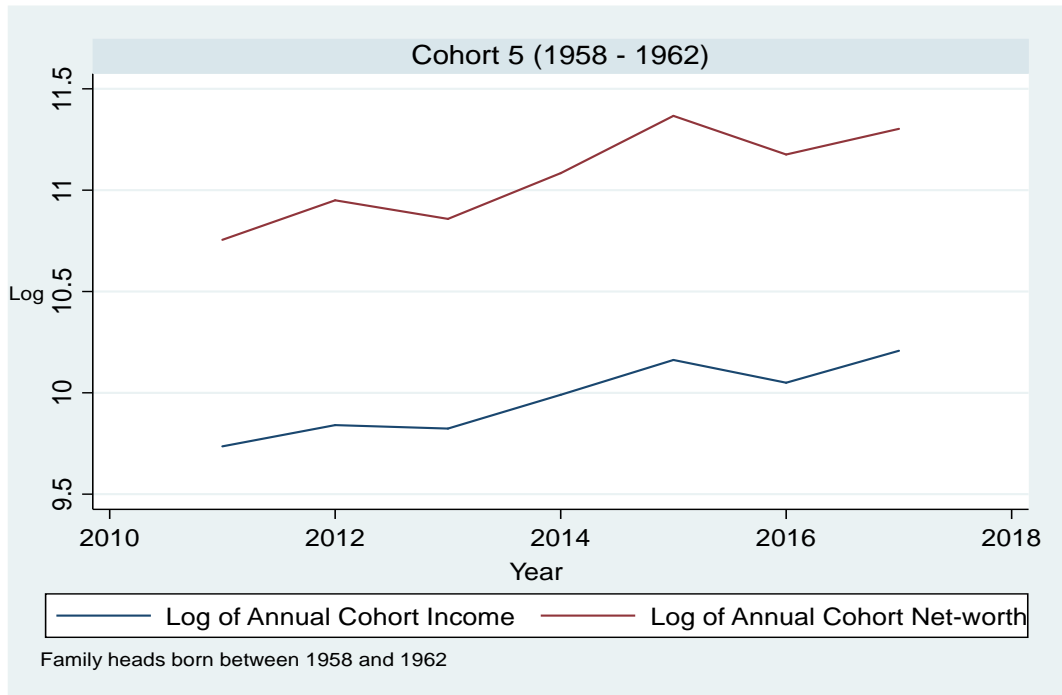


Figure A3.5. Graph of Cohort Income and Cohort Net-worth for Cohort 5

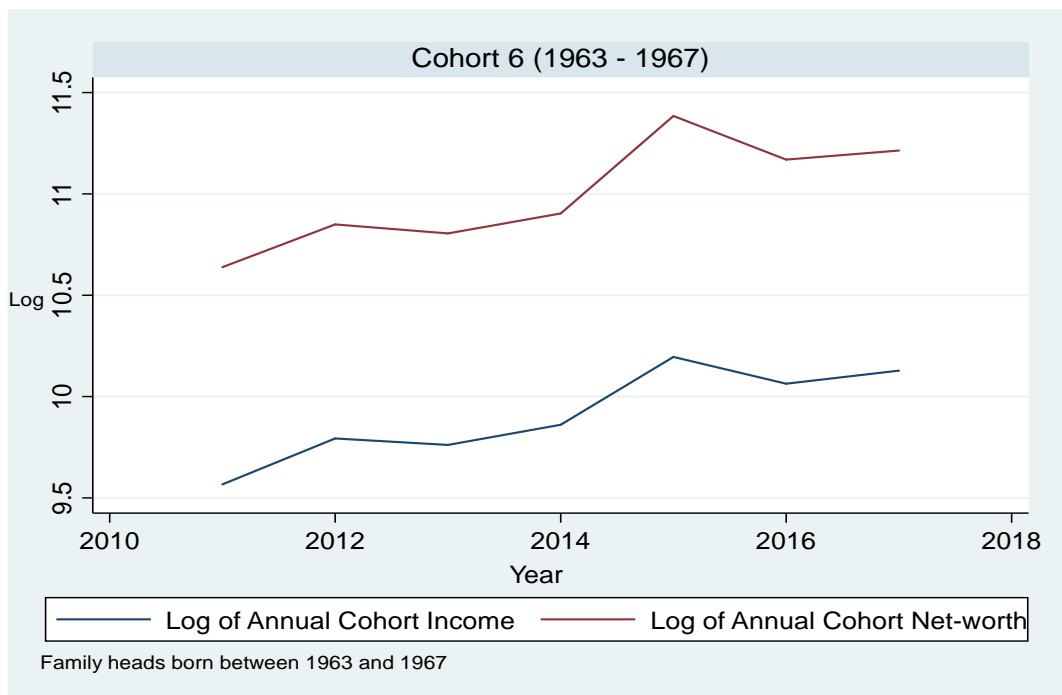


Figure A3.6. Graph of Cohort Income and Cohort Net-worth for Cohort 6

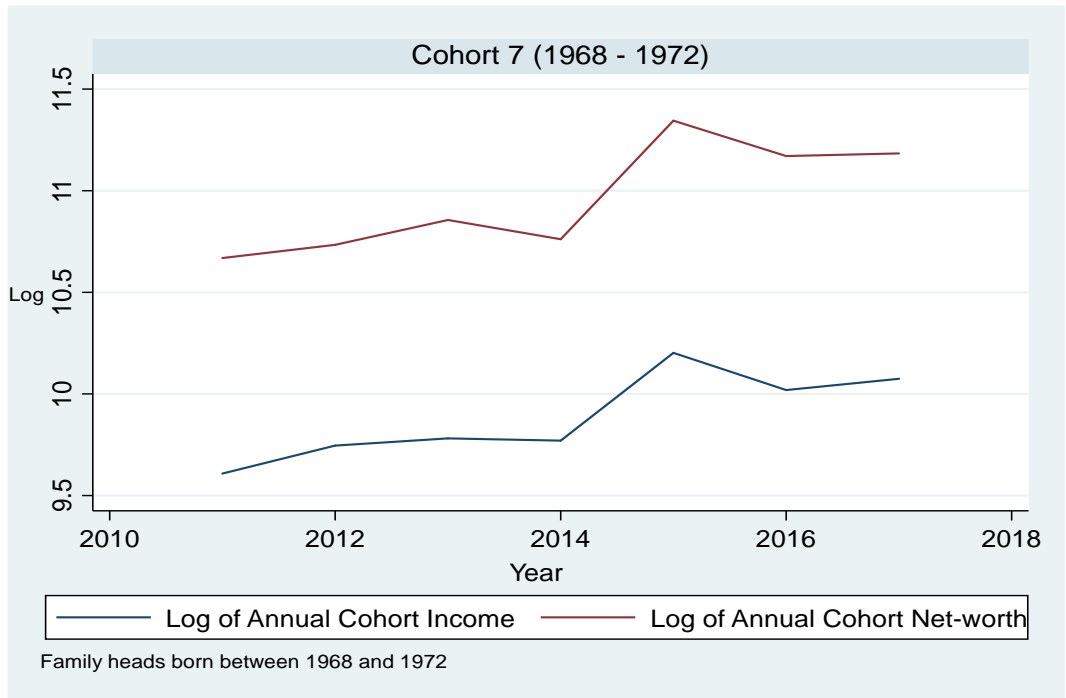


Figure A3.7. Graph of Cohort Income and Cohort Net-worth for Cohort 7

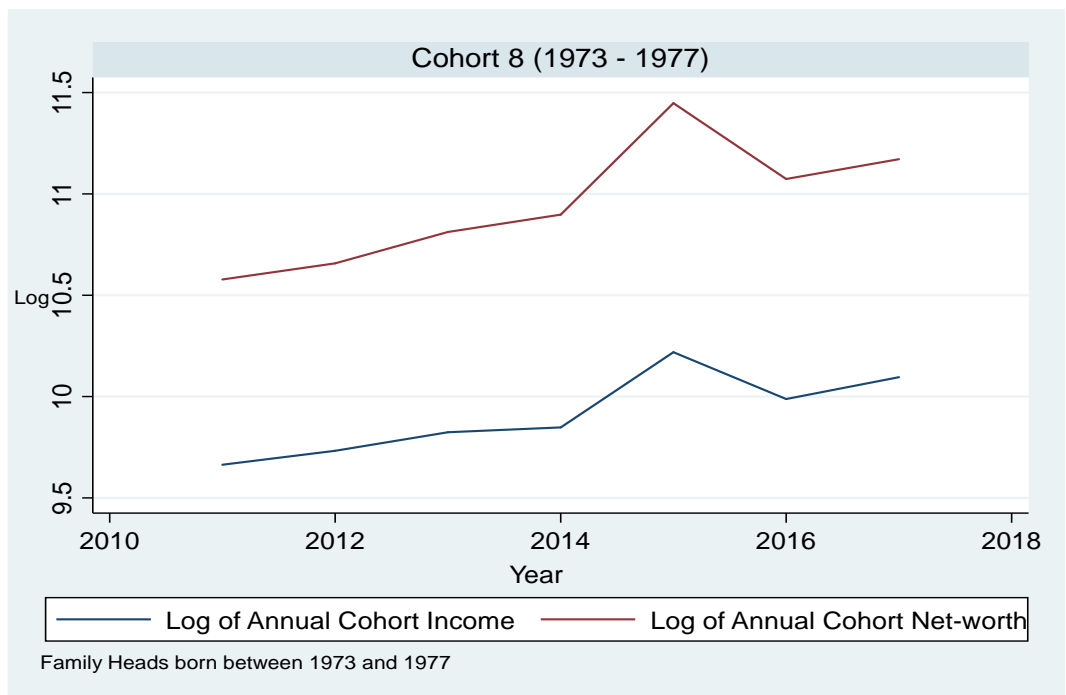


Figure A3.8. Graph of Cohort Income and Cohort Net-worth for Cohort 8

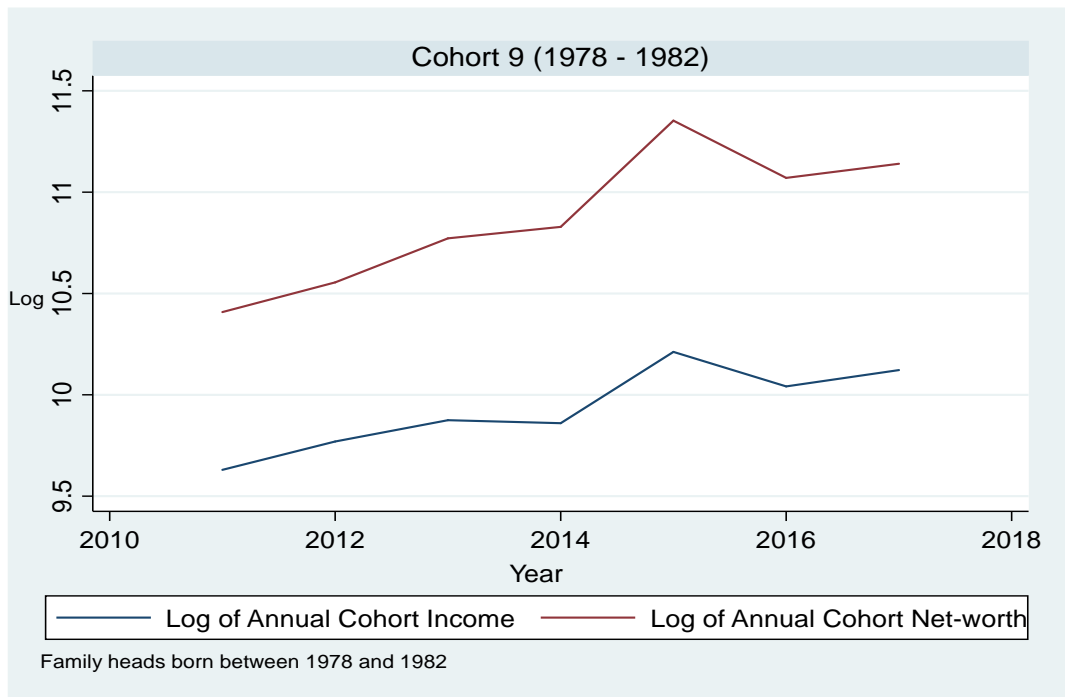


Figure A3.9. Graph of Cohort Income and Cohort Net-worth for Cohort 9

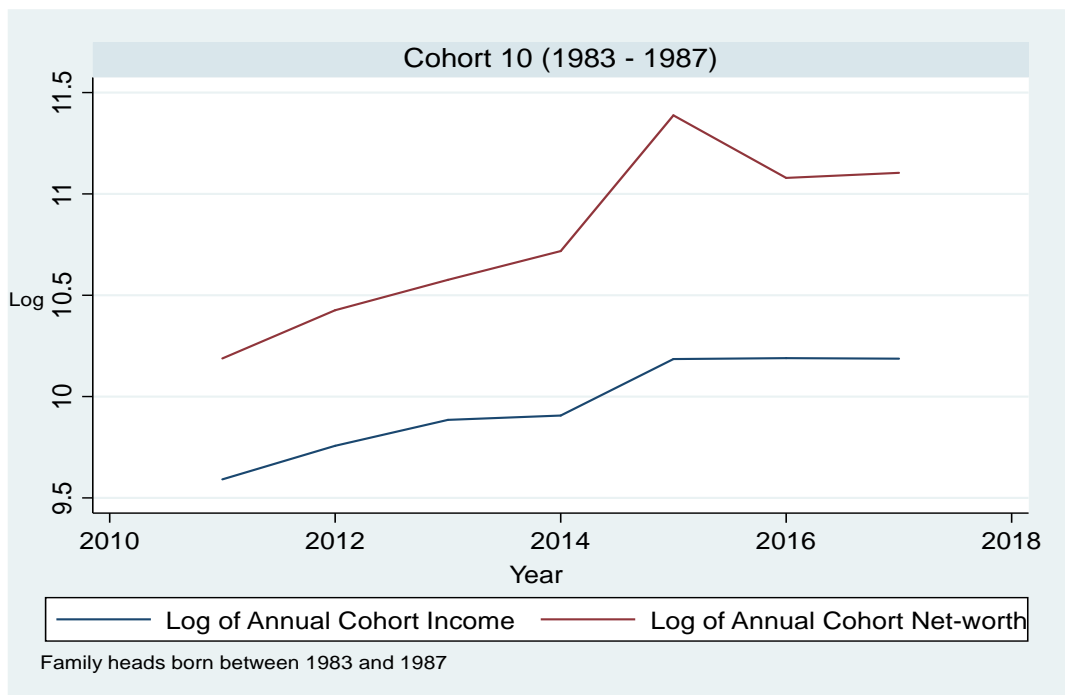


Figure A3.10. Graph of Cohort Income and Cohort Net-worth for Cohort 10

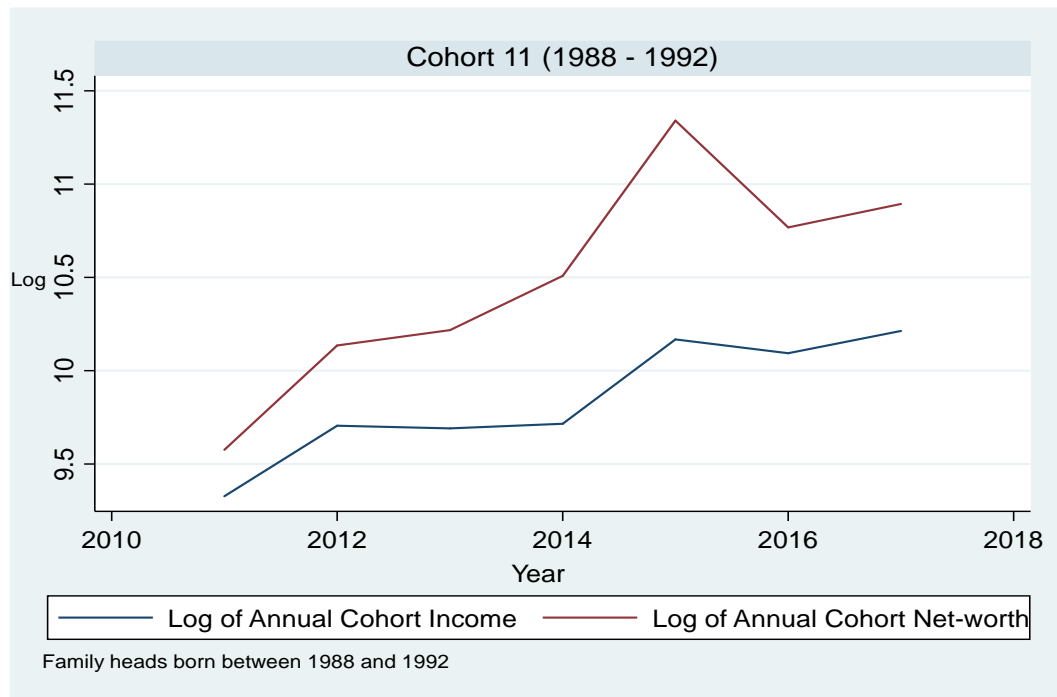


Figure A3.11. Graph of Cohort Income and Cohort Net-worth for Cohort 11

Table A3.5. Regression results from Ceritoglu's (2017) model

	Turkey		Young workers		Mature Workers		Retirees	
	(1) Cons. Growth	(2) Cons. Growth	(3) Cons. Growth	(4) Cons. Growth	(5) Cons. Growth	(6) Cons. Growth	(7) Cons. Growth	(8) Cons. Growth
Cohort Income	-0.0790 (0.130)	-0.0848 (0.145)	-0.0730 (0.0723)	-0.157* (0.0627)	-0.0290 (0.204)	0.184* (0.0764)	0.0994 (0.228)	0.0555 (0.223)
Variance of Cohort Cons. Growth	-4.131 (3.730)	-6.351 (3.453)	0.128 (7.407)	-0.491 (8.208)	2.309 (5.068)	4.923 (4.404)	5.163 (13.83)	-12.92 (11.62)
Household Size:								
hhsiz5	-0.669 (0.389)		-1.271 (0.568)		-2.141 (1.185)		-1.869 (0.861)	
hhsiz6		0.332 (0.473)		-0.146 (0.424)		-3.997* (1.629)		0.707 (1.401)
House Ownership	-0.102 (0.154)	-0.0753 (0.108)	-0.505* (0.180)	-0.440 (0.233)	1.587** (0.472)	0.618* (0.202)	0.592 (0.205)	0.300 (0.212)
Gender:								
Male	1.168 (1.186)		2.033 (2.101)		-1.784 (4.033)		1.205 (2.404)	
Female		-1.182 (1.186)		-1.886 (1.955)		4.085 (3.303)		0.310 (1.396)
Higher Education	-0.232 (0.280)	-0.0648 (0.211)	-0.670 (0.287)	-0.473 (0.257)	0.0375 (0.319)	0.0660 (0.250)	1.423 (1.782)	1.283 (2.597)
R-squared	0.117	0.093	0.439	0.392	0.353	0.386	0.300	0.180
Observations	77	77	28	28	28	28	21	21
No. of Cohorts	11	11	4	4	4	4	3	3

Notes: (1) Robust standard errors are in parentheses. The 3 asterisks (***), 2 asterisks (**), and 1 asterisk (*) refer to coefficients that are significant at 1%, 5%, and 10% significance levels, respectively.

(2) The household size dummies are hhsiz5 (1 for an extended family; 0 for otherwise) and hhsiz6 (1 for a single-parent family; 0 for otherwise). The gender dummies are male (1 for being a male; 0 for otherwise) and female (1 for being a female; 0 for otherwise), and the higher education dummy is assigned 1 for family heads with a 2-year vocational school certificate, undergraduate degree, master's degree or a Ph.D. degree; 0 for otherwise. The other household size dummies (hhsiz1, hhsiz2, hhsiz3, and hhsiz4) are excluded from the regressions because they cause multi-collinearity.

CURRICULUM VITAE

Personal Information:

Name - Surname: Lamin Dibba

E-mail (1): lamin.dibba@ibnhaldun.edu.tr

E-mail (2): ld130301118@gmail.com

Education:

2014-2018 BA in Economics, Abant Izzet Baysal University, Turkey

2018-2020 MA in Economics, Ibn Haldun University, Turkey

Teaching Experience:

September 2018 – January 2020 Teaching Fellow, SPS103, Ibn Haldun University

February – May 2020 Teaching Assistant, Econometrics, Ibn Haldun University

Conferences and Presentations:

Dibba, L. (2020, May). *Analysis of the Precautionary Saving Motive Using Income Risk as a Measure of Uncertainty: Evidence from Turkey*. Paper presented at the 3rd Graduate Conference on Social Sciences, Humanities, and Management, IHU Gradcon 2020, Istanbul, Turkey.

Awards and Scholarships:

Turkish Government Undergraduate Scholarships (2013 – 2018)

Ibn Haldun University's Full Scholarship for Graduate Studies (2018 – present)