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The Impact of Labour Income Risk on Household Saving Decisions in Turkey

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The Impact of Labour Income Risk on Household Saving Decisions in Turkey [a] [b]

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Abstract

I analyse the Household Budget Surveys prepared by the Turkish Statistical Institute (TURKSTAT) to reveal the empirical importance of precautionary saving in Turkey. The most difficult aspect of the empirical analysis is the approximation of labour income risk as a proxy variable for future labour income uncertainty. Individual disposable income is interacted with the probability of being unemployed and with the probability of job-loss in the next period to generate the labour income risk variables. The econometric results support the precautionary saving hypothesis and labour income risk emerges as one of the main determinants of household saving decisions. Moreover, households implement alternative strategies to smooth their income streams such as holding a second job and increasing the number of income earners in the family. However, it is observed that they are still vulnerable against labour income risk, which underlines the need for a satisfactory social security system.

JEL Classification: D12 and J65

Key words: *precautionary saving, labour income risk and unemployment insurance*

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I. Introduction

The aim of this empirical research paper is to analyse the impact of labour income risk on household saving decisions in Turkey. Although, the analysis of household consumption and saving behaviour is arguably one of the most interesting topics in economic theory, the empirical literature is far from being satisfactory. Specifically, there is a significant gap in the literature from a micro-economic point of view within the context of developing countries. Thus, I analyse the Household Budget Surveys prepared by the Turkish Statistical Institute (TURKSTAT) to reveal the empirical importance of precautionary saving in Turkey.

The discussion on the nature and the importance of precautionary saving is not only a theoretical issue, but it is also important for public policy formation, especially for the design of health care and unemployment insurance schemes (Attanasio and Weber, 2010). There is a rich empirical literature on precautionary saving for developed countries *i.e.* Lusardi (1997 and 1998), Kazarosian (1997), Carroll and Samwick (1997 and 1998), Guariglia (2001), Guariglia and Rossi (2002), Carroll *et al.* (2003), Benito (2006). Although, there are significant contributions such as Kochar (1999), Guariglia and Kim (2003 and 2004), Chamon and Prasad (2010), empirical research on precautionary saving for developing countries has been limited so far.

Generally, the labour market of Turkey is not considered as flexible, especially in the public sector. However, private sector employees experience certain difficulties. It is observed that the majority of the labour force works at the minimum wage rate in the private sector and it is estimated that half of the labour force works in the unregistered economy. Therefore, they cannot benefit from the social security system such as health care expenditures and retirement pensions. Moreover, union membership is limited among private sector workers. Finally, it is quite difficult to deserve unemployment insurance, while unemployment insurance payments are only half of the minimum wage.

Tansel (1992) observed that second job holding is quite widespread, especially among farmers in the rural regions using the TURKSTAT Household Labour Surveys in Turkey. Metin-Özcan *et al.* (2003) found that there is a positive relationship between private savings and inflation variability using macroeconomic figures for the Turkish economy and considered that as empirical evidence in favour of the precautionary saving hypothesis. Moreover, Rijckeghem and Üçer (2009) showed that household saving is inversely related to health expenditures risk using TURKSTAT Household Budget Surveys. However, to my knowledge this topic was not investigated

for the Turkish economy using micro-economic data previously, which is more appropriate for the analysis of household behaviour under risk and uncertainty.

The precautionary motive for saving might be even more important for households from developing countries. The lack of a satisfactory social security system, which will meet the needs of society, might raise the amount of precautionary saving. However, empirical research for developing countries is scarce mainly due to the lack of appropriate micro-economic data sets (Deaton, 1997). The TURKSTAT Household Budget Surveys present a good opportunity to investigate the empirical importance of precautionary saving in Turkey. Therefore, it is thought that the empirical analysis in this paper is a positive contribution to the literature on household consumption and saving behaviour for developing countries.

The outline of this paper is as follows: Section II presents a formal interpretation of the Permanent Income Theory and the precautionary saving hypothesis. Section III shows the approximation of labour income risk and the prediction of permanent income following a descriptive analysis of the TURKSTAT Household Budget Surveys. Section IV presents the econometric results. Finally, Section V concludes this empirical paper.

II – Theoretical Background

II.1 – A Formal Interpretation of the Permanent Income Theory

The main idea behind the Permanent Income Theory is the fact that the individual's life-time consumption cannot be greater than his/her life-time resources (Friedman, 1957). It is assumed that there is a rational and risk-averse individual, who is a representative economic agent for the rest of society. The only source of utility is consumption and the individual aims to maximise utility from consumption with respect to the budget constraint, which is the total lifetime resources of the individual. As a result, saving is defined simply as the difference between current income and consumption. It is assumed that consumption has a steady pattern throughout the individual's life following permanent income, but saving is quite volatile in this period. In addition to that, it is expected that transitory income changes will be reflected in saving, which increases its volatility.

According to this interpretation of the Permanent Income Theory, the ultimate purpose of saving is future consumption. Campbell (1987) suggests that it is reasonable to evaluate this definition of saving as

"*saving for a rainy day*". The individual raises the amount of saving if his/her future income prospects are bleak or uncertain. This interpretation allows for the establishment of a direct link between saving decisions in the current period and future income prospects. In this respect, saving will be a good predictor of expected income changes.

In this framework, following Deaton (1992), it is possible to define consumption as the present value (PV) of wealth and expected life-time income (1):

$$c_t = \frac{r}{1+r} A_t + \left(\frac{r}{1+r}\right) \sum_{i=0}^{\infty} (1+r)^{-i} \mathrm{E}(y_{t+i} \mid \Omega_t). \tag{1}$$

In this terminology, c_t is the real consumption, y_t is the real *labour* income, A_t is the real value of financial assets, r is the real interest rate, which is constant, and finally Ω_t is the information available to the individuals at time t upon which their expectations are based.

$$s_t = \frac{r}{1+r} A_t + y_t - c_t \tag{2}$$

The equation (2) is substituted into the equation (1) to express the "*saving for a rainy day*" concept formally. Saving at time t (s_t) is the present value (PV) of all future expected falls in income, as shown in equation (3) below. In this equation, the symbol Δ indicates the backward first difference.

$$s_t = -\sum_{i=1}^{\infty} (1+r)^{-i} \mathrm{E}(\Delta y_{t+i} \mid \Omega_t) \tag{3}$$

At this point, it is important to indicate that the information at time t Ω_t is only available to the individual. Therefore, it is necessary to replace the information matrix of the individual Ω_t with the information

available to the researcher H_t. The researcher has only limited information compared to the individual, $H_t \subseteq \Omega_t$. Consequently, the equation (4) becomes a formal expression with observable variables, which is appropriate for empirical analysis.

$$s_t = -\sum_{i=1}^{\infty} (1+r)^{-i} \mathrm{E}(\Delta y_{t+i} \mid H_t) \tag{4}$$

The intuition behind the "s*aving for a rainy*" conceptualisation is that the individual will increase his/her saving in the current period if he/she anticipates that his/her future income will be lower than its lifetime average. This is certainly the case for many households from the rural regions of developing countries. Since their agricultural revenues are dependent on favourable weather conditions, rural households are able to forecast their agricultural income level accurately by considering seasonal weather changes in the previous periods. Hence, they adjust their saving level according to the available information.

II.2 – The Precautionary Saving Hypothesis under Labour Income Risk

The precautionary saving hypothesis proposes that households are forced to postpone their consumption expenditures and raise their saving level in order to ensure their well-being under risk and uncertainty. The postponement of consumption expenditures and the rise in the amount of saving will allow the households to accumulate financial assets. The main reason for the choice of financial wealth is the fact that it can be used almost instantaneously in times of need due to its liquid character. Hence, the presence of financial wealth guarantees the well-being of the family. In this respect, p*recautionary saving* is defined as the amount of financial wealth that households keep to safeguard themselves from future labour income uncertainty.

On the other hand, there is a significant theoretical and empirical difference between the saving for a rainy day concept and the precautionary saving hypothesis. It is expected that saving will be a good predictor of future income changes, *i.e.* an individual will increase his/her saving level in the current period, if he/she expects that income will fall in the next periods. However, the precautionary motive for saving will emerge if and only if there is uncertainty about future labour income prospects such as a spell of unemployment.

Although, the precautionary saving hypothesis is widely accepted from a theoretical point of view, previous empirical research indicates that the share of precautionary saving in household saving is small and quantitatively unimportant (Browning and Lusardi, 1996; Attanasio and Weber, 2010). A crucial aspect of the discussion on precautionary saving is that there are different types and sources of risk and uncertainty in the economy. Moreover, it is suggested that the complexity of the development of proxy measures for uncertainty contributes to the underestimation of the empirical importance of precautionary saving. Households are not only concerned with the possibility of losing their jobs, but they are also worried about health care issues because of the size of out-of-pocket health expenditures. Therefore, it is essential to establish an alternative approach to understand the empirical importance of precautionary saving. A feasible option is to analyse the impact of each type of income risk on household saving decisions separately.

An alternative formulation of household consumption and saving behaviour, which incorporates the precautionary saving hypothesis with the Permanent Income Theory, can be presented formally as shown in equation (5). The virtue of this alternative formulation is that it is suitable for the empirical verification of the theory under risk and uncertainty. This alternative formulation of the saving function depends on Campbell's (1987) "*saving for a rainy day*" interpretation of the Permanent Income Theory. For instance, Guariglia (2001) and Guariglia and Kim (2003 and 2004) followed a similar approach to estimate the empirical importance of precautionary saving.

$$S_h = \alpha_h + \beta \hat{Y}_h^P + \lambda \tilde{U}_{hh} + \sum_{k=1}^{K} \vartheta_k Z_h + u_h \tag{5}$$

The dependent variable (S) of this equation is household saving. There are two essential explanatory variables on the right hand side of the household saving equation. The first one is the estimation of the permanent component of household head's income (Y_P) and the second variable is the approximation of the household head's labour income risk (U). The social and demographic characteristics of the households (Z) are incorporated into the econometric investigation process as control variables.[1]

[1] The introduction of household permanent income and the social and demographic characteristics into the econometric investigation process aims to capture the life-cycle effects such as saving for the retirement period. However, the precautionary motive for saving is independent of the life-cycle motives and it emerges only if there is uncertainty about future income prospects. Therefore, the approximation of the household head's labour income risk enters the household saving equation as an independent variable.

III – Empirical Analysis

III.1 – TURKSTAT Household Budget Surveys

I analyse seven consecutive waves of the TURKSTAT Household Budget Surveys between 2003 and 2009, which are actually repeated cross-sectional surveys that do not have a panel dimension. However, these surveys provide information about family structure, economic indicators, social and demographic characteristics at the individual level and the household level. Moreover, the TURKSTAT Household Budget Surveys provide detailed data about sub-items of household consumption expenditures as well as income distribution at the household level distinguishing between rural regions and urban regions.[2]

Traditionally, family is the most important aspect of social life, which makes it the focus of empirical research on household consumption and saving behaviour as well. Therefore, household saving is the dependent variable in the econometric investigation process. There are two different definitions of household saving are analysed in this empirical paper.[3] The first definition of household saving (*SAVI*) is merely the difference between household disposable income and consumption expenditures. The second definition of household saving (*SAVII*) is the difference between household disposable income and consumption expenditures, but in this case, household saving includes expenditures on durable goods from consumption, since durable goods are generally considered as part of household saving in the economics literature.[4] It is calculated that around 56.9 % of total households have positive savings with respect to the first definition of household saving (*SAVI*) in the pooled sample, but this ratio rises to 62.8 %, when the second definition of household saving (*SAVII*) is analysed (Table 1). Moreover, household saving rate increases from 8.7 % to 17% for the pooled sample, if expenditures on durable goods are included in household saving rather than in consumption.[5]

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[2] A settlement unit like a village or town is defined as an urban region, if the total population of the place is equal to or greater than 20.000 people. If its population is less than 20.000 people, then it is considered as a rural region. However, this definition of a rural region does not take into account economic sectors such as the role of the agricultural sector or tourism revenues in the local economy. Therefore, social and economic characteristics of the rural regions might differ significantly between the west and east of the country.

[3] Consumption expenditures are available only at the household level and as monthly figures in the TURKSTAT Household Budget Surveys. Monthly consumption expenditures are multiplied by twelve to reach an annual estimate of household consumption expenditures under the assumption that household consumption follows a steady pattern throughout the year. Moreover, individual disposable income is available both monthly and annually, but household disposable income is available only annually in the surveys. Thus, household saving is calculated as the difference between annual household disposable income and annualised household consumption expenditures.

[4] Durable goods, which are considered as part of household saving, are home appliances, medical equipment, consumer electronics, new and second-hand automobile purchases and jewellery and watches for personal consumption.

[5] TURKSTAT collects individual and household disposable income figures for the twelve months period prior to the survey month, but not for the calendar year due to the design of the survey questionnaires. For instance, if a household participates in the Household Budget Survey in September 2008, then annual household disposable income will refer to the twelve months period between September 2007 and September 2008. However, the monthly inflation rates are quite high and there are significant differences in the inflation rates of geographical regions in Turkey. TURKSTAT includes a regional and monthly inflation variable in the Household Budget Surveys since 2003. Household disposable income and household consumption are inflated to the year-end (December) prices of the corresponding survey year by multiplying with this inflation index. Annual household disposable income and household consumption expenditures are divided by year-end consumer price indices for each survey year and all economic variables including household saving figures are analysed in 2003 TL prices.

Table 1 – Household Saving with respect to the Family Characteristics

	(%) of Households with SAVI > 0	*Median Values of SAVI (TL)*	*(%) of Households with SAVII > 0*	*Median Values of SAVII (TL)*
Total	56.9	395.8	62.8	755.8
Rural	56.6	347.9	61.3	602.2
Urban	57.0	417.8	63.5	836.4
1st 20 %	36.1	-501.0	38.6	-389.4
2nd 20 %	50.8	37.3	55.8	249.0
3rd 20 %	58.4	559.1	65.0	976.4
4th 20 %	69.1	1,854.3	77.0	2,570.6
5th 20 %	79.0	5,793.5	88.1	7,305.1
Household Head Characteristics				
Female	55.6	234.2	61.0	467.0
20 < Age < 24	45.2	-215.0	52.2	115.5
25 < Age < 29	52.4	99.8	59.4	427.0
30 < Age < 34	54.4	231.8	61.4	598.5
35 < Age < 39	54.8	251.4	61.4	625.4
40 < Age < 44	55.9	377.9	61.6	789.3
45 < Age < 49	57.9	521.3	64.3	1,013.9
50 < Age < 54	58.7	631.4	65.0	1,102.9
55 < Age < 59	59.0	623.6	64.4	1,102.9
60 < Age < 64	58.9	536.6	64.1	863.2
Home-Ownership,				
Home-Owner	60.0	592.6	65.7	961.5
Tenant	49.4	-32.8	55.7	290.7
House provided by Employer	68.7	1,856.1	75.9	2,709.9
House owned by a Relative	48.7	-71.9	55.0	296.6
Education Level of the Household Head				
Illiterate	51.3	47.6	55.0	184.1
Literate	55.7	261.0	60.0	425.4
Primary School	55.5	289.4	61.0	598.5
High School	59.5	642.6	65.7	1,141.8
Vocational School	57.8	676.7	66.8	1,398.7
University Graduate	67.0	2,202.3	76.0	3,393.9
Health Insurance Coverage of the Household Head				
Compulsory	60.0	684.5	66.8	1,168.6
Voluntary	57.9	339.3	61.8	665.0
Green-card	41.6	-353.6	45.3	-178.7
No Health Insurance	50.9	32.94	54.7	177.13

Source: TURKSTAT Household Budget Surveys

The TURKSTAT Household Budget Surveys do not provide information about the individuals' ages. Instead, the surveys specify the age intervals of the individuals. Therefore, the empirical analysis can only be realised with respect to the individuals' age groups, which increase in five year intervals. For this reason, it is not possible to create a pseudo-panel data set using birth cohorts, since it is not possible to determine the individuals' birth years. The remaining age groups, which are not shown in Table 1, are children between the ages of 0 to 5, 6

to 14 and 15 to 19 and individuals, who are 65 or older. On the other hand, it is observed that there is a positive relationship between the age of the household head and household saving level (Table 1).

III.2 – The Approximation of Labour Income Risk

The main focus of the econometric investigation process is *labour income risk,* which is associated with future labour income uncertainty in the economy. The development of a proxy variable for uncertainty, which separates anticipated income changes from unexpected negative income shocks such as a spell of unemployment, is essential to the analysis of the precautionary saving hypothesis.[6] A suitable proxy variable for uncertainty and to capture its implications for household saving decisions can be based on the prediction of unemployment risk. Labour income risk is generated by interacting unemployment risk of the individual with the variance of labour income following Lusardi (1998), Guariglia (2001) and Guariglia and Kim (2004), as shown in equation (6).

The approximation of labour income risk, which is based on the probability of being unemployed in the next period, is more appropriate to reveal the empirical importance of precautionary saving, since unemployment risk is a more relevant concern for working-class individuals rather than the volatility of income.[7] Moreover, this proxy variable is restricted to only labour income. There are different sources of disposable income such as rent and interest income, which are available to the individual, even if the individual is unemployed and searching for a job at that moment. Thus, only the variance of labour income is interacted with unemployment risk to create the labour income risk variable. The individual has zero labour income with the probability (p) and with the probability ($1 - p$) the individual gains his/her labour income (I), which excludes income from all other sources. The sum of the two possibilities will be the expected labour income of the individual in the next period. The subscript (i) indicates that the model is estimated using individual observations.[8]

[6] According to Browning and Lusardi (1996), a potential uncertainty measure must be an *observable* variable, but an *exogenous* one to the individual's decisions and behaviour. Finally, a potential uncertainty measure must be variable across the population to account for the *heterogeneity* in society.

[7] Carroll *et al.* points that (2003, pg. 586) "… a tenured college professor who, by choice, teaches or consults every other summer may have more variable annual income than a factory worker, but does not face the uncertainty of being laid off during a recession."

[8] The common approach in the previous literature is to approximate labour income risk by using the individuals' subjective evaluation of unemployment risk. However, the TURKSTAT Household Budget Surveys do not have a question about the individuals' subjective evaluation of the probability of being unemployed in the next period, which restricts the scope of the empirical analysis. At the same time, it is observed that the *objective* probability of being unemployed in the next period is also used to generate labour income risk. For instance, Guariglia and Kim (2004) used the objective probability of unemployment risk to develop a second approximation of labour income risk to check for the robustness of their econometric results.

$$U_i = p_i * (1 - p_i) * (I_i)^2 \tag{6}$$

Unemployment is defined as the situation, when an individual is not working, but actively seeking a job during the survey month. The probability of being unemployed is predicted from a probit model. The dummy variable for being unemployed, which takes the value of one if the individual is unemployed and zero otherwise, is regressed on gender, age-group, age-group squared, health insurance coverage and education level. It is thought that health insurance coverage is an important factor in individuals' labour force participation choices, since most individuals gain most individuals gain health insurance coverage as well as social security coverage through their employment contracts. Moreover, time dummy variables for survey years and a dummy variable for the rural regions are also included in the probit model. There are 112,205 individuals, who participate in the labour market and 9,666 of them are unemployed individuals, who constitute 8.61 % of the labour force in the pooled sample, which is consistent with national unemployment rates.

The sample set is restricted to the household heads, who are of working age – between 15 and 64 – and who participate in the labour market voluntarily. Unpaid family workers are excluded from the sample, since they pre-dominantly work in family farms in agricultural production in the rural regions. Thus, these individuals have significant differences in their labour market choices compared to the working-class individuals. Moreover, all of the retired individuals are excluded from the sample set, since their perception of unemployment risk and income loss would be significantly different than young and active individuals in the labour market. As a result, the probit model is estimated for 47,884 household heads, who satisfy these criteria from the pooled sample of the TURKSTAT Household Budget Surveys between 2003 and 2009 (Table 2).[9]

Moreover, it is possible that individuals pool the risk of being unemployed and losing their labour income by living together with their family just as they share their income and consumption in the family. Thus, it is necessary to consider this issue in the approximation of labour income risk. For this reason, the probit model for the probability of being unemployed is estimated by controlling for clustering within the household. The consideration of clustering within the household also aims to attend to the unobserved heterogeneity issues, which might stem from household characteristics.

[9] A shortcoming of the TURKSTAT Household Budget Surveys is that there is not any information about income and employment prospects of the individual, if he/she is already unemployed. It is possible to observe the employment sector and job status of the individual, only if he/she is currently employed. Moreover, it is not feasible to find whether the individual has social security coverage or not, if he/she is unemployed.

Table 2 – Unemployment Risk of the Household Heads (1)

	Pooled Sample, Cluster (Household)	
	Unemployed	
	Coef.	*Std. Err.*
Female	0.329	(0.064)**
Age Group	0.169	(0.049)**
Age Group Squared	-0.010	(0.003)**
Health Insurance Coverage		
Compulsory	-0.964	(0.031)**
Voluntary	-0.187	(0.092)*
Green-card	0.003	(0.036)
Education Level		
Illiterate	0.244	(0.082)**
Literate	0.272	(0.081)**
Primary School	0.276	(0.055)**
High School	0.303	(0.060)**
Vocational School	0.121	(0.076)
Rural	-0.569	(0.032)**
Constant	-1.739	(0.190)**
Number of Obs.		47,884
R-squared		0.14
Log pseudo-likelihood		-6,235.369

There are 47,884 household clusters in the probit model.

Standard errors in parentheses.

* significant at 5%; ** significant at 1%

(1) The omitted variables are not having coverage in the health insurance category and being a university graduate in the education category.

Unemployment risk is higher for young household heads, but it decreases with age and it is observed that female household heads have a higher unemployment risk compared to male household heads as expected. Household heads, who have from compulsory health insurance coverage, have a lower unemployment risk. It is observed that an employment opportunity in the registered economy provides both job-security and compulsory health insurance coverage. Moreover, university graduates have a lower unemployment risk compared to other education categories except for vocational school (Table 2). The probability of being unemployed in the next period is predicted from the probit model and utilised in the approximation of the first labour income risk variable (*LIRI*). The predicted probability of being unemployed in the next period is interacted with the square of the logarithm of the individual disposable income, as shown in equation (6).

Job-loss is defined as the situation, when the individual was employed in the previous year, but he/she is not working and actively searching for a job in the survey month. In other words, the individual lost his/her job recently. It is observed that there are 2,806 individuals, who lost their jobs in the survey year and constitute 2.5 % of the labour force in the pooled sample. The econometric results from the probit model for job-loss risk

are similar to the econometric results from the probit model for unemployment risk (Table 3). The probability of one's losing his/her job is estimated using a pooled probit model by controlling for clustering within the household for 47,884 household heads, who are between the ages of 15 and 64 (Table 3). Unpaid family workers and retired individuals are excluded from the sample as previously. The predicted probability of job-loss from the probit model is interacted with the square of the logarithm of the individual disposable income to generate the second labour income risk (*LIRII*), as shown in equation (6).

Table 3 – Job-Loss Risk of the Household Heads (1)

	Pooled Sample, Cluster (Household)	
	Unemployed	
	Coef.	*Std. Err.*
Female	-0.077	(0.084)
Age Group	0.190	(0.057)**
Age Group Squared	-0.014	(0.004)**
Health Insurance Coverage		
Compulsory	-0.863	(0.035)**
Voluntary	-0.195	(0.108)
Green-card	0.025	(0.040)
Education Level		
Illiterate	0.299	(0.095)**
Literate	0.390	(0.090)**
Primary School	0.281	(0.065)**
High School	0.280	(0.071)**
Vocational School	0.111	(0.089)
Rural	-0.389	(0.034)**
Constant	-2.192	(0.226)**
Number of Obs.		47,884
R-squared		0.12
Log pseudo-likelihood		-4,624.8553

There are 47,884 household clusters in the probit model.

Standard errors in parentheses.

* significant at 5%; ** significant at 1%

(1) The omitted variables are not having coverage in the health insurance category and being a university graduate in the education category.

III.3 – The Prediction of the Permanent Income Variable

The estimation of the permanent component of individual disposable income is realised following the seminal contributions of King and Dicks-Mireaux (1982) and Kazarosian (1997). Permanent income, which is denoted by Y_i^P is dependent on the individuals' social and demographic characteristic properties, which are shown by the Z_i matrix in the next equation (7). In this equation, δ_i is the individual-specific error component

and it is assumed that it has zero mean and constant variance ($\delta_i \sim N(0, \sigma_\delta^2)$). Thus, permanent income is annual individual disposable income, which does not include the transitory component, and it is evaluated at the same age for every individual.

$$Y_i^P = \alpha_i + \sum_{k=1}^{K} \beta_k \mathrm{Z}_i + \delta_i \tag{7}$$

Individual disposable income, which is denoted by E_i, is the sum of permanent income and age-income profile of the individual, $g(A_i)$, and the transitory component, μ_i, in the next equation (8). There are two main differences between individual disposable income and permanent income. First, the age-income profile of the young individuals is generally steeper than older individuals over the life-cycle. The second important source of differentiation is the transitory component of income, which is shown by μ_i in equation (8). It is assumed that μ_i has zero mean and constant variance σ_μ^2 and finally, it is not correlated with δ_i.

$$E_i = \alpha_i + \sum_{k=1}^{K} \beta_k \mathrm{Z}_i + g\left(A_i\right) + \mu_i + \delta_i \tag{8}$$

The proxy variable for permanent income is approximated by obtaining the fitted values from the regression of the household heads' disposable income on their social and demographic characteristic properties. The acquired fitted values are considered as the permanent component of household heads' disposable income and used as a proxy variable for household permanent income in the household saving equations. However, there are important difficulties in the estimation of the permanent component of income. First of all, the TURKSTAT Household Budget Surveys do not have a panel dimension, which limits the scope of the empirical analysis. There are certain disadvantages of analysing repeated cross-sectional surveys compared to having a panel data set as indicated by Kazarosian (1997). For instance, the income profile is biased downwards in a cross-section estimation, since the income level of old individuals is downward biased with respect to the future income level of young individuals. Second, there are many household heads, who have a positive income level despite the fact that they do not participate in the labour market. It is observed that a significant percentage of household heads –

20,930 observations, which make up 26.7 % of the pooled sample set – derive their disposable income from alternative sources rather than the labour market. Finally, there are a small number of household heads, who do not report any income, since they are either unpaid family workers or unemployed.

The presence of *censored* observations in the pooled sample creates obstacles in the estimation of the permanent component of income. This situation might also lead to a sample-selection bias in the estimation process. In order to overcome this problem, the permanent component of income is developed by analysing individual disposable income with the Heckman two-step selection model (Heckman, 1979). The first stage of the model is a probit model and the selection criterion is a dummy variable, which equals one, if the household head has a positive income level. In the second stage of the model, individual disposable income is regressed on the dummy variables for gender, education level, employment sector, job-status, occupation, social security coverage and finally, sector distribution in the economy. In addition, time dummy variables for the survey years are included in both stages of the estimation.

The Heckman two-step selection model is estimated for household heads, who are between the ages of 20 and 64. Moreover, unpaid family workers, who constitute a very small percentage of the sample, are excluded from the estimation. There are 67,771 household head observations in the pooled sample after the restrictions, but only 925 of them are censored observations. The fitted values from the Heckman two-step selection model are saved and used as the permanent component of current income (Table 4).[10]

The second stage of the Heckman two-step selection model is similar to a Mincerian earnings function, which explores the relationship between the income level and the human capital of the individual. It is observed that the level of education raises both the probability of having positive income and the income level of the individuals. The regression coefficient of the Inverse Mills Ratio (*lambda*) is statistically significant at 1 % confidence level, which confirms the application of the Heckman two-stage least squares estimation technique. The permanent component of individual disposable income is predicted from the Heckman two-step selection model only for household heads, who participate in the labour market and gain labour income and for those, who do not participate in the labour market, but have disposable income from other sources.

[10] Moreover, it is strongly recommended to have at least one variable in the first stage probit model, which is not included in the second stage OLS regression in the Heckman two-step selection model. The variables that are included in the first stage probit model, but excluded from the second stage OLS regression are essentially instruments. The dummy variables for health insurance coverage of the household head are considered as valid instruments due to their direct relationship with labour force participation choices. Therefore, the dummy variables for health insurance coverage of the household head are included in the first stage probit model, but they are not included in the second stage OLS regression.

Table 4 – The Estimation of Individual Permanent Income (1) (2)

	Heckman selection model – two-step estimates (regression model with sample selection)			
	Probit Model		*OLS Regression*	
	Positive Income		*Annual Disposable Income*	
	Coef.	*Std. Err.*	*Coef.*	*Std. Err.*
Female	-0.607	(0.036) **	533.415	(137.277) **
Education Level				
Illiterate	-1.049	(0.103) **	-5840.427	(304.403) **
Literate	-0.864	(0.105) **	-6425.718	(276.522) **
Primary School	-0.454	(0.096) **	-6166.957	(225.000) **
High School	-0.290	(0.105) **	-4342.715	(230.633) **
Vocational School	-0.167	(0.128)	-4344.755	(234.298) **
Health Insurance Coverage				
Compulsory	0.678	(0.033) **		
Voluntary	0.108	(0.114)		
Green-card	0.128	(0.045) **		
Employment Sector				
Industry			-265.819	(200.810)
Construction			502.888	(157.318) **
Services			-502.896	(154.063) **
Job-Status				
Manager			4961.433	(237.302) **
Professional			2547.424	(195.860) **
Sales Personal			620.988	(76.735) **
Farmer			637.154	(212.757) **
Skilled Worker			978.568	(70.649) **
Occupation				
Salary Earner			1453.196	(141.657) **
Employer			10766.060	(423.928) **
Self-Employed			2904.666	(183.716) **
Sector of the Economy				
Private Sector			8.257	(107.971)
State-owned Enterprise (SoE)			4101.932	(273.686) **
Rural	0.378	(0.038) **	-1272.384	(86.572) **
Constant	2.294	(0.102) **	11078.790	(220.957) **

Standard errors in parentheses, * significant at 5%; ** significant at 1%

(1) The standard errors are estimated using the bootstrap method with 1,000 replications.

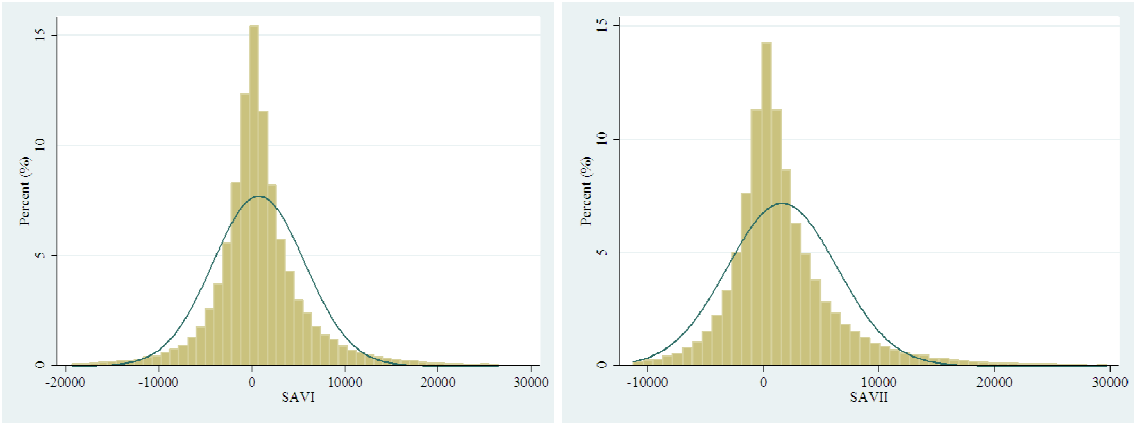
(2) The omitted dummy variables are being a university graduate in the education category, not having coverage in the health insurance category, agriculture in the employment sector category, unskilled worker in the job-status category, wage earner in the occupation category, not having social security coverage and finally, being a public sector employee in the Heckman two-step selection model.

IV. Econometric Results

Households may under-report their disposable income for various reasons, which is observed in many developing country examples, while household consumption expenditures are collected in a detail manner. Thus, household saving is under-estimated, since it is calculated as the residual between household disposable income

and consumption expenditures (Deaton, 1997). Rijckeghem and Üçer (2009) argue that household saving levels are questionably negative for several observations. In addition to that, Yükseler and Türkan (2008) claim that the TURKSTAT Household Budget Surveys fail to observe individual interest and rent income accurately. For this reason, the lowest and highest 1 % quintiles of household saving variables (*SAVI* and *SAVII*) are trimmed out to remove potential outliers from the sample. Household units, which are composed of individuals, who are living together, and families, whose household head is an unpaid family worker are also excluded from the sample. Finally, the econometric regressions are performed for families, whose household head's age is between 20 and 64. The resulting distributions of household saving variables (*SAVI* and *SAVII*) are presented in Figure 1.

Figure 1 – The Distributions of Household Savings



The labour income risk variables (*LIRI* and *LIRII*) are regressed on both definitions of household saving (*SAVI* and *SAVII*) using pooled OLS regressions and the econometric results are presented in Table 5 and Table 6. The econometric results of the pooled OLS regressions are similar for both definitions of household saving. The pooled OLS regressions on household saving, which includes expenditures on durable goods (*SAVII*), have a higher explanatory power compared to the first definition of household saving (*SAVI*). It is observed that the regression coefficient of household permanent income is positive and statistically significant at 1 % significance level in all estimations. Moreover, the regression coefficients of the labour income risk variables (*LIRI* and *LIRII*) have the expected positive signs and they are statistically significant at 1 % significance level (Table 5 and Table 6). Therefore, the econometric results are in favour of the precautionary saving hypothesis.[11]

[11] Moreover, labour income risk and household permanent income are generated variables, which are predicted using auxiliary regressions at the previous stages of the empirical analysis. Therefore, the standard errors of the pooled OLS regressions are estimated using the bootstrap method with 1,000 replications.

Table 5 – Pooled OLS Regressions using Labour Income Risk I (1) (2)

$$S_h = \alpha_h + \beta \hat{Y}_h^P + \lambda \tilde{U}_{hh} + \sum_{k=1}^{K} \vartheta_k Z_h + u_h$$

	SAVI			*SAVII*		
Permanent Income	0.220	0.211	0.212	0.264	0.254	0.253
	(0.009)**	(0.010)**	(0.009)**	(0.010)**	(0.010)**	(0.010)**
Labour Income Risk I	$133.3 * 10^{-6}$	$135.4 * 10^{-6}$	$119.9 * 10^{-6}$	$192.4 * 10^{-6}$	$195.3 * 10^{-6}$	$193.3 * 10^{-6}$
	$(15.1 * 10^{-6})$**	$(15.3 * 10^{-6})$**	$(17.4 * 10^{-6})$**	$(20.0 * 10^{-6})$**	$(19.6 * 10^{-6})$**	$(21.9 * 10^{-6})$**
Female	-179.646	-116.807	-115.927	-184.786	-109.815	-108.282
	(91.762)	(92.528)	(92.919)	(85.305)*	(86.404)	(86.992)
Age-group	-29.099	-203.658	-196.669	34.371	-180.836	-178.457
	(70.055)	(67.526)**	(70.845)**	(65.270)	(67.685)**	(66.537)**
Age-group Squared	12.246	20.085	19.649	10.972	20.672	20.503
	(4.294)**	(4.142)**	(4.325)**	(4.046)**	(4.151)**	(4.113)**
Literate	413.834	392.531	395.253	469.046	443.766	444.196
	(96.839)**	(98.214)**	(101.534)**	(87.176)**	(90.559)**	(89.828)**
Primary School	488.480	480.834	484.282	691.179	681.102	682.525
	(70.599)**	(69.144)**	(75.203)**	(66.578)**	(68.503)**	(67.171)**
High School	334.349	413.668	418.792	631.234	728.054	730.120
	(93.204)**	(92.413)**	(95.578)**	(88.086)**	(87.091)**	(85.684)**
Vocational School	409.855	471.157	475.705	956.273	1,028.759	1,031.197
	(116.428)**	(111.188)**	(112.131)**	(103.259)**	(98.925)**	(98.275)**
University	603.267	608.487	610.104	1,477.569	1,485.239	1,484.742
	(125.391)**	(119.500)**	(123.908)**	(114.754)**	(109.635)**	(106.697)**
Additional Employment		93.702	37.309		134.970	51.884
		(76.040)	(96.749)		(65.850)*	(106.896)
Multiple Income Earner		1,255.849	1,194.789		1,528.577	1,537.503
		(43.089)**	(72.747)**		(41.871)**	(81.698)**
LIRI – AE			$24.9 * 10^{-6}$			$37.4 * 10^{-6}$
			$(35.3 * 10^{-6})$			$(46.2 * 10^{-6})$
LIRI – MIE			$32.6 * 10^{-6}$			$-4.14 * 10^{-6}$
			$(35.2 * 10^{-6})$			$(44.6 * 10^{-6})$
Rural	524.277	324.200	327.576	496.714	251.440	256.606
	(48.692)**	(50.070)**	(52.754)**	(50.983)**	(54.234)**	(49.820)**
Constant	-2,671.108	-2,300.240	-2,312.440	-3,458.026	-2,999.090	-3,000.880
	(335.892)**	(344.126)**	(330.859)**	(320.934)**	(332.843)**	(323.800)**
Number of Obs.	65,712	65,712	65,712	65,756	65,756	65,756
Adj. R-squared	0.10	0.11	0.11	0.20	0.22	0.22

Standard errors in parentheses.

* significant at 5%; ** significant at 1%

(1) The standard errors are estimated using the bootstrap method with 1,000 replications.

(2) Dummy variables for family type, home-ownership status, household head's employment sector and social security coverage and time dummies for the survey years are also included in the regressions.

According to the econometric results, when the elasticity of uncertainty is calculated at the sample means, *ceteris paribus*, it is observed that a 10 % rise in the first approximation of labour income risk (*LIRI*) leads to an increase of 3.3 % in the first definition of household saving (*SAVI*) and an increase of 2.2 % in the second definition of household saving (*SAVII*). In addition to that a 10 % rise in the second approximation of

labour income risk (*LIRII*) leads to an increase of 3.5 % in the first definition of household saving (*SAVI*) and an increase of 2.3 % in the second definition of household saving (*SAVII*). It is possible to interpret the increase in household saving due to a rise in labour income risk as precautionary saving. Moreover, these percentages indicate that households postpone their consumption and increase their saving amount against labour income risk considerably, since a 10 % increase in the labour income risk is actually a modest rise. Thus, the econometric results are similar to the findings of Guariglia (2001) and also Guariglia and Kim (2003 and 2004).[12]

Moreover, it is observed that household expenditures on durable goods are negatively affected from labour income risk as in Carroll *et al.* (2003) and Benito (2006). However, the estimated increases in the second definition of household saving (*SAVII*) due to a 10 % rise in the labour income risk variables (*LIRI* and *LIRII*) are lower than the increases in the first definition of household saving (*SAVI*) in the pooled OLS regressions, contrary to the findings of Carroll *et al.* (2003). At this point, it is safe to assume that families are also deterred from house purchases, which is not included in the second definition of household saving (*SAVII*), due to labour income risk in Turkey.

Moreover, it is thought that households implement alternative strategies to protect themselves against labour income risk, if it is not possible to accumulate savings for precautionary purposes. They might try and increase their income sources, which will diminish the negative effects of the household head's labour income risk. Tansel (1992) and Kochar (1999) demonstrated that farmers shift their labour from agriculture to the related sectors of the economy to smooth their income streams to smooth their consumption expenditures in the rural regions. Moreover, Guariglia and Kim (2004) observed that households use moonlighting as a self-insurance mechanism against future labour income uncertainty in Russia. Nevertheless, it is observed that the dummy variable for the additional employment of the household head is not statistically significant, while the dummy variable for the presence of multiple income earners in the household is statistically significant in the pooled OLS regressions. Moreover, the interaction terms between additional employment and multiple income earners and the labour income risk variables are not statistically significant in the pooled OLS regressions (Table 5 and Table 6).

The presence of multiple income earners in the household makes a positive contribution to household saving, even if it does not reduce the statistical significance and the size of the household head's labour income

[12] I restricted the sample set to households only from the urban regions of the country to check the robustness of the econometric results. The econometric results for the restricted sample are very similar to the results presented in the paper. Moreover, I observed that the calculated elasticity of uncertainty and its effect on household saving decisions remains the same, even when the sample set is restricted to households from the urban regions of the country. The main difference between urban and rural regions of the country is the situation of unpaid family workers, who are mostly employed in the agriculture sector, but these observations are already removed from the sample set.

risk. It is observed that household size decreases continuously both in the urban and the rural regions over the years in Turkey. Despite this fact, traditional and extended families constitute 18 % all households even in 2009. The labour force participation rate of children, who are at the working age, is actually higher than spouses. Thus, it is thought that young family members work and support family income provided that they can find a job.

Table 6 – Pooled OLS Regressions using Labour Income Risk II (1) (2)

$$S_h = \alpha_h + \beta \hat{Y}_h^P + \lambda \tilde{U}_{hh} + \sum_{k=1}^{K} \vartheta_k Z_h + u_h$$

	SAVI			*SAVII*		
Permanent Income	0.215	0.206	0.207	0.259	0.248	0.247
	(0.010)**	(0.010)**	(0.010)**	(0.010)**	(0.010)**	(0.010)**
Labour Income Risk II	226.3 * 10^{-6}	229.8 * 10^{-6}	215.7 * 10^{-6}	319.2 * 10^{-6}	323.8 * 10^{-6}	337.5 * 10^{-6}
	(25.7 * 10^{-6})**	(25.7 * 10^{-6}) **	(28.8 * 10^{-6})**	(33.9 * 10^{-6})**^{6}	(33.6 * 10^{-6})**^{6}	(36.1 * 10^{-6})**
Female	53.831	120.279	118.520	149.279	229.051	232.005
	(91.668)	(91.538)	(92.402)	(84.548)	(86.324)**	(84.270)**
Age-group	-35.840	-210.468	-211.028	37.491	-177.643	-181.068
	(70.519)	(67.222)**	(70.770)**	(65.683)	(68.405)**	(67.279)**
Age-group Squared	13.923	21.778	21.844	12.577	22.291	22.508
	(4.350)**	(4.148)**	(4.364)**	(4.113)**	(4.242)**	(4.214)**
Literate	425.650	404.667	404.554	487.881	463.017	462.620
	(96.383)**	(98.035)**	(101.359)**	(87.061)**	(90.794)**	(89.987)**
Primary School	561.272	554.993	553.588	798.162	789.870	789.423
	(69.810)**	(67.868)**	(74.836)**	(64.953)**	(66.976)**	(66.166)**
High School	440.639	521.912	519.706	788.978	888.371	887.679
	(92.360)**	(90.566)**	(94.811)**	(87.256)**	(86.241)**	(85.731)**
Vocational School	518.973	582.315	580.254	1,116.401	1,191.564	1,192.707
	(115.756)**	(111.353)**	(112.421)**	(104.484)**	(99.235)**	(99.142)**
University	743.476	750.932	747.311	1,674.971	1,685.582	1,689.494
	(126.209)**	(121.290)**	(125.253)**	(117.732)**	(113.483)**	(112.497)**
Additional Employment		87.067	123.315		127.837	169.448
		(76.256)	(110.006)		(66.163)	(124.077)
Multiple Income Earner		1,258.222	1,206.508		1,530.994	1,559.014
		(43.353)**	(78.069)**		(41.470)**	(85.064)**
LIRII – AE			-23.9 * 10^{-6}			-26.1 * 10^{-6}
			(61.5 * 10^{-6})			(77.8 * 10^{-6})
LIRII – MIE			43.0 * 10^{-6}			-23.4 * 10^{-6}
			(61.0 * 10^{-6})			(72.5 * 10^{-6})
Rural	503.940	(75.027)**	301.842	461.236	215.907	215.386
	(47.110)**	303.922	(51.307)**	(48.708)**	(51.970)**	(47.064)**
Constant	-2,703.620	(48.489)**	-2,324.058	-3,540.512	-3,083.800	-3,081.091
	(336.225)**	-2,334.306	(329.936)**	(318.017)**	(330.396)**	(324.884)**
Number of Obs.	65,712	65,712	65,712	65,756	65,756	65,756
Adj. R-squared	0.10	0.12	0.12	0.20	0.22	0.22

Standard errors in parentheses.

* significant at 5%; ** significant at 1%

(1) The standard errors are estimated using the bootstrap method with 1,000 replications.

(2) Dummy variables for family type, home-ownership status, household head's employment sector and social security coverage and time dummies for the survey years are also included in the regressions.

However, unemployment insurance is not widespread, since its application conditions are very strict.[13] Only individuals, who worked in the registered economy and paid their social security premiums regularly for a sufficient amount of time, can apply for unemployment benefits. On the other hand, these workers have a lower level of unemployment risk compared to individuals, who work in the unregistered economy without formal employment contracts. As a result, the percentage of unemployed individuals, who benefit from unemployment insurance, is quite low. Therefore, households remain vulnerable against labour income risk, which underlines the need for a satisfactory social security system.

V. Conclusion

The empirical analysis reveals that the precautionary motive for saving is quite significant for Turkish households. The estimated increases in household saving due to labour income risk are sizeable in comparison to the current trends in the household saving ratios. It is observed that households implement alternative strategies such as increasing the number of income earners within the family to smooth consumption patterns, if it is not possible to raise household saving level further for precautionary reasons. However, they still remain vulnerable against labour income risk. Consequently, there are challenging policy implications with regards to the labour market situation. It is necessary to implement a comprehensive public policy to decrease the high unemployment ratio among young university graduates. At the same time, it is required to reform the social security system to care for the segment of the labour force, which is in the unregistered economy. Finally, the positive relationship between permanent income and household saving indicates that a growth policy, which stimulates investment and employment, will contribute to the rise of household saving level in Turkey.

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[13] It is observed that the total number of individuals that benefit from unemployment insurance is only 362, when there are 9,666 unemployed people out of 112,205 individuals in the labour force.

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